PLANNING COMMISSION AGENDA

July 12, 2012

PLANNING COMMISSION MEETING – 7:00 P.M.

CITY OF MORENO VALLEY
City Hall Council Chambers
14177 Frederick Street
Moreno Valley, California 92553

CALL TO ORDER

ROLL CALL

PLEDGE OF ALLEGIANCE

APPROVAL OF AGENDA

PUBLIC ADVISED OF THE PROCEDURES TO BE FOLLOWED IN THE MEETING

(ON DISPLAY AT THE REAR OF THE ROOM)

COMMENTS BY ANY MEMBER OF THE PUBLIC ON ANY MATTER WHICH IS NOT LISTED ON THE AGENDA AND WHICH IS WITHIN THE SUBJECT MATTER JURISDICTION OF THE COMMISSION

The City of Moreno Valley complies with the Americans with Disabilities Act of 1990. If you need special assistance to participate in this meeting, please contact Mel Alonzo, ADA Coordinator at (951) 413-3027 at least 48 hours prior to the meeting. The 48-hour notification will enable the City to make arrangements to ensure accessibility to this meeting.

NON-PUBLIC HEARING ITEMS

APPROVAL OF MINUTES

PUBLIC HEARING ITEMS

1.

Case Number:	P11-090, PA09-0004, and PA09-0022
Case Description:	Plot Plan and Tentative Parcel Map 36162 for development of a 1.6 million square foot warehouse facility on approximately 80 acres. Certification of an Environmental Impact Report is required for approval of this project.
Case Type:	Environmental Impact Report, Plot Plan for a 1.6 million square foot warehouse, and Tentative Parcel Map 36162
Applicant:	Vogel Engineers, Inc.
Owner:	Vogel Engineers, Inc.
Representative:	RKZ, Inc.
Location:	The project is located within the Moreno Valley Industrial Area Plan (SP 208) at the City's southern boundary, between Perris Boulevard and Indian Street and between Grove View Road and the Perris Valley storm channel.
Proposal:	The project is generally described as a Plot Plan (PA09-0004) for development of a 1,616,133 square foot warehouse distribution building on a 71.13 net acre site. The building includes 268 dock high doors and 44,000 square feet of office area in four potential office locations. Tentative Parcel Map No. 36162 (PA09-0012) is proposed to combine four existing parcels into a single parcel for development of the 1.6 million square warehouse distribution facility. Certification of an Environmental Impact Report is required for approval of this project.
Case Planner:	Jeff Bradshaw

1. **APPROVE** Resolution No. 2012-16 and thereby: **CERTIFY** that the Environmental Impact Report (EIR) for the VIP Moreno Valley Project has been completed in compliance with the California Environmental Quality Act; and,

2. **APPROVE** Resolution No. 2012-17 and thereby: **APPROVE** PA09-0004 (Plot Plan) and PA09-0012 (Tentative Parcel Map

36162), subject to the attached conditions of approval included as Exhibits A and B.

2. Case Number: PA11-0013
Case Description: Modify specific sections of the Municipal Code necessary to adopt Reach Codes.
Case Type: Development Code Amendments
Applicant: City of Moreno Valley
Owner: Same as above
Representative: Same as above
Location: Citywide
Proposal: Modify Title 9 of the Municipal Code for energy efficiency measures equal to and above current 2011 California Green Building Code standards necessary to adopt Reach Codes, including the modification of Section 9.05.040, "Industrial Site Development Standards", Section 9.17.030 "Landscape and Irrigation Design", Section 9.11.040 "Off Street Parking Requirements", Section 9.03.040 "Residential Site Development Standards, Section 8.80.020 "Waste Diversion Requirements" and Section 8.80.030 Waste Management Plan".
Case Planner: Mark Gross

Recommendation:

APPROVE Resolution No. 2012-13 and thereby **RECOMMEND** that the City Council:

1. **RECOGNIZE** that the proposed Municipal Code Amendments are exempt from the California Environmental Quality Act (CEQA) Guidelines pursuant to Sections 15061 of the CEQA Guidelines; and,

2. **APPROVE** PA11-0013 to amend the Municipal Code to include various Municipal Code modifications and additions to allow for the adoption of Reach Codes (Attachment 2).

OTHER BUSINESS

STAFF COMMENTS

PLANNING COMMISSIONER COMMENTS

ADJOURNMENT

PLANNING COMMISSION STAFF REPORT

Case:	PA09-0004 – Plot Plan PA09-0012 – Tentative Parcel Map No. 36162 P11-020 – Environmental Impact Report
Date:	July 12, 20112
Applicant:	Vogel Engineers, Inc.
Representative:	RKZ, Inc.
Location:	South side of Grove View Road between Perris Boulevard and Indian Street at the City's southern boundary, in the Moreno Valley Industrial Area Plan (SP 208),
Proposal:	Plot Plan for a 1,616,133 square foot warehouse distribution building to be developed on approximately 80 acres. The building includes 268 dock high doors and 44,000 square feet of office area in four potential office locations. Tentative Parcel Map No. 36162 proposes to combine four existing parcels into a single 80 acre parcel for development of the project. An Environmental Impact Report has been prepared for the project.
Recommendation:	Approval

SUMMARY

This project proposes the development of a 1,616,133 square foot warehouse facility on approximately 80 acres. The project also requires approval of a tentative parcel map, and certification of a Final Environmental Impact Report (EIR).

PROJECT DESCRIPTION

The applicant, Vogel Engineers, Inc. has submitted three applications for development of the VIP Moreno Valley Project, which include a plot plan, a tentative parcel map, and an EIR, in order to develop a 1,616,133 square foot warehouse facility on an approximate 80 acre site (Assessor's Parcel Numbers 316-210-071, -073, -075 and -076) located in the Moreno Valley Industrial Area Plan (SP 208), south side of Grove View Road between Perris Boulevard and Indian Street at the City's southern boundary.

Plot Plan

The Plot Plan is for a 1,616,133 square foot warehouse distribution facility. The warehouse facility is a permitted use in the Industrial zone of the Moreno Valley Industrial Area Plan (SP #208). The east and west elevations of the building are set back 125 from the property line along Perris Boulevard and Indian Street while the truck courts on the north elevation is set back 271 feet from the property line along Grove View Road and the south truck court is set back 261 feet from the Perris Valley Storm Channel.

The warehouse facility includes 268 loading docks with roll-up doors, truck staging and parking areas for 368 trailers within the enclosed truck court, two office areas and 589 parking spaces for employees and visitors. Proposed parking exceeds the City's requirements for trucks (1 per loading dock) and meets the employee/visitor parking for a warehouse use.

The loading and truck parking areas have been placed on the northern and southern elevations of the building. The truck courts are screened by perimeter concrete tilt-up walls on the north, east and west. A chain link fence with slats shall be provided along the project's southern property line to screen the truck loading and parking area from the Perris Valley Storm Channel, as permitted by the Specific Plan.

The project has been conditioned to provide standard parking lot and setback landscape to include ground cover, shrubs and trees. The project's Perris Boulevard, Indian Street and Grove View Road will be developed with standard curb, gutter, parkway, and sidewalk.

Tentative Parcel Map

Tentative Parcel Map No. 36162 is proposed to combine the four parcels located within the project site into a single parcel of approximately 80 acres, as well as provide all required street dedications and utility easements.

Site

The project site is currently vacant, consisting of gently sloping land that has been used historically for agricultural purposes but currently lies fallow. It was most recently used as a sod farm that ceased operating in August 2005. The major roads that provide access to the project site are Perris Boulevard, Indian Street, Grove View Street, and Harley Knox Boulevard, with the nearest I-215 interchanges at Harley Knox Boulevard and the Ramona Expressway.

Surrounding Area

The project is located in an area of predominately industrial land uses within the Moreno Valley Industrial Area Plan (SP #208). Land uses to the north include a Waste Management facility and a 426,700 square foot warehouse building. Land uses to the west include the 360,440 square foot i-Herb warehouse building, approximately 20 acres of vacant Industrial zoned land and a site currently used for container storage.

Further to the west is the southern approach to the runways at March Air Reserve Base. Land uses to the east include a ministorage facility, the approximately 255,000 square foot Masonite Door factory, and the approximate 1.2 million square foot Ross Dress For Less distribution facility.

The project site is located at the southerly City limits with a mixture of vacant Industrial zoned land and developed distribution land uses within the City of Perris on the south side of the Perris Valley Storm Drain.

Access

Access to the project site will be provided via two driveways on Indian Street, three driveways on Grove View Road, and two driveways on Perris Boulevard. The northern driveway on Perris Boulevard will be for passenger vehicle and emergency access only. The southern driveway on Perris Boulevard will align with the existing signalized intersection at the Ross Distribution Warehouse entrance. The north project driveway on Indian Street will be for passenger vehicle and emergency access only; all other driveways will be used by both passenger vehicles and trucks. The project is anticipated to be constructed by the year 2013.

The driveways and interior drive aisles associated with the project have been approved by the Fire Prevention Bureau for fire truck access and turnaround. The site has also been designed for adequate truck maneuvering and turnaround within the designated loading zones located on the north and south elevations of the building.

Design

Site design of the proposed warehouse distribution facility is consistent with requirements of the City's Municipal Code and the Moreno Valley Industrial Area Plan (SP #208).

The architectural design of the building is a concrete tilt-up construction. Building and wall colors include earthtones, with varying amounts of accent colors and vertical features to break up the architecture of building. Roof top equipment will be screened from public view by parapet walls.

Staff worked with the applicant to ensure that all sides of the building include architectural treatment. The loading bays and trailer storage areas along the northern and southern elevations have been screened from view. The screen wall along the north elevation is a fourteen (14) foot wall of concrete tilt-up construction which will match the building design and colors.

Landscaping for the site is proposed at around 9.5% of the site. The City's Municipal Code does not require a minimum percentage of landscape on a site. Instead, there are requirements for landscape setback areas along perimeter streets, parking lot landscape, street trees and landscape treatments around the perimeter of the buildings where visible from the public right-of-way. The project as designed meets the City's current landscape criteria.

Signs are not a part of this approval and will be reviewed and approved under separate administrative permit.

REVIEW PROCESS

In the review of this project, consideration was given to the potential impact to surrounding land uses by the proposed Plot Plan for the warehouse facility.

Upon review at PRSC in March 2009, modifications were required to the site plan. Comments from staff included revisions to the layout of the parking lot, access from adjacent roads, screening, architecture, typical street sections, grading and the submittal of required environmental and technical studies.

Subsequent PRSC reviews occurred in June and December 2009. The project then went inactive for a period of time.

In 2011, the applicant began working again with the City to address potential environmental concerns. Project technical studies were updated and staff determined that an environmental impact report was required pursuant to the California Environmental Quality Act (CEQA). An application for an environmental impact report was subsequently submitted.

Upon review of a final draft of the site plan and completion of the draft Final Environmental Impact Report, a determination was made to schedule this project for a Planning Commission public hearing on May 12, 2012.

ENVIRONMENTAL

Initial Study/Notice of Preparation

An Initial Study was completed after all discretionary applications were deemed complete. Based on the information within the Initial Study, an Environmental Impact Report (EIR) was recommended to be prepared. A Notice of Preparation for the EIR was prepared, with the public comment period beginning on August 26, 2011 and ending on September 26, 2011. A public meeting to receive input on the issues to be covered by the EIR was held at City Hall on September 19, 2011.

Draft Environmental Impact Report

Subsequent to that meeting, draft environmental documents were prepared by the applicant's consultant LSA Associates, Inc. and submitted to the City and its peer consultant for review.

City staff and the peer review consultant reviewed the draft environmental documents for compliance with the California Environmental Quality Act (CEQA) Guidelines and required revisions to address identified questions and concerns. After revisions were incorporated into the document, the Draft EIR was circulated for a 45-day public review period, starting on April 20, 2012, and ending on June 4, 2012.

The Draft EIR was sent to all required State and local agencies and numerous interested parties on April 19, 2012, as well as to the City's Environmental and Historical Preservation Board. Eight comment letters were provided during the 45-day review period. An additional two letters were received after the end of the review period.

Final Environmental Impact Report

Responses to the eight comments received during the 45 day review period are included in the Response to Comments. Comment letters were received after the comment period from Eastern Municipal Water District (EMWD) and from the State Clearinghouse. These letters did not include comments on the project but were instead sent in recognition of the receipt of the Draft EIR. Responses to these letters were also provided and are included in the Final EIR.

The Response to Comments and related documents were mailed to all interested parties and responsible agencies on June 29, 2012, to allow for their review prior to Planning Commission hearing, to meet the notice period of 10 days required by CEQA. As was the case with the Draft EIR, the draft Final EIR was provided for public review at City Hall, the City Library and posted on the City's website.

Significant and Unavoidable Impacts

Analysis presented in the EIR indicates that the proposed project will have a number of potentially significant impacts, either as direct result of the proposed project or cumulatively with other proposed projects on agricultural resources, air quality, climate change, and traffic. The EIR includes a number of proposed mitigation measures to reduce or eliminate potential significant impacts. Even with proposed mitigation, a number of potential impacts cannot be reduced to a less than significant level. As identified in the document, these noted impacts above are considered to be significant and unavoidable.

Although impacts to agricultural resources, air quality, climate change and traffic cannot be reduced to less than significant levels, CEQA allows a decision making body to consider a statement of overriding considerations and findings. CEQA requires the decision making agency to balance the economic, legal, social, technological or other benefits of a proposed project against its unavoidable environmental impacts when determining whether to approve the proposed project. This would include project benefits such as the creation of jobs or other beneficial project features versus project impacts that cannot be mitigated to less than significant levels. If the decision making body determines that the benefits of a proposed project outweigh the unavoidable adverse environmental effects, it may approve a statement of overriding considerations and approve the project.

Mitigation Measures

The EIR includes mitigation measures intended to reduce project-specific and cumulative impacts for Air Quality, Biological Resources, Cultural Resources, Geology and Soils, Greenhouse Gas Emissions and Global Climate Change, Hydrology and Water Quality, Noise, and Traffic and Circulation. All other environmental effects evaluated in the EIR are considered to be less than significant without mitigation. With mitigation, anticipated impacts to Biological Resources, Cultural Resources, Geology and Soils, Hydrology and Water Quality and Noise are anticipated to be below significant thresholds.

Mitigation measures are included to reduce the environmental impacts where possible, even where the impacts could not be reduced to less than significant levels. All mitigation measures have also been included as conditions of approval for the project.

Approval and Certification

The Planning Commission will take public testimony on the EIR and project. Before the proposed project can be acted upon, the Planning Commission will need to review the final environmental document and either certify or reject the EIR and project Mitigation Monitoring Program.

NOTIFICATION

Public notice was sent to all property owners of record within 300' of the project. The public hearing notice for this project was also posted on the project site and published in the local newspaper. As of the date of report preparation, staff had received no public inquiries in response to the noticing for this project.

REVIEW AGENCY COMMENTS

Staff received the following responses to the Project Review Staff Committee transmittal; which was sent to all responsible reviewing agencies.

Agency	Response Date	Comments
Southern California Edison	February 25, 2009	No Issues
South Coast Air Quality District	February 25, 2009	Request to review AQ study
March Air Reserve Base	March 3, 2009	Verify project site and AICUZ
Riverside County Flood Control	March 12, 2009	District Master Plan Facilities
March JPA	March 18, 2009	AICUZ & Avigation Easement

Staff has coordinated with the responsible agencies listed above and where applicable, conditions of approval have been included to address concerns from the responding agencies.

STAFF RECOMMENDATION

Staff recommends that the Planning Commission take the following actions:

1. **APPROVE** Resolution No. 2012-016 **and CERTIFY** that the Environmental Impact Report (EIR) for the VIP Moreno Valley Project has been completed in compliance with the California Environmental Quality Act; and

2. **APPROVE** Resolution No. 2012-17 **APPROVING** Plot Plan PA09-0004 and Tentative Parcel Map 36162 (PA09-0012), subject to the attached conditions of approval included as Exhibits A and B.

Prepared by:

Jeff Bradshaw
Associate Planner

Approved by:

John C. Terell, AICP
Planning Official

ATTACHMENTS:

1. Public Hearing Notice
2. Planning Commission Resolution No. 2012-16
   Exhibit A – Statement of Overriding Considerations
   Exhibit B – Mitigation Monitoring Program
3. Planning Commission Resolution No. 2012-17
   Exhibit A - Plot Plan Conditions of Approval
   Exhibit B – Parcel Map Conditions of Approval
4. Final EIR
5. Draft EIR
6. Color Site Plan
7. Color Elevations
8. Color and Materials Board
9. Sight Line Exhibit
10. Conceptual Landscape Plan
11. Tentative Parcel Map 36162
12. Preliminary Grading Plan
13. Screenwall and Elevations
14. Aerial Photograph

Notice of
PUBLIC HEARING

This may affect your property. Please read.

Notice is hereby given that a Public Hearing will be held by the Planning Commission of the City of Moreno Valley on the following item(s):

CASE: PA09-0004 – Plot Plan
PA09-0012 – Tentative Parcel Map No. 36162
P11-020 – Environmental Impact Report

APPLICANT: Vogel Engineers, Inc.

OWNER: Vogel Engineers, Inc.

REPRESENTATIVE: RKZ, Inc.

LOCATION: Moreno Valley Industrial Area Plan (SP 208), south side of Grove View Road between Perris Boulevard and Indian Street at the City's southern boundary.

PROPOSAL: Plot Plan for a 1,616,133 square foot warehouse distribution building to be developed on approximately 80 acres. The building includes 268 dock high doors and 44,000 square feet of office area in four potential office locations. The project is located at the City's southern boundary on the north side of the Perris storm channel. Water quality features include five sandfilter basins and an infiltration swale. Tentative Parcel Map No. 36162 proposes to combine four existing parcels into a single 80 acre parcel for development of the project. An Environmental Impact Report has been prepared for the project.

ENVIRONMENTAL DETERMINATION: Environmental Impact Report

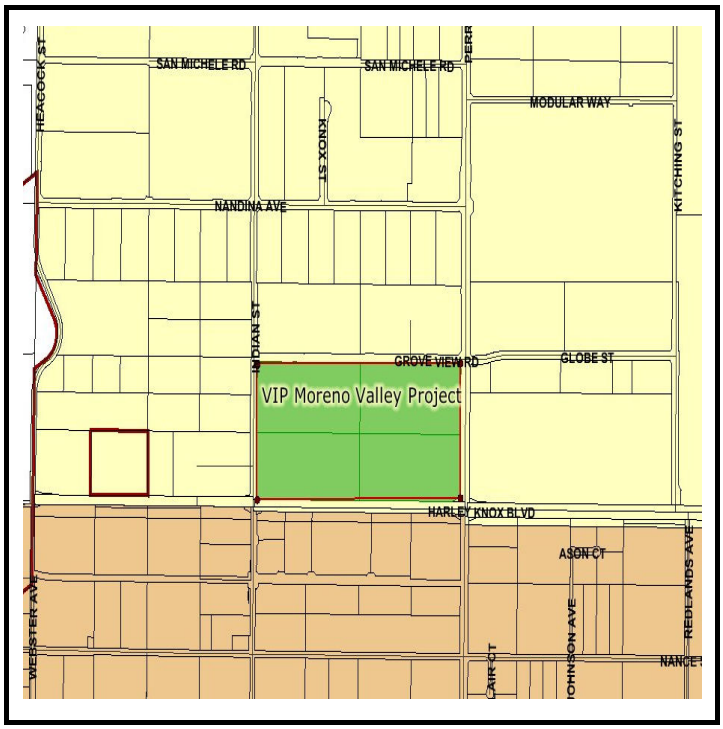
COUNCIL DISTRICT: 4

Any person interested in any listed proposal can contact the Community & Economic Development Department, Planning Division, at 14177 Frederick St., Moreno Valley, California, during normal business hours (7:30 a.m. to 5:30 p.m., Monday through Thursday) or may telephone (951) 413-3206 for further information. The associated documents will be available for public inspection at the above address.

In the case of Public Hearing items, any person may also appear and be heard in support of or opposition to the project or recommendation of adoption of the Environmental Determination at the time of the Hearing.

The Planning Commission, at the Hearing or during deliberations, could approve changes or alternatives to the proposal.

If you challenge any of these items in court, you may be limited to raising only those items you or someone else raised at the Public Hearing described in this notice, or in written correspondence delivered to the Planning Commission at, or prior to, the Public Hearing.



LOCATION N ↑

PLANNING COMMISSION HEARING

City Council Chamber, City Hall
14177 Frederick Street
Moreno Valley, Calif. 92553

DATE AND TIME: July 12, 2012 at 7:00 PM

CONTACT PLANNER: Jeff Bradshaw

PHONE: (951) 413-3224

ATTACHMENT 1

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RESOLUTION NO. 2012-16

A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF MORENO VALLEY, CALIFORNIA, CERTIFYING THE FINAL ENVIRONMENTAL IMPACT REPORT (P11-020), ADOPTION OF THE FINDINGS AND STATEMENT OF OVERRIDING CONSIDERATIONS, AND APPROVAL OF THE MITIGATION MONITORING PROGRAM FOR THE VIP MORENO VALLEY PROJECT, GENERALLY LOCATED IN THE MORENO VALLEY INDUSTRIAL AREA PLAN (SP 208), ON THE SOUTH SIDE OF GROVE VIEW ROAD BETWEEN PERRIS BOULEVARD AND INDIAN STREET AT THE CITY'S SOUTHERN BOUNDARY.

WHEREAS**,** on July 12, 2012, the Planning Commission of the City of Moreno Valley held a public hearing to consider the Environmental Impact Report and all related environmental documentation for the proposed project, which includes a Plot Plan for a 1,616,133 square foot distribution warehouse facility on approximately 80 acres. The warehouse building includes 268 dock doors and and 44,000 square feet of office area in four potential office locations. The project is located at the City's southern boundary on the north side of the Perris storm channel. Water quality features include five sandfilter basins and an infiltration swale. Tentative Parcel Map No. 36162 proposes to combine four existing parcels into a single 80 acre parcel for development of the project;

WHEREAS, the project includes applications for a plot plan (PA09-0004) and a tentative parcel map (PA09-0012). All the applications are related but shall not be approved unless the Environmental Impact Report (P11-020) is certified and approved.

WHEREAS, a Draft Environmental Impact Report (DEIR) was initially prepared for this project. Said DEIR was initially circulated for review on April 20, 2012, while the review period ended on June 4, 2012. A Final EIR, (including the Draft EIR and responses to comments), has been completed and is being recommended for certification, prior to the approval of discretionary permits related to the project.

WHEREAS, on June 29, 2012, the City published a notice in the local newspaper (Press Enterprise) and distributed copies of the Final EIR with complete responses to comments to the State Clearinghouse, local agencies and other interested parties;

WHEREAS, on July 12, 2012, the Planning Commission held a public hearing to consider a Final EIR for this project.

WHEREAS on July 12, 2012, the Planning Commission reviewed in full the Final EIR, the Statement of Overriding Considerations and Mitigation Monitoring Program;

WHEREAS**,** the draft and final EIR concerning the proposed VIP Moreno Valley Project were prepared in sufficient detail and duly circulated in compliance with the California Environmental Quality Act (CEQA), the State CEQA Guidelines and the City of Moreno Valley Rules and Procedures to Implement CEQA;

ATTACHMENT 2

WHEREAS, the Final EIR recommended to the City Council includes all responses to comments thereon;

WHEREAS, the Final EIR includes a review of potential impacts associated with the implementation of the VIP Moreno Valley Project, including, but not limited to agricultural resources, air quality, climate change and traffic;

WHEREAS, a Mitigation Monitoring Program has been completed to ensure that all of the mitigation measures outlined in the Final EIR are implemented, and

WHEREAS**,** all legal prerequisites to the adoption of this Resolution have occurred.

NOW, THEREFORE, the Planning Commission of the City of Moreno Valley does hereby resolve as follows:

1. The Planning Commission certifies that the Final Environmental Impact Report (EIR) for the VIP Moreno Valley Project on file with the Community & Economic Development Department, incorporated herein by this reference, has been completed in compliance with the California Environmental Quality Act, that the Planning Commission reviewed and considered the information contained in the Final EIR and that the Final EIR reflects the City's independent judgment and analysis; and

2. The Planning Commission hereby adopts the Findings and Statement of Overriding Considerations regarding the Final EIR for the VIP Moreno Valley Project, attached hereto as Exhibit A; and

3. The Planning Commission hereby approves the Mitigation Monitoring Program for the Final EIR for the proposed VIP Moreno Valley Project, attached hereto as Exhibit B.

APPROVED AND ADOPTED this 12th day of July, 2012.

_____
Meli Van Natta
Chair, Planning Commission

ATTEST:

_____
John C. Terell, Planning Official
Secretary to the Planning Commission

APPROVED AS TO FORM:

_____
City Attorney

Facts, Findings and Statement of Overriding Considerations
Regarding the Environmental Effects and the Approval of the
VIP Moreno Valley Project
(State Clearinghouse No. 2011081084)

I. INTRODUCTION

The Planning Commission of Moreno Valley (this "Commission"), in certifying the EIR for the VIP Moreno Valley Project and approving Tentative Parcel Map 36162 and a Site Plan authorizing the construction of up to approximately 1,616,133 square feet of distribution warehouse space (the "Project"), makes the Findings described below and adopts the Statement of Overriding Considerations presented at the end of the Findings. The Environmental Impact Report ("EIR") was prepared by the City acting as lead agency pursuant to the California Environmental Quality Act ("CEQA"). Hereafter, unless specifically identified, the Notice of Preparation ("NOP"), Notice of Availability & Completion ("NOA/NOC"), Draft EIR ("DEIR"), Technical Studies, Final EIR containing Responses to Comments and textual revisions to the Draft EIR ("FEIR"), and the Mitigation Monitoring and Reporting Program ("MMRP") will be referred to collectively herein as the "EIR." These Findings are based on the entire record before this Commission, including the EIR. This Commission adopts the facts and analyses in the EIR, which are summarized below for convenience. The omission of some detail or aspect of the EIR does not mean that it has been rejected by this Commission.

II. PROJECT SUMMARY

A. PROJECT DESCRIPTION

1. Site Location

The Project is located in the southwest portion of the City of Moreno Valley. The Project site consists of four parcels totaling approximately 71 net acres located on the southwest corner of Perris Boulevard and Grove View Road. The Perris Valley Storm Drain Lateral B channel forms the southern boundary of the site while Indian Street forms the western boundary. The site is located approximately 1.3 miles east of I-215, 4.5 miles south of SR-60, and 1.75 miles west of Lake Perris. March Air Reserve Base is located approximately one half mile west of the Project site.

The Project site is currently vacant, consisting of gently sloping land that has been used historically for agricultural purposes but currently lies fallow. It was most recently used as a sod farm that ceased operating in August 2005. The major roads that provide access to the Project site are Perris Boulevard, Indian Street, Grove View Road, and Harley Knox Boulevard, with the nearest I-215 interchanges at Harley Knox Boulevard and Ramona Expressway.

2. Project Description

The proposed Project would result in the construction and operation of approximately 1,616,133 square feet of distribution warehouse space on an approximately 71 acre site. The single building will be constructed with 264 vertical-lift dock-high roll up doors on the long (north and south) sides of the building to allow access for the loading and unloading of products from diesel truck/trailers. Building interiors are typically large and open to accommodate the temporary storage of the products to be distributed. The building will include a total of approximately 44,000 square feet of business office space for the management of the warehouse. Parking at the warehouse will be provided for 368 truck trucks and trailers as well as 589 parking stalls for passenger vehicles in accordance with City standards for light industrial uses.

The Project site is currently designated Business Park/Light Industrial in the City's General Plan. The site is zoned Industrial (I) in the Moreno Valley Industrial Area Plan (SP 208), which was originally adopted in 1989, and amended in 2001 and 2002. The proposed high-cube logistics warehouse project is consistent with the existing General Plan land use and zoning for the site.

3. Actions Covered by the EIR

The EIR will support the following discretionary approvals:

- Tentative Parcel Map approval (PM 36162);
- Certification of the Project EIR
- Approval of the Site Plan Review

Other non-discretionary actions

- Approval of a Storm Water Pollution Prevention Plan (SWPPP)

- Approval of a Water Quality Management Plan (WQMP)
- Issuance of a Grading permit, final drainage study, Final WQMP, and obtaining an NOI and WDID number.
- Issuance of an Encroachment permit
- Issuance of a Building permit

Approvals and permits required by other agencies include:

- A National Pollutant Discharge Elimination System (NPDES) permit
- Approval of water and sewer improvement plans by the Eastern Municipal Water District.
- Approval from the City and Riverside County Flood Control and Water Conservation District to ensure that construction site drainage velocities are equal to or less than the pre-construction conditions.

B. PROJECT OBJECTIVES

The Project Objectives include the following:

- Create employment-generating opportunities for the citizens of Moreno Valley and surrounding communities
- Encourage industrial development and minimize conflicts with the surrounding existing uses
- Encourage warehouse distribution services that take advantage of the area's close proximity to various freeways and transportation corridors
- Provide the infrastructure improvements required to meet Project needs in an efficient and cost-effective manner
- Encourage new development consistent with the capacity and municipal service capabilities

- Provide a high density, high-quality large-scale industrial development to provide jobs for residents at a variety of income levels
- Facilitate the efficient and cost-effective movement of goods in and through the City, which, in turn, allows the City to compete economically on a domestic and international scale
- Provide an industrial warehouse facility that meets the substantial and unmet demands of businesses located in the City and County
- Cluster industrial warehouse uses near efficient access points to the state highway system to reduce traffic congestion on surface streets and to reduce associated air pollutant emissions from vehicle sources
- Implement the City's General Plan Industrial/Business Park Land Use designations that are applicable to the site
- Accommodate new development that channels land uses in a phased, orderly manner and is coordinated with the provision of necessary infrastructure and public improvements;
- Provide new development that will assist the City in obtaining fiscal balance in the years ahead
- Address community circulation, both vehicular and pedestrian, utilizing available capacity within the existing circulation system, and provide fair share improvements to various future-year deficient intersections or road segments

III. ENVIRONMENTAL REVIEW AND PUBLIC PARTICIPATION

The City has conducted an extensive review of this Project which included the DEIR, FEIR and supporting technical studies, along with a public review and comment period first during the circulation of the NOP/Initial Study and then through the circulation of the DEIR. The following is a summary of the environmental review of this Project:

- On August 26, 2011, the City circulated a Notice of Preparation ("NOP") and the Initial Study that identified the environmental issues that the City anticipated would

be analyzed in the Project's DEIR to the State Clearinghouse, responsible agencies, and other interested parties.

- On September 19, 2011, the City conducted a public scoping meeting to allow members of the public to provide comments and input regarding the scope and content of the DEIR.

- The NOP public review period ran for 30 days, from August 26, 2011 to September 26, 2011. Written comments on the NOP were received from 12 different agencies, organizations, and individuals. The scope of the issues identified in the comments expressing concern included potential impacts associated with: Air Quality, Alternatives Analysis, Biological Resources, Cultural Resources/Sacred Sites, Greenhouse Gas Emissions/Global Climate Change, Hazardous Materials/Contamination, Traffic, and Water Availability and Quality.

- Based on the Initial Study, included in the DEIR in Appendix A, and comments received pursuant to the NOP, it was determined that some issues need not be addressed in depth in the DEIR because previous studies of other analyses provided sufficient information, analysis, and mitigation to conclude that there was little or no potential for significant impacts. These environmental topics included: (1) Aesthetics; (2) Biological Resources; (3) Cultural Resources; (4) Geology and Soils; (5) Hazards and Hazardous Materials; (6) Hydrology and Water Quality; (7) Land Use Planning; (8) Mineral Resources; (9) Population/Housing; (10) Public Services; (11) Recreation; and, (12) Utilities and Service Systems.

- On April 20, 2012, the NOA/NOC was filed with the Riverside County Recorder and the State Clearinghouse and the DEIR was circulated for the 45 day public review, which ended June 4, 2012.

- The City received a total of seven (7) comment letters from public agencies; one (1) from a community organization; and two (2) from individuals. The City prepared specific responses to all comments. The responses to comments are included in Section 3.0 of the FEIR.

- On June 28, 2012 in accordance with *Public Resources Code* Section 21092.5, the City provided written responses to public agencies that commented on the DEIR.

- On June 29, 2012, Notice of the Planning Commission hearing to consider the Project was provided in the following newspaper(s) of general and/or regional circulation: Press Enterprise.

- On July 12, 20012, this Commission held a public hearing to consider the Project and staff recommendations. The City, after considering written comments and oral testimony on the EIR, determined that no new information was presented that would require recirculation of the EIR. Following public testimony, submission of additional written comments, and staff recommendations, this Commission certified the EIR, adopted these Facts, Findings and the Statement of Overriding Considerations, and the further recommendations in the Staff Report, and approved the Project, including the PM 36162 (collectively the "Approvals").

IV. INDEPENDENT JUDGMENT FINDING

The Applicant retained the independent consulting firm of LSA Associates, Inc. to prepare the EIR for the Project. LSA Associates has prepared the EIR under the supervision, direction and review of the City with the assistance of an independent peer review (Michael Brandman Associates). The City of Moreno Valley is the Lead Agency for the preparation of the EIR, as defined by CEQA CPRC Section 21067 as amended. The Planning Commission has received and reviewed the EIR prior to certifying the EIR and prior to making any decision to approve or disapprove the Project.

Finding: The EIR for the Project reflects the City's independent judgment. The City has exercised independent judgment in accordance with *Public Resources Code* Section 21082.1(c) (3) in directing the consultant in the preparation of the EIR, as well as reviewing, analyzing and revising material prepared by the consultant.

A. GENERAL FINDING ON MITIGATION MEASURES

In preparing the Approvals for this Project, City staff incorporated the mitigation measures recommended in the EIR as applicable to the Project. In the event that the Approvals do not use the exact wording of the mitigation measures recommended in the EIR, in each such instance, the adopted Approvals are intended to be identical or substantially similar to the recommended

mitigation measure. Any minor revisions were made for the purpose of improving clarity or to better define the intended purpose.

Finding: Unless specifically stated to the contrary in these findings, it is this Commission's intent to adopt all mitigation measures recommended by the EIR which are applicable to the Project. If a measure has, through error, been omitted from the Approvals or from these Findings, and that measure is not specifically reflected in these Findings, that measure shall be deemed to be adopted pursuant to this paragraph. In addition, unless specifically stated to the contrary in these Findings, all Approvals repeating or rewording mitigation measures recommended in the EIR are intended to be substantially similar to the mitigation measures recommended in the EIR and are found to be equally effective in avoiding or lessening the identified environmental impact. In each instance, the Approvals contain the final wording for the mitigation measures.

V. ENVIRONMENTAL IMPACTS AND FINDINGS

City staff reports, the EIR, written and oral testimony at public meetings or hearings, these facts, findings and statement of overriding considerations, and other information in the administrative record, serve as the basis for the City's environmental determination.

The detailed analysis of potentially significant environmental impacts and proposed mitigation measures for the Project is presented in Section 2.0 and 2.0 of the DEIR and Section 3.0 of the FEIR. Responses to comments on the DEIR, along with copies of the comments, are provided in Chapter 2.0 of the FEIR.

The EIR evaluated five major environmental categories for potential impacts including Agricultural Resources, Air Quality, Climate Change and GHGs, Noise, and Transportation. Both Project-specific and cumulative impacts were evaluated. Of these five major environmental categories, this Commission concurs with the conclusions in the EIR that the issues and sub issues discussed in Sections V.A and V. B below either are less-than-significant without mitigation or can be mitigated below a level of significance. For the remaining potential environmental impacts that cannot feasibly be mitigated below a level of significance discussed in Section V.C, overriding considerations exist which make these potential impacts acceptable to this Commission.

A. LESS-THAN-SIGNIFICANT ENVIRONMENTAL IMPACTS NOT REQUIRING MITIGATION

The Moreno Valley Planning Commission hereby finds that the following potential environmental impacts of the Project are less-than-significant and therefore do not require the imposition of mitigation measures.

1. Agricultural Resources

a. Conflict with existing zoning or a Williamson Act Contract

Potential Significant Impact: Whether the Project would conflict with existing zoning for agricultural use, or a Williamson Act contract.

Findings: Potential impacts of the Project related to conflicts with existing zoning or a Williamson Act Contract are discussed in detail in Section 4.1 of the DEIR. Based on the entire record before us, this Commission finds that no significant impacts related to existing zoning or Williamson Act will occur as a result of development of the Project and, therefore, no mitigation is required.

Facts in Support of the Findings: As identified in section 4.1 of the DEIR, the Moreno Valley General Plan policies and zoning designations support agriculture only as an interim use, and no land in the City is designated solely for agricultural use or for agricultural preservation. The uses proposed for the Project site are consistent with the existing underlying General Plan and Zoning designations. The Project site is not zoned for agricultural uses. No impact would occur and no mitigation is required.

b. Conflict with/Loss of Existing Forest Land or Timberland Zoning

Potential Significant Impact: Whether the Project would conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g)), and whether the Project would result in the loss of forest land or conversion of forest land to non-forest uses.

Findings: Potential impacts of the Project related to conflict with/loss of existing forest land or timberland zoning are discussed in detail in Section 4.1 of the DEIR. Based on the entire record

before us, this Commission finds that no significant impacts related to loss of forest or timberland will occur as a result of development of the Project and, therefore, no mitigation is required.

Facts in Support of the Findings: Section 4.1 identifies no forest or timberland resources located within the Project site nor is the Project site zoned for forest land or timberland. Implementation of the proposed Project would not require any rezoning or General Plan Amendments as the proposed uses are consistent with the existing underlying General Plan land use designation and zoning designation. The proposed Project would not conflict with existing forest zoning, cause rezoning of forest land, or result in the loss or conversion of forest lands to non-forest uses as no such resources exist in the City. No impacts associated with this issue would occur and no mitigation is required.

2. Air Quality

a. Air Quality Management Plan Consistency

Potential Significant Impact: Whether the Project would conflict with or obstruct implementation of the applicable air quality plan.

Findings: Potential impacts of the Project related to the applicable air quality plan are discussed in detail in Section 4.2 of the DEIR. Based on the entire record before us, this Commission finds that development of the Project will not result in significant impacts related to inconsistencies with the applicable air quality plan and, therefore, no mitigation is required.

Facts in Support of the Findings: The Project is consistent with, and will not impede or otherwise conflict with implementation of the Air Quality Management Plan ("AQMP"). The Project is consistent with AQMP Consistency Criterion No. 1 because it will not cause a potential increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay the timely attainment of air quality standards or the interim emissions reductions specified in the AQMP. The Project will not exceed the California Ambient Air Quality Standards ("CAAQS") for localized criteria pollutants during construction operations. While operational emissions will be generated in excess of SCAQMD"s regional threshold criteria (DEIR, pg. 4.2-26), these emissions are already accounted for in the AQMP since the Project is consistent with the land uses and development intensities reflected in the City General Plan and incorporated in the adopted AQMP. Consistent with intent and provisions of the AQMP, the Project will implement all feasible mitigation, and comply with all applicable SCAQMD rules developed to reduce air pollutant emissions. The Project is also consistent with AQMP Consistency Criterion No. 2 because the extent

of air pollutant emissions generated by the Project would be no greater than is reflected in the current General Plan and incorporated in the adopted AQMP. Because the Project is consistent with the General Plan Land Use designation of Business Park/Light Industrial, it does not exceed growth projections contained in the City's General Plan, and is consistent with growth assumptions in the AQMP. (DEIR, pgs. 4.2-14 to 4.2-15) Accordingly, impacts related to consistency with the applicable air quality plan will be less-than-significant and no mitigation is required.

b. Objectionable Odors

Potential Significant Impact: Whether the Project would create objectionable odors affecting a substantial number of people.

Findings: Potential impacts of the Project related to objectionable odors are discussed in detail in Section 4.2 of the DEIR. Based on the entire record before us, this Commission finds that development of the Project will not result in significant impacts due to objectionable odors and, therefore, no mitigation is required.

Facts in Support of the Findings: According to Section 4.2 of the DEIR, the Project does not propose land uses typically associated with emitting objectionable odors. Potential odors during Project construction may result from heavy equipment exhaust and the application of asphalt and architectural coatings. Standard construction requirements would minimize odor impacts from construction. The construction odor emissions would be temporary, short-term, and intermittent in nature and would cease upon completion of the respective phase of construction and is thus considered less-than-significant. Project-related operational odor sources such as vehicle exhaust and routine painting/ maintenance activities are typical of industrial/commercial activities and would be localized to the immediate Project vicinity, with little or no off-site effects. Accordingly, impacts related to objectionable odors will be less-than-significant and no mitigation is required. (DEIR, pg. 4.2-15)

c. Long-Term Microscale (CO Hot Spot) Emissions

Potential Significant Impact: Whether the proposed Project would violate any air quality standard or contribute substantially to an existing or projected air quality violation. For CO, the applicable thresholds are:

- California State one-hour CO standard of 20.0 ppm; and

- California State eight-hour CO standard of 9.0 ppm.

Findings: Potential impacts of the Project related to long-term microscale emissions are discussed in detail in Section 4.2 of the DEIR. Based on the entire record before us, this Commission finds that development of the Project will not result in significant impacts related to long-term microscale emissions and, therefore, no mitigation is required.

Facts in Support of the Findings: According to Section 4.2 of the DEIR, the highest one-hour CO concentration experienced at any of the intersections in the Project vicinity would not exceed the one hour CO State standard of 20 ppm. Based on the *Air Quality Analysis* prepared for the proposed Project, the proposed Project would contribute, at most, a 0.2 ppm increase to the one-hour CO concentrations for all scenarios. This is below the 1.0 ppm increase threshold. Also the highest eight-hour CO concentration experienced at any of the intersections in the Project vicinity would not exceed the eight-hour CO state standard of 35 ppm. Based on the Air Quality Analysis prepared for the proposed Project, the proposed Project would contribute, at most, a 0.2 ppm increase to the eight-hour CO concentrations for all scenarios. This is below the 0.45 ppm increase threshold. Since the proposed Project would not exceed the one-hour or eight-hour CO concentration standards, it is reasonable to conclude that no CO hot spots would occur. Therefore, the proposed Project would not have a significant impact on local air quality for CO and no mitigation measures would be required. (DEIR, pgs. 4.2-15 to 4.2-17)

d. Localized Operational Emissions

Potential Significant Impact: Whether the proposed Project would violate any AAQS or contribute to an existing or projected air quality violation; or expose sensitive receptors to pollutants.

For long-term operation, the applicable localized daily thresholds are:

- 12,083 pounds per day of CO;
- 585 pounds per day of NOX;
- 32 pounds per day of PM10; and
- 14 pounds per day of PM2.5.

Findings: Potential impacts of the Project related to localized operational emissions are discussed in detail in Section 4.2 of the DEIR. Based on the entire record before us, this Commission finds that

development of the Project will not result in significant impacts related to localized operational emissions and, therefore, no mitigation is required.

Facts in Support of the Findings: According to Section 4.2 of the DEIR, the operational emissions rates of NO_X, CO, PM_{10}, and $PM_{2.5}$ are less than 10 percent of the LST thresholds for the applicable pollutant. None of the criteria pollutant emissions would exceed localized thresholds during the operation of the proposed Project. Therefore, the proposed Project would not have a significant impact on localized operational pollutant levels and no mitigation measures would be required. (DEIR, pgs. 4.2-15 to 4.2-17)

e. Operational-Acute Health Risk

Potential Significant Impact: Whether the proposed Project would expose sensitive receptors to substantial pollutant concentrations.

Findings: Potential impacts of the Project related to operational-acute health risks are discussed in detail in Section 4.2 of the DEIR. Based on the entire record before us, this Commission finds that development of the Project will not result in significant impacts related to operational-acute health risks and, therefore, no mitigation is required.

Facts in Support of the Findings: According to Section 4.2 of the DEIR, exposure to diesel exhaust can have immediate health effects, such as irritation of the eyes, nose, throat, and lungs, and it can cause coughs, headaches, light headedness, and nausea. In studies with human volunteers, diesel exhaust particles made people with allergies more susceptible to the materials to which they are allergic, such as dust and pollen. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks. However, according to the rulemaking on *Identifying Particulate Emissions from Diesel-Fueled Engines as a Toxic Air Contaminant* (ARB 1998), the available data from studies of humans exposed to diesel exhaust are not sufficient for deriving an acute non-cancer health risk guidance value. While the lung is a major target organ for diesel exhaust, studies of the gross respiratory effects of diesel exhaust in exposed workers have not provided sufficient exposure information to establish a short-term non-cancer health risk guidance value for respiratory effects. Therefore, the potential for short-term acute exposure from diesel exhaust are considered to be less than significant and no mitigation is required. (DEIR, pg. 4.2-18)

f. Operational-Chronic Health Risk

Potential Significant Impact: Whether the proposed Project would expose sensitive receptors to substantial pollutant concentrations.

For Maximum Individual Cancer Risk, the applicable thresholds are:

- An increased cancer risk greater than 10 in 1 million (1.0×10^{-5}) at any receptor location; or

For non-cancer chronic hazard indices (HI); the applicable threshold is:

- A cumulative increase for any target organ system exceeding 1.0 at any receptor location.

Findings: Potential impacts of the Project related to operational-chronic health risks are discussed in detail in Section 4.2 of the DEIR. Based on the entire record before us, this Commission finds that development of the Project will not result in significant impacts related to operational-chronic health risks and, therefore, no mitigation is required.

Facts in Support of the Findings: According to Section 4.2 of the DEIR, a screening level health risk assessment was performed for the operational emissions associated with the proposed Project based on the SCAQMD's *Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis* guidance. The operations expected to occur at this facility will not emit any toxic chemicals in any significant quantity other than vehicle exhaust. While there may be other toxic substances in use on site, compliance with state and federal handling regulations will bring emissions to below a level of significance. The nearest residences would experience a cancer risk of 6.6 in 1 million, which is below the 10 in 1 million threshold. The nearest residences would also experience a chronic hazard index of 0.0041, which is below the 1.0 threshold. The peak off-site worker cancer risk level is 4.5 in a million, which is also below the 10 in 1 million threshold. Chronic hazard index for the peak off-site worker would be 0.0029, which is below the 1.0 threshold. Since the operational phase of the proposed Project would not exceed any of the operational related health risk assessment thresholds, a less than significant impact would occur and no mitigation is required. (EIR, pgs. 4.2-18 to 4.2-19)

3. Climate Change and Greenhouse Gas Emissions

a. Greenhouse Gas Plan, Policy, Regulation Consistency

Potential Significant Impact: Whether the proposed Project would conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.

Findings: Potential impacts of the Project related to greenhouse gas plan, policy, and regulation consistency are discussed in detail in Section 4.3 of the DEIR. Based on the entire record before us, this Commission finds that development of the Project will not result in significant impacts related to greenhouse gas plan, policy, or regulation consistency and, therefore, no mitigation is required.

Facts in Support of the Findings: The proposed Project would implement appropriate GHG reduction strategies and would ensure that it does not conflict with or impede implementation of reduction goals identified in AB 32, Governor's Executive Order S-3-05, and other strategies to help reduce GHGs to the level proposed by the Governor. In addition, the Project would also be subject to all applicable regulatory requirements, which would also reduce the GHG emissions of the Project. Therefore, the proposed Project would not conflict with any applicable plan, program, policy, or regulation related to the reduction of GHG emissions resulting in a less than significant impact. (DEIR, pgs. 4.3-16 to 4.2-21)

4. Noise

a. Airport Noise

Potential Significant Impacts: Whether a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would results in exposure of people residing or working in the project area to excessive noise levels. Or if a project within the vicinity of a private airstrip, would expose people residing or working in the project area to excessive noise levels.

Findings: Potential impacts of the Project relating to airport noise are discussed in detail in Section 4.4 of the DEIR. Based on the entire record before us, this Commission finds that no significant impacts related to airport noise will occur as a result of development of the Project and, therefore, no mitigation is required.

Facts in Support of the Findings: According to Section 4.4 of the DEIR, the nearest airport is the March Air Reserve Base, which is located approximately 0.75 mile northwest of the Project site. The proposed Project is not identified as being within the noise or safety contours delineated for the March Air Reserve Base Airport. While the proposed Project is located within two miles of a public airport, the proposed Project would not have the potential to expose people working on the Project site to excessive noise levels from airport operations as the Project site is located outside of the noise and safety contours of March Air Reserve Base. A less than significant impact would occur with implementation of the proposed Project. Additionally, the proposed Project site is not located within the vicinity of a private airstrip; therefore, no impact associated with this issue would occur and no mitigation is required. (DEIR, pgs. 4.4-9 to 4.4-10)

b. Ground-Borne Vibrations

Potential Significant Impact: Whether the Project would result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

Findings: Potential impacts of the Project relating groundborne vibration and groundborne noise are discussed in detail in Section 4.4 of the DEIR. Based on the entire record before us, this Commission finds that no significant impacts related to ground-borne vibration and groundborne noise will occur as a result of development of the Project and, therefore, no mitigation is required.

Facts in Support of the Findings: According to Section 4.4 of the DEIR, the Project does not propose activities or uses that would result in long-term substantial or even perceptible vibration levels. The Project site is not located near steel-wheeled trains. Additionally, roadways in the project area are either paved or would be paved and would not result in traffic driving over rough roads. Construction activities for the project site do not include blasting or pile driving. The primary vibratory source during the construction of the proposed Project would be large bulldozers. Based on published data, typical bulldozer activities generate an approximate vibration level of 0.089 in/sec at a distance of 25 feet. At the distance of the nearest residence to the project boundary (approximately 1,000 feet) the estimated vibration level would not be discernible. While heavy-duty earthmoving equipment would be used during the construction phase of the project, the level of vibration would not be excessive or permanent, nor would it exceed the level at which building damage typically occurs. Therefore, impacts from construction-related groundborne vibration construction would be less than significant and no mitigation is required. (DEIR, pg. 4.4-10)

c. Long-Term Traffic Noise

Potential Significant Impact: Whether the project would result in a substantial temporary, periodic, and/or permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

Findings: Potential impacts of the Project related to long-term noise are discussed in detail in Section 4.4 of the DEIR. Based on the entire record before us, this Commission finds that no significant impacts related to long-term noise will occur as a result of development of the Project and, therefore, no mitigation is required.

Facts in Support of the Findings: According to Section 4.4 of the DEIR, project-related traffic noise level increases would be 0.8 dBA or less along all roadway segments analyzed. Noise level increases within this range are small and are not perceptible by the human ear. Therefore, no significant traffic noise impacts would occur to off-site land uses with implementation of the proposed Project. Also the proposed warehouse distribution center uses are not impacted by the 75 dBA CNEL noise contour from Indian Street (within 50 feet of the roadway centerline), Oleander Avenue (within 50 feet of the roadway centerline), or Perris Boulevard (98 feet from the roadway centerline). Therefore, noise levels at the on-site uses are below the City's 75 dBA CNEL noise standard for industrial uses. No significant noise impacts to on-site industrial uses would occur and no mitigation measures are required. (DEIR, pgs. 4.4-10 to 4.4-13)

d. Long-Term Operational Noise

Potential Significant Impact: Whether the project would cause exposure of persons to or generation of noise levels in excess of standards established in the City of Moreno Valley General Plan, Moreno Valley Municipal Code, or applicable standards of other agencies.

Findings: Potential impacts of the Project related to long-term operational noise are discussed in detail in Section 4.4 of the DEIR. Based on the entire record before us, this Commission finds that no significant impacts related to long-term operational noise will occur as a result of development of the Project and, therefore, no mitigation is required.

Facts in Support of the Findings: The nearest existing sensitive receptors in the vicinity of the project site are rural residential uses located along Nandina Avenue approximately 1,000 feet north of the project boundary. There are also nonconforming residential dwelling units within commercial and industrial uses on property zoned for commercial or industrial uses approximately 0.5 mile

southwest of the project site on the south side of Oleander Avenue between Heacock Street and Patterson Avenue.

The warehouse distribution use has loading docks on the north and south sides of the building, approximately 1,000 feet from the existing residences to the north. Noise associated with loading/unloading activities would potentially affect these existing residential uses. Other on-site, noise-producing activities may include traffic and activity within the parking lot (load talking, horn blowing, vehicle door slamming, truck idling, etc.). Although individual activity may generate relatively high and intermittent noise, when added to the typically lower ambient noise and averaged over a longer period of time, the cumulative noise level would be much lower and would be considered a less than significant impact. (DEIR, pg. 4.4-14)

The project would have rooftop heating, ventilating, and air conditioning (HVAC) equipment, as well as ground floor garbage compactors. Rooftop HVAC units generate noise levels of approximately 62 dBA at 50 feet. The closest noise-sensitive land uses are existing residences which are located approximately 1,000 feet to the north from the nearest potential on-site rooftop HVAC equipment location. With the effect of distance divergence, noise generated by HVAC equipment would be reduced by 26 dBA at the closest residences when compared with the noise level measured at 50 feet. Additionally, the roof edge (parapet) creates a noise barrier that reduces noise levels from rooftop HVAC units by an additional 3 to 5 dBA or more for ground floor receptors. Because of the attenuation achieved, nearest residences located to the north of the project site would be exposed to an exterior noise level of 33 dBA L_{max} or lower. This range of noise levels is substantially lower than traffic noise on roadways in the project vicinity and the truck movement and loading/unloading noise. Therefore, because the City's exterior noise standard of 60 dBA L_{dn}/CNEL for HVAC equipment in residential district (Planning and Zoning Code, Chapter 9.03.040) would not be exceeded at the nearest sensitive noise receptors, no significant noise impact resulting from the operation of rooftop HVAC equipment would occur and no mitigation is required. (DEIR, pg. 4.4-15)

Garbage compactors generate approximately 70 dBA L_{max} at 6 feet. With the effect of distance divergence, noise generated by garbage compactors would be reduced to 26 dBA L_{max} or lower at the closest residences. Because the City's exterior noise standard of 60 dBA L_{max} during the day and 55 dBA L_{max} during the night would not be exceeded, no significant noise impacts from the on-site garbage compactors would occur. In the absence of any significant impact, no mitigation is required. (DEIR, pg. 4.4-15)

It is anticipated that the proposed uses would have some sort of speaker system at the truck loading docks. Typical loud speakers generate a sound level of 75 dBA L_{max} at 50 feet. With the distance attenuation of 26 dBA the speaker noise at the nearest residences will be at or below 49 dBA L_{max}. This range of maximum noise levels is lower than the City's nighttime exterior noise standards of 55 dBA L_{max} standard. Therefore, noise associated with loading dock speakers at the proposed warehouse buildings would not result in noise levels exceeding the typical daytime or nighttime noise standards at the nearest residences to the southeast and no mitigation measures are required. (DEIR, pg. 4.4-15)

The typical maximum allowable interior noise levels for residential uses are 45 dBA between 10:01 p.m. and 7:59 a.m. and 50 dBA between 8:00 a.m. and 10:00 p.m. Typical southern California homes with windows open would achieve up to 12 dBA in exterior to interior noise reduction. When windows are closed, the noise attenuation increases to 24 dBA. Additionally, distance divergence of 1,000 feet provides 26 dBA of noise attenuation. Interior noise levels at the nearest residential homes to the north, attributable to loading/unloading activities from the nearest on-site loading areas, would be reduced to 37 dBA L_{max} with windows open and to 25 dBA L_{max} with windows closed. This range of noise level is compatible with or lower than typical household activity noise. Therefore, no significant interior noise impacts for the nearest sensitive receptors would occur and no mitigation is required. (DEIR, pg. 4.4-16)

5. Transportation

a. Design Features or Incompatible Uses

Potential Significant Impact: Whether the Project would substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Findings: Potential impacts of the Project related to design features or incompatible uses are discussed in detail in Section 4.5 of the DEIR. Based on the entire record before us, this Commission finds that no significant impacts related to the design features or incompatible uses will occur as a result of development of the Project and, therefore, no mitigation is required.

Facts in Support of the Findings: According to Section 4.5 of the DEIR, the design of roadways must provide adequate sight distance and traffic control measures. This provision is normally realized through roadway design to facilitate roadway traffic flows. Roadway improvements in and

around the Project site would be designed and constructed to satisfy all City requirements for street widths, corner radii, intersection control as well as incorporate design standards tailored specifically to site access requirements.

The final design of all roadways and intersections within the Project site access would be reviewed by a licensed professional civil engineer to ensure adequate safety when traveling to and from the Project site. The proposed Project does not include any sharp curves or dangerous intersections in its design. Adherence to applicable existing requirements of the City of Moreno Valley consistent with the City's Circulation Element Objectives 5.1 (create a safe, efficient, and neighborhood-friendly street system), 5.5 (maximize efficiency of the local circulation system by using appropriate policies and standards to design, locate, and size roadways), and 5.11 (eliminate obstructions that impede safe movement of vehicles, bicyclists, and pedestrians) and other agencies would reduce impacts associated with this issue to a less than significant level and no mitigation is required. (DEIR, pgs. 4.4-15 to 4.4-16)

b. Inadequate Emergency Access

Potential Significant Impact: Whether the proposed Project would result in inadequate emergency access.

Findings: Potential impacts of the Project related to inadequate emergency access are discussed in detail in Section 4.5 of the DEIR. Based on the entire record before us, this Commission finds that no significant impacts related to inadequate emergency access will occur as a result of development of the Project and, therefore, no mitigation is required.

Facts in Support of the Findings: According to Section 4.5 of the DEIR, the developers of the proposed Project would be required to design, construct, and maintain structures, roadways, and facilities to provide for adequate emergency access and evacuation. Construction activities, which may temporarily restrict vehicular traffic, would be required to implement adequate and appropriate measures to facilitate the passage of persons and vehicles through/around any required road closures. The proposed Project design would be submitted to and approved by the City's Fire and Police Departments prior the issuance of building permits. Adherence to applicable existing requirements of the City of Moreno Valley and other agencies would reduce impacts associated with this issue to a less than significant level and no mitigation is required. (DEIR, pg. 4.4-16)

c. Alternative Transportation

Potential Significant Impact: Whether the proposed Project would conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

Findings: Potential impacts of the Project related to alternative transportation are discussed in detail in Section 4.5 of the DEIR. Based on the entire record before us, this Commission finds that no significant impacts related to alternative transportation will occur as a result of development of the Project and, therefore, no mitigation is required.

Facts in Support of the Findings: According to Section 4.5 of the DEIR, the design of the Project would be required to adhere to applicable City of Moreno Valley standards that support and/or facilitate alternative modes of transportation, including but not limited to pedestrian pathways and sidewalks consistent with the City's Circulation Element Objective 5.8 (encourage development of an efficient public transportation system for the entire community). Through the City's project review process, policies, plans, and/or programs supporting alternative transportation would be reviewed and incorporated as applicable. Consequently, a less than significant impact would occur as a result of the proposed Project and no mitigation is required. (DEIR, pgs. 4.4-16 to 4.4-17)

d. Air Traffic Patterns

Potential Significant Impact: Whether the Project would increase or otherwise affect existing air traffic patterns.

Findings: Potential impacts of the Project related to air traffic patterns are discussed in detail in Section 4.5 of the DEIR. Based on the entire record before us, this Commission finds that no significant impacts related to any change in air traffic patterns will occur as a result of development of the Project and, therefore, no mitigation is required.

Facts in Support of the Findings: According to Section 4.5 of the DEIR, airport facilities within the vicinity of the Project site include the March Air Field, which is part of the March Air Reserve Base (MARB). The Project site is located approximately 0.75 mile east of March Air Field and is entirely within Airport Influence Area II. As part of the standard process for development within Airport Influence Areas for MARB, proposed Projects are required to be reviewed by the ALUC for consistency with the ALUP. As a standard condition imposed during ALUC reviews, developments located within the boundaries of Influence Area III are required to provide avigation easements. To

ensure consistency with the ALUC recommendations is maintained, avigation easements will be required as part of a condition of approval for the Project site. Development that would occur within Airport Influence II of MIP would not include any features that would alter air traffic patterns or the level of air traffic at the MIP; therefore, a less than significant air traffic safety impact would occur and no mitigation is required. (DEIR, pgs. 4.4-17 to 4.4-18)

B. ENVIRONMENTAL IMPACTS MITIGATED TO A LEVEL OF LESS-THAN-SIGNIFICANT

Public Resources Code Section 21081 states that no public agency shall approve or carry out a project for which an EIR has been completed which identifies one or more significant effects unless the public agency makes one or more of the following findings:

I. Changes or alterations have been required in, or incorporated into, the Project which mitigate or avoid the significant effects on the environment.

II. Those changes or alterations are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by that other agency.

III. Specific economic, legal, social, technological, or other considerations make infeasible the mitigation measures or alternatives identified in the EIR, and overriding economic, legal, social, technological, or other benefits of the Project outweigh the significant effects on the environment.

Certain of the following issues from the environmental categories analyzed in the EIR, including biological resources, paleontological resources, geology and soils, hydrology and water quality, noise (short-term construction), and transportation (local intersections and roadways) were found to be potentially significant, but can be mitigated to a less-than-significant level with the imposition of mitigation measures. This Commission hereby finds pursuant to *Public Resources Code* Section 21081 that all potentially significant impacts listed below can and will be mitigated to below a level of significance by imposition of the mitigation measures in the EIR; and that these mitigation measures are included as Conditions of Approval and set forth in the MMRP adopted by this Commission. Specific findings of this Commission for each category of such impacts are set forth in detail below.

1. Biological Resources

a. Adverse Effects to Sensitive or Special Status Species

Potential Significant Impact: The EIR evaluated and concluded that the Project could have an adverse effect on candidate, sensitive, or special status species.

Finding: Implementation of the following mitigation measures will reduce the potential adverse impacts to sensitive or special status species to less than significant:

Mitigation Measure BIO-1: *No more than 72 hours prior to initiation of ground-disturbing activities, a pre-construction survey shall be completed by a qualified biologist. The survey will identify special status avian species (if any) within the area of intended disturbance. In the event no special status avian species are identified within the limits of disturbance, no further mitigation is required. In the event such species are identified within the limits of ground disturbance, Mitigation Measure BIO-3 shall apply.*

Mitigation Measure BIO-2: *No more than 72 hours prior to initiation of ground-disturbing activities, a pre-construction burrowing owl survey shall be completed by a qualified biologist for the planned disturbance area. The pre-construction burrowing owl surveys may be conducted as part of the survey required in Mitigation Measure BIO-1. A report detailing the findings of the pre-construction survey shall be submitted to the City prior to the initiation of ground-disturbing activities. In the event no burrowing owls are identified within the limits of ground disturbance, no further mitigation is required. In the event burrowing owls are identified within the limits of ground disturbance, Mitigation Measures BIO-3 and BIO-4 shall apply.*

Mitigation Measure BIO-3: *If nesting special status avian or burrowing owl species are determined to occupy a proposed area of disturbance, no construction activity shall take place within 500 feet of an active nest/burrow until it has been determined that the nest/burrow is no longer active, and all juveniles have fledged the nest/burrow.*

Mitigation Measure BIO-4: *If active burrowing owl burrows are detected outside the breeding season, then passive and/or active relocation may be approved following consultation with the CDFG and/or USFWS. One-way doors may be installed as part of a passive relocation program. Burrowing owl burrows shall be excavated with hand tools by a qualified biologist when determined to be unoccupied, and backfilled to ensure that animals do not re-enter the holes/dens.*

Facts in Support of the Finding: According to Section 2.5.2 of the DEIR, the site is characterized as a regularly disked field that supports little to no standing vegetation and is not located within a Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) Criteria Area. However, the site is located in an area that requires habitat assessments for burrowing owl, five Narrow Endemic Plant Species, and nine Criteria Area Plant Species in accordance with the MSHCP. During the habitat assessment surveys and focused surveys no sign of burrowing owls were observed. The Project site is not an optimal habitat for burrowing owl, but because burrowing owls have been known to occur on land that has been disturbed and is considered a mobile and opportunistic species, **Mitigation Measures BIO-1 through BIO-4** were taken to reduce the potential impact to less than significant. The five NEPS and nine CAPS were not observed during the general survey (February 2007) and focused surveys (May, June, and July 2009) conducted on site. Overall, the Project site lacks suitable habitat for these species due to historic agricultural activities. Nonetheless, focused surveys were conducted to cover the four depressed areas and the ditch. No special status plants were observed during the focused surveys. Because of the absence of members of the species and suitable habitat, a less than significant impact to other special status plants would occur. (DEIR, pg. 2-9)

2. <u>Cultural Resources</u>

a. Directly or Indirectly Destroy a Unique Paleontological Resource or Site or Unique Geologic Feature

Potential Significant Impact: The EIR evaluated and concluded that the Project could have an adverse effect on significant fossil resources.

Finding: Implementation of the following mitigation measures will reduce the impact to unique paleontological resources and site or unique geological features to less than significant:

Mitigation Measure CUL-1: *Prior to construction involving excavation four feet or more below existing surface grade, the construction contractor shall provide evidence that a qualified paleontologist has been retained, and that the paleontologist(s) shall be present during all grading and other significant ground-disturbing activities that reach four feet or more below existing surface grade. If the paleontologist(s) do not find evidence for Pleistocene-era deposits once the maximum excavation depth is reached, monitoring shall be discontinued. In the event fossiliferous deposits are encountered, the following measures shall be implemented:*

- *Monitoring shall be conducted by qualified paleontological monitor(s) of excavation in areas identified as likely to contain paleontological resources, including undisturbed older Pleistocene alluvium. Paleontological monitors shall be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors shall be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring may be reduced if the potentially fossiliferous units are determined upon exposure and examination by qualified paleontological personnel to have low potential to contain fossil resources.*

- *Paleontological monitoring of any earthmoving will be conducted by a monitor, under direct guidance of a qualified paleontologist. Earthmoving in areas of the parcel where previously undisturbed sediments are buried, but not otherwise disturbed, will not be monitored.*

- *If too few fossil remains are found after 50 percent of the planned-for earthmoving has been completed, monitoring can be reduced or discontinued in those areas at the project paleontologist's direction.*

- *Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates.*
- *Identification and curation of specimens into a professional, fully accredited museum repository with permanent retrievable storage. The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities.*
- *Preparation or a report of findings with and appended itemized inventory of specimens. The report and report and inventory, when submitted to the City of Moreno Valley along with confirmation of the curation of recovered of recovered specimens into an established, accredited museum repository, will signify completion of the program to mitigate impacts to paleontological resources.*

Facts in Support of the Finding: Based on the paleontological resources analysis contained in Section 2.5.3 of the DEIR, the site has a high potential to contain significant fossil resources due to the presence of early to middle Pleistocene alluvial fan deposits. These resources have the potential for being unearthed and damaged during grading and construction activities and are estimated to lie at approximately 4 feet below ground surface. Construction and grading of the proposed Project site will result in soil disturbance below 4 feet, which may unearth previously undetected subsurface paleontological resources. **Mitigation Measure CUL-1** has been identified to reduce the significance of paleontological resource impacts. Adherence to this measure would reduce impacts to paleontological resources to a less than significant level. (DEIR, pgs. 2-12 to 2-13)

3. <u>Geology and Soils</u>

a. Unstable Soils

Potential Significant Impact: The EIR evaluated and concluded that the Project site could experience soil shrinkage during excavation and recompaction.

Finding: Implementation of the following mitigation measures will reduce the potential impact of lateral spreading, subsidence, and collapse to less than significant:

Mitigation Measure GEO-1: *Prior to the issuance of grading permits, any existing low density soils and/or saturated soils shall be removed to competent natural soil under the inspection of the Soils Engineering Firm. After the exposed surface has been cleansed of debris and/or vegetation, it shall be scarified until it is uniform in consistency, brought to the proper moisture content and compacted to a minimum of 90 percent relative compaction (in accordance with ASTM: D-1557). In any area where a transition between fill and native soil or between bedrock and soil are encountered, additional excavation beneath foundations and slabs will be necessary in order to provide uniform support and avoid differential settlement of the structure.*

The on-site soils or approved import soils may be utilized for the compacted fill, provided they are free of any deleterious materials and shall not contain any rocks, brick, asphaltic concrete, concrete, or other hard materials greater than eight inches in maximum dimensions. Any import soil must be approved by the Soils Engineering firm a minimum of 24 hours prior to importation to the site.

The approved fill soils shall be placed in layers not in excess of six inches in thickness. Each lift shall be uniform in thickness and thoroughly blended. The fill soils shall be brought to within 2 percent of the optimum moisture content, unless otherwise specified by the Soils Engineering firm. Each lift shall be compacted to a minimum of 90 percent relative compaction (in accordance with ASTM: D-1557) and approved prior to the placement of the next layer of soil. Compaction tests shall be obtained at the discretion of the Soils Engineering firm but to a minimum of one test for every 500 cubic yards placed and/or for every two feet of compacted fill placed.

The minimum relative compaction shall be obtained in accordance with accepted methods in the construction industry. The final grade of the structural areas shall be in a dense and smooth condition prior to placement of slabs-on-grade or pavement areas. No fill soils shall be

placed, spread, or compacted during unfavorable weather conditions. When the grading is interrupted by heavy rains, compaction operations shall not be resumed until approved by the Soils Engineering firm.

Facts in Support of the Finding: Section 2.5.4 of the DEIR included a geotechnical analysis that performed in-place soil density tests, which revealed that soil shrinkage that may occur would be approximately 10 percent to 15 percent due to excavation and recompaction. This is based on the assumption that the fill would be compacted to 90 percent of the dry density per ASTM standards. As a result subsidence is estimated at 0.2 feet due to earthwork operations. Impacts are considered potentially significant and mitigation measures are required. The geotechnical analysis determined that there is no potential for landslides or liquefaction. Additionally, potential impacts related to lateral spreading would be reduced to less than significant level through adherence to the UBC. **Mitigation Measure GEO-1** would reduce potential impacts associated with unstable soils to a less than significant level. (DEIR, pgs. 2-15 to 2-16)

b. Expansive Soils

Potential Significant Impact: The EIR evaluated and concluded that expansive soils could occur.

Finding: Implementation of the following mitigation measures will reduce to potential impact of expansive soils to less than significant:

Mitigation Measure GEO-2: *Prior the issuance of grading permits, the project proponent shall inform the project engineers, architects, owner, maintenance personnel, and other interested parties of the Expansive Soil Guidelines provided in the project's geotechnical analysis. The recommendations identified in the project's Expansive Soil Guidelines shall be reviewed and considered by the project engineers, architects, owner, maintenance personnel, and other interested parties to determine applicable design guidelines. Applicable design guidelines shall be included and implemented in the project's grading plans.*

Facts in Support of the Finding: According to Section 2.5.4 of the DEIR, soils on site include Exeter sandy loam, 0–2 percent slopes (EnA), Exeter sandy loam, deep (EpA), Exeter very fine

sandy loam (EwB), Exeter very fine sandy loam, deep (EyB), Greenfield sandy loam (GyA), Ramona sandy loam (RaA), Ramona very fine sandy loam (ReC2), and Travor loamy fine sand, eroded (Tp2). As detailed in the Project's geotechnical analysis, expansive soils were observed on the Project site. Exploratory trenches revealed the existing earth materials on site to consist of a disturbed soil/fill and natural soil. A fill/disturbed natural soil classifying as a brown, sandy to clayey silt to a silty sand was encountered across the site and ranged in depth from 1 foot to 1½ feet. These soils were noted to be soft to loose and damp. An undisturbed alluvium soil classifying as a brown sandy to clayey silt to a silty sand was encountered beneath the disturbed top soils and fill. These native soils were noted to be firm to stiff, medium dense to dense, and moist. Development of the proposed Project site would be required to adhere to UBC and City design and engineering standards. However, because expansive soils are present on site, impacts associated with this issue are potentially significant and mitigation measures are required. **Mitigation Measure GEO-2** would reduce potential impacts associated with expansive soils to a less than significant level. (DEIR, pgs. 2-16 to 2-17)

4. <u>Hydrology and Water Quality</u>

a. Water Quality Standards and Waste Discharge Requirements

Potential Significant Impact: The EIR evaluated and concluded that the Project could violate water quality or waste discharge requirements, substantially increase the rate of surface runoff causing flooding, create substantial additional sources of polluted runoff, or otherwise substantially degrade water quality.

Finding: Implementation of the following mitigation measures will reduce the potential impacts related to compliance with water quality standards and waste discharge requirements to less than significant:

Mitigation Measure HYD-01: *Prior to grading plan approval and the issuance of a grading permit by the City, the project proponent shall provide evidence to the City that a Notice of Intent (NOI) with the Regional Water Quality Control Board has been filed to be covered under the State NPDES General Construction Permit for discharge of stormwater associated with construction activities.*

Mitigation Measure HYD-02: *Prior to grading plan approval and the issuance of a grading permit by the City, the project proponent shall submit to the State Water*

Quality Control Board, a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP shall include a surface water control plan and erosion control plan citing specific measures to control on-site and off-site erosion during the entire grading and construction period. Additionally, the SWPPP shall identify structural and nonstructural BMPs to control sediment and non-visible discharges from the site. BMPs to be implemented in the SWPPP may include but shall not be limited to the following:

- *Sediment discharges from the site may be controlled by the following: gravel bags, silt fences, straw wattles and temporary debris basins (if deemed necessary), and other discharge control devices. The construction and condition of the BMPs will be periodically inspected during construction, and repairs will be made when necessary as required by the SWPPP.*

- *Materials that have the potential to contribute non-visible pollutants to stormwater must not be placed in drainage ways and must be contained, elevated, and placed in temporary storage containment areas.*

- *All loose piles of soil, silt, clay, sand, debris, and other earthen material shall be protected in a reasonable manner to eliminate any discharge from the site. Stockpiles will be surrounded by silt fences.*

- *The SWPPP will include inspection forms for routine monitoring of the site during the construction phase to ensure NPDES compliance.*

- *Additional BMPs and erosion control measures will be documented in the SWPPP and utilized if necessary.*

- *The SWPPP will be kept on site for the entire duration of project construction and will also be available to the local RWQCB for inspection at any time.*

In the event that it is not feasible to implement the above BMPs, the City of Moreno Valley can make a determination that other BMPs will provide equivalent or superior treatment either on or off site.

Mitigation Measure HYD-03: Prior to the issuance of grading permits, the project proponent shall provide evidence to the City that the following provisions have been added to construction contracts for the project:

- *The Construction Contractor shall be responsible for performing and documenting the application of BMPs identified in the SWPPP. Weekly inspections shall be performed on sediment control measures called for in the SWPPP. Monthly reports shall be maintained by the Contractor and submitted to the City for inspection. In addition, the Contractor will also be required to maintain an inspection log and have the log on site to be reviewed by the City of Moreno Valley and the representatives of the Regional Water Quality Control Board.*

Mitigation Measure HYD-04: Prior to grading plan approval and the issuance of a grading permit by the City, the project proponent shall receive approval from the City of Moreno Valley for a Final Water Quality Management Plan (F-WQMP). The F-WQMP shall specifically identify pollutants of concern, site design, source control, and treatment control BMPs that shall be used on site to control predictable pollutant runoff in order to reduce impacts to water quality to the maximum extent practicable.

Facts in Support of the Finding: According to Section 2.5.6 of the DEIR, development of the Project is required to obtain coverage under an NPDES permit, which includes the submittal of a Notice of Intent (NOI) application to the State Water Resources Control Board (SWRCB), the receipt of a Waste Discharge Identification Number (WDID) from SWRCB, and the preparation of an SWPPP for construction wastewater discharges. During the construction period, the Project would use a series of Best Management Practices (BMPs) to reduce erosion and sedimentation. These measures may include the use of gravel bags, silt fences, hay bales, check dams, hydroseed, and soil binders. The construction contractor would be required to operate and maintain these controls throughout the duration of on-site activities. In addition, the construction contractor would be

required to maintain an inspection log and have the log on site to be reviewed by the City and representatives of the RWQCB. Adherence to **Mitigation Measures HYD-01 through HYD-04** will ensure that these practices and measures take place and would reduce the potential impacts related to compliance with water quality standards and waste discharge requirements to less than significant. (DEIR, pgs. 2-19 to 2-24)

b. Erosion

Potential Significant Impact: The EIR evaluated and concluded that the Project could significantly alter drainage patterns that would result in erosion or siltation.

Finding: Implementation of the following mitigation measures will reduce the potential impacts to less than significant:

Mitigation Measure HYD-05: *Prior to grading plan approval and the issuance of a grading permit, the project proponent shall submit a detailed grading plan and drainage report, with supporting engineering calculations, to the City Engineer for review and approval. The plan and report shall incorporate relevant requirements identified by the City and/or site-specific geotechnical investigations. The plan and report shall provide evidence that the storm drainage system would be adequate to convey water for the 100-year storm event from the project site and that the post-development flows exiting the proposed Project site are less than or equal to pre-development flows.*

Facts in Support of the Finding: According to Section 2.5.6 of the DEIR, the majority of storm flows associated with the Project will be collected by a series of drop inlet catch basins. While the increase in impervious surfaces attributable to the proposed Project would contribute to a greater volume and higher velocity of storm water flows, the proposed Project's drainage system would accept and accommodate runoff that would result from Project construction at or below pre-Project conditions. Therefore, the post-development flows generated on the Project site would not exceed the capacity of the planned storm water drainage systems. To ensure that long-term drainage capacity issues are reduced to a less than significant level, **Mitigation Measure HYD-05** has been identified. With adherence to this mitigation measure, impacts associated with effects on existing drainage patterns are reduced to less than significant. (DEIR, pgs. 2-24 to 2-25)

5. Noise

a. Short-Term Construction Noise

Potential Significant Impact: The EIR evaluated and concluded that noise levels from grading and other construction activities for the proposed Project may range up to 65 dBA at the closest residences north of the Project site for very limited times when construction occurs near the Project's boundary. Construction-related noise impacts from the proposed Project would be potentially significant.

Finding: Implementation of the following mitigation measures will reduce potential short-term construction noise impacts to less than significant:

4.4.6.1A *During all project site excavation and grading on site, the project contractor shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.*

4.4.6.1B *The project contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest to the project site.*

4.4.6.1C *The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receptors nearest to the project site during all project construction.*

4.4.6.1D *During all project site construction activities, the construction contractor shall limit all construction-related activities that would result in high noise levels to between the hours of 6:00 a.m. and 8:00 p.m. on weekdays and between the hours of 7:00 a.m. to 8:00 p.m. on weekends and holidays, unless written approval is obtained from the City Building Official or City Engineer. For grading activity, the hours are limited to between 7:00 a.m. and 6:00 p.m. weekdays and 8:00 a.m. to 4:00 p.m. on weekends and holidays.*

Facts in Support of the Finding: According to Section 4.4 of the DEIR, two types of short-term noise impacts could occur during the construction of the Project. First, construction crew commutes and the transport of construction equipment and materials to the site for the proposed Project would incrementally increase noise levels on access roads leading to the site. The second type of short-term noise impact is related to noise generated during excavation, grading, and building erection on the

Project site. Construction of the proposed Project is expected to require the use of scrapers, bulldozers, and water and pickup trucks. The site preparation phase, which includes excavation and grading of the site, tends to generate the highest noise levels, because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery such as backfillers, bulldozers, draglines, and front loaders. Earthmoving and compacting equipment includes compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve one or two minutes of full-power operation followed by three to four minutes at lower power settings. The maximum noise level generated by each scraper on the proposed Project site is assumed to be approximately 87 dBA L_{max} at 50 feet from the scraper. Each bulldozer would generate approximately 85 dBA Lmax at 50 feet. The maximum noise level generated by water and pickup trucks is approximately 86 dBA L_{max} at 50 feet from these vehicles. Each doubling of the sound sources with equal strength increases the noise level by three (3) dBA. Assuming that each piece of construction equipment operates at some distance from the other equipment, the worst-case composite noise level during this phase of construction would be 91 dBA L_{max} at a distance of 50 feet from the active construction area.

The nearest noise-sensitive receptor locations to the Project site are existing residences approximately 1,000 feet to the north. These nearest residents may be subject to short-term, intermittent, maximum noise reaching 65 dBA L_{max}, generated by construction activities on the project site. The ambient noise associated with vehicular traffic and industrial uses in the project area would mask the majority of the construction noise from the project site. No significant construction noise impacts would occur if construction of the proposed project would occur within the permitted hours of 6:00 a.m. to 8:00 p.m. of any working day, and within the permitted hours of 7:00 a.m. and 8:00 p.m. on Sundays and federal holidays. Compliance with the construction hours specified in the City's Municipal Code would result in construction noise impacts that are less than significant. While impacts would be considered less than significant as long as construction activities occur within the designated hours identified in the City's Municipal Code, mitigation measures have been identified to reduce the noise levels that would expose nearby sensitive receptors to noise levels in excess of the City's noise standards.

With adherence to the City's designated construction hours and with implementation of the proposed mitigation measures, potential short-term construction noise impacts would be reduced below the level of significance. (DEIR, pgs. 4.4-16 to 4.4-18)

6. Transportation

a. Existing Plus Project Roadway Segments

Potential Significant Impact: The EIR evaluated and concluded that two roadway segments are forecasted to exceed satisfactory levels of service in the existing plus project conditions.

Finding: Implementation of the following mitigation measures will reduce project-specific roadway segment impacts to less than significant:

4.5.6.1A. *Prior to the issuance of building permits, the project applicant shall participate in the City of Moreno Valley Development Impact (DIF) Fee Program and pay the project's fair share for local circulation improvements as outlined in the VIP Moreno Valley Project Traffic Study. The City shall ensure that the intersection and street improvements outlined in the VIP Moreno Valley Project Traffic Study will be constructed pursuant to the timeframes established by the City of Moreno Valley Development Impact Fee Program.*

4.5.6.1B. *Prior to the issuance of building permits, the project applicant shall participate in the County of Riverside Transportation Uniform Mitigation Fee (TUMF) Program and pay the project's fair share for regional circulation improvements. The City shall ensure that the intersection and street improvements outlined in the VIP Moreno Valley Project Traffic Study will be constructed pursuant to the timeframe established by the County of Riverside TUMF Program.*

Facts in Support of the Finding: According to Section 4.5 of the DEIR, Perris Boulevard north of Grove View Road (southbound); and Perris Boulevard south of South Project Driveway (northbound and southbound) are projected to operate at unsatisfactory levels of service. The DEIR determined that this roadway currently operates at unsatisfactory levels of service without the projected conditions. The City is currently in the process of implementing a Capital Improvement Project to widen Perris Boulevard from Cactus Avenue south to city limits. The improvement project will widen Perris Boulevard to a six-lane street section, consistent with the General Plan. Construction is scheduled to start in the summer of 2012 and end in May 2013. The widening will encompass the improvements defined in the DEIR to improve operations of the roadway to the City's level of service standard and mitigate the proposed Project's contribution to the impact. With implementation of the City's improvements to Perris Boulevard and implementation of Mitigation Measures 4.5.6.1A

and 4.5.6.1B requiring that the Project applicant pay traffic impact fees, project-specific impacts will be reduced to less than significant levels. (DEIR, pgs. 4.4-18 to 4.4-19)

b. Year 2013 Cumulative With Project Conditions Intersection and Roadway Segments

Potential Significant Impact: The EIR evaluated and concluded that eleven intersections and four roadway segments are forecasted to exceed satisfactory levels of service in the year 2013 cumulative plus project conditions.

Finding: Implementation of the following mitigation measures will reduce the Project's contribution to cumulatively considerable intersection and roadway segment impacts to a less than significant level:

4.5.6.2A. *Prior to the issuance of occupancy permits, the project applicant shall have constructed the site access roadway improvements outlined below.*

Indian Street/South Project Driveway: Restripe to convert center turn lane on Indian Street to a two-way left-turn lane. This location does not meet a peak hour signal warrant. This is a site-adjacent improvement to be constructed by the project applicant.

Facts in Support of the Finding: According to Section 4.5 of the DEIR, an intersection and roadway segment level of service analysis was conducted for the year 2013 cumulative with project condition to determine the Project's contribution to cumulative traffic impacts to local intersections and roadway segments. As identified in Table 4.5.E in the DEIR, the addition of Project traffic to the year 2013 cumulative scenario would result in conditions exceeding the established LOS standard at the following intersections:

- I-215 Southbound Ramps/Harley Knox Boulevard (a.m. and p.m. peak hours);
- I-215 Northbound Ramps/Harley Knox Boulevard (a.m. and p.m. peak hours);
- Indian Street/South Project Driveway (p.m. peak hour);
- Indian Street/Harley Knox Boulevard (a.m. and p.m. peak hours);
- Perris Boulevard/Gentian Avenue (a.m. and p.m. peak hours);
- Perris Boulevard/Iris Avenue (a.m. and p.m. peak hours);

- Perris Boulevard/Krameria Avenue (a.m. and p.m. peak hours);
- Perris Boulevard/Nandina Avenue (a.m. and p.m. peak hours);
- Perris Boulevard/Grove View Road (a.m. and p.m. peak hours);
- Perris Boulevard/South Project Driveway (a.m. and p.m. peak hours); and
- Perris Boulevard/Harley Knox Boulevard (a.m. and p.m. peak hours).

The project contributes to the failure to meet the level of service standard at ten of the eleven intersections resulting in a significant cumulative impact. The unsatisfactory level of service at the Indian Street/South Project Driveway intersection is considered to be a project-specific impact because the need for the intersection is exclusively for project access.

As identified in Table 4.5.E in the DEIR, the addition of Project traffic to the year 2013 cumulative scenario would result in conditions exceeding the established LOS standard at the following roadway segments:

- Harley Knox Boulevard west of Indian Street (eastbound and westbound);
- Indian Street south of South Project Driveway (northbound and southbound);
- Perris Boulevard north of Grove View Road (southbound only); and
- Perris Boulevard south of South Project Driveway (northbound and southbound).

Section 4.5 of the DEIR identifies the improvements necessary to maintain the level of service standard at the intersections and roadways impacted in the year 2013 plus project condition. The roadway and intersection improvements are consistent with the City's General Plan and DIF program and are included in the County's TUMF program. A portion of the City's DIF is allocated toward funding improvements to the City's transportation system and the specific improvements are based on the General Plan Circulation Element.

The following improvements were identified in the DEIR to maintain or improve the operational level of service of the impacted intersections and roadways. The improvements required to maintain or to improve the level of service operations of transportation facilities affected by the project will be constructed through the City's DIF as supplemented by the County's TUMF program. The project will participate with these programs as part of **Mitigation Measures 4.5.6.1A and 4.5.6.1B**. The list of improvements is as follows:

- I-215 Southbound Ramps/Harley Knox Boulevard: Restripe the left-most westbound through lane as a left-turn lane. Restripe the off-ramp to provide two left-turn lanes and a shared through/right-turn lane. This improvement is part of the TUMF program.

- I-215 Northbound Ramps/Harley Knox Boulevard: Restripe the northbound shared through/left-turn lane as a shared left-turn/through/right-turn lane. Add an eastbound free right-turn lane. This improvement is part of the TUMF program.

- Indian Street/Harley Knox Boulevard: Add an eastbound through lane. Provide overlap phasing for the southbound right-turn lane. These improvements are consistent with the City of Perris General Plan Circulation Element. This improvement is part of the TUMF program.

- Perris Boulevard/Gentian Avenue: Add a southbound through lane. This improvement is consistent with the City of Moreno Valley's General Plan Circulation Element. Perris Boulevard/Iris Avenue: Add a second westbound left-turn lane and an eastbound right-turn lane. These improvements are consistent with the City of Moreno Valley's General Plan Circulation Element. This improvement is part of the City DIF and County TUMF programs.

- Perris Boulevard/Krameria Avenue: Add two southbound through lanes, a northbound through lane, and a northbound right-turn lane. These improvements are consistent with the City of Moreno Valley's General Plan Circulation Element. This improvement is part of the City DIF and County TUMF programs.

- Perris Boulevard/Nandina Avenue: Add a southbound through lane. This improvement is consistent with the City of Moreno Valley's General Plan Circulation Element. This improvement is part of the City DIF and County TUMF programs.

- Perris Boulevard/Grove View Road: Add a southbound through lane. This improvement is consistent with the City of Moreno Valley's General Plan Circulation Element. This improvement is part of the City DIF and County TUMF programs.

- Perris Boulevard/South This improvement is part of the City DIF and County TUMF programs.

- Project Driveway: Add a southbound through lane. This improvement is consistent with the City of Moreno Valley's General Plan Circulation Element. This improvement is part of City DIF and TUMF programs.

- Perris Boulevard/Harley Knox Boulevard: Add two southbound through lanes, one northbound through lane, a second eastbound left-turn lane, and overlap phasing for the southbound right-turn lane. These improvements are part of the TUMF program.

- Harley Knox Boulevard west of Indian Street: Widen to a six-lane Divided Arterial. This improvement is consistent with the City of Perris General Plan Circulation Element. This improvement is part of the TUMF program.

- Indian Street south of South Project Driveway: Widen to a four-lane Undivided Arterial. This improvement is consistent with the City of Moreno Valley General Plan Circulation Element. This improvement is part of the City of Moreno Valley DIF and TUMF programs.

- Perris Boulevard north of Grove View Road: Widen to a six-lane Divided Arterial. This improvement is consistent with the City of Moreno Valley General Plan Circulation Element. This improvement is part of the City's DIF and TUMF programs.

- Perris Boulevard south of South Project Driveway: Widen to a six-lane Divided Arterial. This improvement is consistent with the City of Moreno Valley and City of Perris General Plan Circulation Elements. This improvement is part of the City of Moreno Valley DIF and County TUMF programs.

With implementation of these improvements, all intersections and roadway segments would operate at the applicable performance standard or better during peak hours for year 2013 cumulative with project conditions resulting in a less than significant impact.

The project will contribute toward these future intersection and roadway improvements to maintain the applicable level of service standard through payment of frees required as part of the DIF and TUMF programs. As part of its Capital Improvement Program (CIP), the City determines the timing of necessary roadway improvements based on periodic review of citywide traffic counts, traffic trends, and a review of traffic accidents. The CIP projects are funded by a variety of sources including the County TUMF program and the City's DIF program and general fund. (DEIR, pgs. 4.4-19 to 4.4-28)

C. ENVIRONMENTAL IMPACTS NOT FULLY MITIGATED TO A LEVEL OF LESS-THAN-SIGNIFICANT

The Moreno Valley Planning Commission finds the following environmental impacts identified in the EIR remain significant even after application of all feasible mitigation measures: agricultural resources (individually and cumulative), air quality (individually and cumulative), cumulative climate change and greenhouse gas emissions, transportation (and cumulative). In accordance with CEQA Guidelines Section 15092(b)(2), the Planning Commission of the City of Moreno Valley cannot approve the Project unless it first finds (1) under *Public Resources Code* Section 21081(a)(3), and CEQA Guidelines Section 15091(a)(3), that specific economic, legal, social technological, or other considerations, including provisions of employment opportunities to highly trained workers, make infeasible the mitigation measures or Project alternatives identified in the EIR; and (2) under CEQA Guidelines section 15092(b), that the remaining significant effects are acceptable due to overriding concerns described in the CEQA Guidelines Section 15093 and, therefore, a statement of overriding considerations is included herein.

1. <u>Agricultural Resources (Individual and Cumulative Impacts)</u>

a. Conversion of State Designated Farmland

Significant Unavoidable Impact: The EIR evaluated and concluded that the Project could impact 16.89 acres of Prime Farmland, 16.23 acres of Farmland of Local Importance, and 38.69 acres of Farmland of Local Importance.

Finding: Based on the entire record before us, this Commission finds that this impact is potentially significant as there are no known feasible mitigation measures that could reduce this impact to a level

of less than significant. Accordingly, Project-related impacts to state designated farmland will remain significant and unavoidable.

Facts in Support of the Finding: Section 4.1 of the DEIR identifies several potential agricultural conservation measures contained in the City's General Plan that include: enrolling productive agricultural land into a Williamson Act Contract; providing protection to ongoing agricultural operations from complaints and nuisance complaints from adjacent new development; protecting productive agricultural land subject to conversion through the purchase of or transfer of its development rights; purchasing conservation easements on existing agricultural land to ensure that the land is never converted to urban uses; and donating funds to a regional or statewide program that promotes and implements the use of agricultural land conservation easements.

The potential agricultural conservation measures identified in the DEIR are not considered to be feasible by the City for the following reasons:

Williamson Act Contracts: Williamson Act contracts are entered into voluntarily by property owners and the City cannot force owners to participate in this program. In addition, Williamson Act contracts will result only in temporary preservation of agricultural land since property owners have the option of non-renewal of these contracts at any time after the ten-year contract period ends.

Protecting Existing Agricultural Operations: Providing protection for ongoing agricultural activities from new developments, such as buffers between agricultural operations and new development or requiring the notification and disclosure of agricultural activities to the purchasers adjacent properties, will not permanently protect agricultural land.

Transfer of Development Rights, Conservation Easements, or Agricultural Conservation Bank: The purchase or transfer of development rights, purchase of conservation easements, or donation of funds to assist in the conservation of agricultural land would need to be implemented to ensure the preservation of agricultural land. As stated previously, the City anticipates the conversion of agricultural land within the City and does not set aside land for permanent preservation. The current General Plan does not include any agricultural designations. The City allows agricultural uses in all land use designations as an interim use until such time as the land is developed per the vision identified in the General Plan. One of the goals stated in the City's recent General Plan is the "…orderly conversion of agricultural lands." For this reason, the City expects that the majority of the land within the City will be converted to urban uses, although some agriculture will continue as interim uses, as allowed by the City's Development Code for all zoning categories. The existing and

continued reduction in productive agricultural operations within the City is produced by several factors including; urbanization in the City and Inland Empire resulting in dramatically increasing land prices; high water and labor costs; environmental regulation (e.g., insects, odors, groundwater contamination, and solid waste removal); and competition from Kern County and the Central Valley with lower land costs and reduced regulations. (DEIR, pgs. 4.1-10 to 4.1-14)

The City has determined that these measures are economically infeasible and that they are contrary to the City's vision (as stated in its General Plan) for the Project site and alternative mitigation has not been identified.

b. Conversion of Farmland to a Non-Agricultural Use

Significant Unavoidable Impact: The EIR evaluated and concluded that the Project would result in the development of industrial uses on land that has historically been utilized for sod production.

Finding: Based on the entire record before us, this Commission finds that this impact is potentially significant as there are no known feasible mitigation measures that could reduce this impact to a level of less than significant. Accordingly, Project-related impacts from the conversion of farmland to a non-agricultural use will remain significant and unavoidable.

Facts in Support of the Finding: According to Section 4.1 of the DEIR, the Project site has historically been in agricultural production and was most recently used to grow sod, and the sod production ceased operations in in August 2005 and has not been in agricultural production since that time. The conversion of the Project site to a non-agricultural use is a result of various economic and demographic factors. Increased cost for water and a continuing demand for housing and other development in the City and region are the primary reasons for this agricultural land conversion. A LESA model was also used to evaluate the site. It was determined that the Project LESA score is 64.38, which is considered significant. The Project does not include design features that would prevent the existing agricultural operations in the area from continuing. The Project would convert land that was previously used for agriculture and the development of the proposed Project may contribute to the conversion of adjacent lands. However, the Project is a logical extension of development in the City and does not create leapfrog development or islands of agricultural land that would be difficult to farm. The City recognizes development pressures within the City, and that these pressures will increase as the City continues to build out. Additionally, while the Project would not directly cause the conversion of adjacent agricultural land to non-agricultural uses because in has lied fallow for seven years, it would contribute to development pressure within the City that could potentially lead to the conversion of

agricultural land off site. However, as stated in the previous discussion of these Findings regarding the conversion of state designated farmland, the City has determined the agricultural conservation measures identified by the City are economically infeasible and that they are contrary to the City's vision (as stated in its General Plan) for the Project site and alternative mitigation has not been identified. (DEIR, pgs. 4.1-10 to 4.1-15)

c. Cumulative Agricultural Resource Impacts

Significant Unavoidable Impact: The EIR evaluated and concluded that the Project would have a significant cumulative impact on agricultural resources in Riverside County.

Finding: Based on the entire record before us, this Commission finds that this impact is potentially significant as there are no known feasible mitigation measures that could reduce this impact to a level of less than significant. Accordingly, Project-related impacts to cumulative state designated farmland will remain significant and unavoidable.

Facts in Support of the Finding: According to Section 4.1 of the DEIR, the Project-related impacts to Farmland of Statewide Importance and the conversion of agricultural land to a non-agricultural use cannot be mitigated through a local or regional program to mitigate impacts to agricultural resources. As stated previously, the City does not maintain a General Plan or zoning designation for agricultural uses and there are no Project-level feasible mitigation measures that would help reduce cumulative impacts. During the last reporting period (2006–2008), 6,540 acres of Prime Farmland, 2,366 acres of Farmland of Statewide Importance, and 8,873 acres of Farmland of Local Importance were converted to other uses. The cumulative effect of development in the region will continue to result in the conversion of agricultural lands to non-agricultural uses. Because agricultural land, including Prime Farmland, Farmland of Statewide Importance, and Farmland of Local Importance is a finite resource, the conversion of approximately 71 acres to industrial uses, combined with planned and future development in the City and region, represents a significant cumulative impact to agricultural operations and resources. (DEIR, pg. 4.1-16) As stated in the previous discussion of these Findings regarding the conversion of state designated farmland and conversion of agricultural land to a non-agricultu8rla use, the City has determined the agricultural conservation measures identified by the City are economically infeasible and that they are contrary to the City's vision (as stated in its General Plan) for the Project site and alternative mitigation has not been identified

2. Air Quality (Project-Specific and Cumulative Impact)

a. Short-Term Construction Emissions

Significant Unavoidable Impact: The EIR evaluated and concluded that the Project's construction source emissions would temporarily exceed SCAQMD regional and localized significance thresholds, thereby potentially violating an air quality standard or contributing to an existing or projected air quality.

Finding: Based on the entire record before us, this Commission finds that this impact is potentially significant but will be reduced to the extent feasible through mitigation measures. The Commission finds that **Mitigation Measures 4.2.6.1A through 4.2.6.1T** are incorporated into the MMRP for the Project, and will be implemented as specified therein. However, the Commission finds that even with application of the following mitigation measures, construction emissions-related air quality impacts are considered significant and unavoidable.

4.2.6.1A *Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall place construction equipment staging areas at least 200 feet away from sensitive receptors. Contract specifications shall be included in the proposed Project construction documents, which shall be reviewed by the City.*

4.2.6.1B *Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall utilize power sources (e.g., power poles) or clean-fuel (e.g., fuel other than diesel or gasoline) generators. Contract specifications shall be included in the proposed Project construction documents, which shall be reviewed by the City.*

4.2.6.1C *Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall utilize California Air Resources Board (CARB) Tier II Certified equipment or better during the rough/mass grading phase for the following pieces of equipment: rubber-tired dozers and scrapers. Contract specifications shall be included in the proposed Project construction documents, which shall be reviewed by the City.*

4.2.6.1D *All clearing, grading, earthmoving, or excavation activities shall cease when winds exceed 25 mph per SCAQMD guidelines in order to limit fugitive dust emissions.*

4.2.6.1E *The contractor shall ensure that all disturbed unpaved roads and disturbed areas within the project are watered at least three times daily during dry weather. Watering, with complete coverage of disturbed areas, shall occur at least three times a day, preferably in the mid-morning, afternoon, and after work is done for the day.*

4.2.6.1F *The contractor shall ensure that traffic speeds on unpaved roads and project site areas are reduced to 15 miles per hour or less to reduce PM_{10} and $PM_{2.5}$ fugitive dust haul road emissions. Speed limit signs (15 mph maximum) shall be posted at entry points to the project site, and along any unpaved roads providing access to or within the project site and/or any unpaved designated on-site travel routes.*

4.2.6.1G *Groundcover shall be replaced, and/or non-toxic soil stabilizers shall be applied (according to manufacturers' specifications) to any inactive construction areas (previously graded areas inactive for ten days or more).*

4.2.6.1H *The contractor shall minimize pollutant emissions by maintaining equipment engines in good condition and in proper tune according to manufacturer's specifications and during smog season (May through October) by not allowing construction equipment to be left idling for more than five minutes (per California law).*

4.2.6.1I *The contractor shall ensure use of low-sulfur diesel fuel in construction equipment as required by the California Air Resources Board (CARB) (diesel fuel with sulfur content of 15 ppm by weight or less).*

4.2.6.1J *If available, the project applicant shall use "Low-Volatile Organic Compounds" paints, coatings, and solvents with a VOC content lower than required under Rule 1113 (not to exceed 150 grams/liter; 1.25 pounds/gallon). High Pressure Low Volume (HPLV) applications of paints, coatings, and solvents shall be consistent with South Coast Air Quality Management District Rule 1113. Alternatively, the project applicant shall use materials that do not require painting or are pre-painted.*

4.2.6.1K *Grading plans, construction specifications and bid documents shall also include the following notations:*

- *Off-road construction equipment shall utilize alternative fuels where feasible e.g., biodiesel fuel (a minimum of B20), natural gas (CNG), liquefied natural gas (LNG), propane, except for equipment where use of such fuels would void the equipment warranty;*

- *Gravel pads shall be provided at all access points to prevent tracking of mud onto public roads;*
- *Install and maintain trackout control devices at all access points where paved and unpaved access or travel routes intersect;*
- *The contractor or builder shall designate a person or person(s) to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust off site;*
- *The contractor or builder shall post a publicly visible sign with the telephone number and person to contact regarding dust complaints. The contact person shall take corrective action within 24 hours;*
- *High-pressure injectors shall be provided on diesel construction equipment where feasible;*
- *Engine size of construction equipment shall be limited to the minimum practical size;*
- *Substitute gasoline-powered for diesel powered construction equipment where feasible;*
- *Use electric construction equipment where feasible;*
- *Install catalytic converters on gasoline-powered equipment where feasible;*
- *Ride-sharing program for the construction crew shall be encouraged and shall be supported by contractor(s) via incentives or other inducement;*
- *Documentation shall be provided to the City of Moreno Valley indicating that construction workers have been encouraged to carpool or otherwise reduce VMT to the greatest extent practical, including providing information on available park and ride programs;*
- *Lunch vendor services shall be permitted on site during construction to minimize the need for off-site vehicle trips;*
- *All forklifts used during construction and in subsequent operation of the project shall be electric or natural gas powered; and*

- *Suspend use of all construction equipment operations during second stage smog alerts.*

4.2.6.1L *Throughout project construction, a construction relations officer/community liaison, appointed by the Applicant, shall be retained on-site. In coordination and cooperation with the City, the construction relations officer/community liaison shall respond to any concerns related to PM_{10} (fugitive dust) generation or other construction-related air quality issues.*

4.2.6.1M *All project entrances shall be posted with signs which state:*

- *Truck drivers shall turn off engines when not in use;*
- *Diesel delivery trucks servicing the project shall not idle for more than three (3) minutes; and*
- *Telephone numbers of the building facilities manager and CARB, to report violations.*

4.2.6.1N *When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.*

4.2.6.1O *All streets shall be swept at least once a day using SCAQMD Rule 1186 certified street sweepers utilizing reclaimed water trucks if visible soil materials are carried to adjacent streets.*

4.2.6.1P *Any vegetative cover to be utilized onsite shall be planted as soon as possible to reduce the disturbed area subject to wind erosion. Irrigation systems required for these plants shall be installed as soon as possible to maintain good ground cover and to minimize wind erosion of the soil.*

4.2.6.1Q *Provide temporary traffic controls such as a flag person, during all phases of construction to maintain smooth traffic flow.*

4.2.6.1R *All roadways, driveways, sidewalks, etc., should be completed as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.*

4.2.6.1S *Implement activity management techniques including a) development of a comprehensive construction management plan designed to minimize the number of*

large construction equipment operating during any given time period; b) scheduling of construction truck trips during non-peak hours to reduce peak hour emissions; c) limitation of the length of construction work-day period; and d) phasing of construction activities.

4.2.6.1T *Reroute construction trucks away from congested streets and sensitive receptor areas.*

These measures shall be enforced by the on-site facilities manager (or equivalent.

Facts in Support of the Finding: Even after compliance with applicable SCAQMD Rules and implementation of Mitigation Measures 4.2.6.1A through 4.2.6.1T, Project construction activities would temporarily exceed SCAQMD regional and localized emissions thresholds for oxides of nitrogen (NO_x) and particulate matter (PM_{10} and $PM_{2.5}$). (See DEIR Tables 4.2-I and 4.2-J) Project construction-related emissions in exceedance of SCAQMD's regional and localized significance thresholds are therefore determined to be significant and unavoidable air quality impacts notwithstanding mitigation. (DEIR, pgs. 4.2-19 through 4.2-25).

b. Long-Term Operational Emissions

Significant Unavoidable Impact: The EIR evaluated and concluded that the Project could potentially exceed applicable daily thresholds for operational activities.

Finding: Based on the entire record before us, this Commission finds that this impact is potentially significant but will be reduced to the extent feasible through mitigation measures. The Commission finds that Mitigation Measures 4.2.6.3A and 4.2.6.3B is incorporated into the MMRP for the Project, and will be implemented as specified therein. However, the Commission finds that even with application of these mitigation measures, long term construction emissions-related air quality impacts are considered significant and unavoidable.

4.2.6.3A *Prior to issuance of the first building permit, building and site plan designs shall ensure that the project's energy efficiencies surpass applicable 2008 California Title 24, Part 6 Energy Efficiency Standards by a minimum of 20 percent. Verification of increased energy efficiencies shall be documented in Title 24 Compliance Reports provided by the Applicant, and reviewed and approved by the City. Any combination of design features, including but not limited to the following list, may be used to fulfill*

this requirement provided that the total increase in energy efficiency meets or exceeds 20 percent:

- *Exceed California Title 24 Energy Efficiency performance standards for water heating and space heating and cooling, as deemed acceptable by the City.*
- *Increase in insulation such that heat transfer and thermal bridging is minimized.*
- *Limit air leakage through the structure or within the heating and cooling distribution system to minimize energy consumption.*
- *Incorporate dual-paned or other energy efficient windows.*
- *Incorporate energy efficient space heating and cooling equipment.*
- *Use interior and exterior energy efficient lighting which exceeds the California Title 24 Energy Efficiency performance standards, as deemed acceptable by the City. Use automatic devices to turn off lights when they are not needed.*
- *To the extent that they are compatible with landscaping guidelines established by the City, use shade-producing trees, particularly those that shade paved surfaces such as streets and parking lots and buildings at the project site.*
- *Use paint and a surface color palette for the project emphasizing light and off-white colors which reflect heat away from the buildings.*
- *Install a photovoltaic array (solar panels) or other source of renewable energy generation on-site, or otherwise acquire energy from the local utility that has been generated by renewable resources, to meet the project's office electricity needs.*
- *Reduce energy demand associated with potable water conveyance using the following:*
    - *Landscaping palette emphasizing drought-tolerant plants;*
    - *Use of water-efficient irrigation techniques; and,*
    - *U.S. EPA Certified WaterSense labeled for equivalent faucets, high-efficiency toilets (HETs), and water-conserving shower heads.*
- *Provide secure, weather-protected, on-site bicycle storage/parking.*

- *Provide on-site showers (one for males and one for females). Lockers for employees shall be provided.*
- *Establish a Transportation Management Association (TMA). The TMA will coordinate with other TMAs within the City to encourage and coordinate carpooling among building occupants. The TMA will advertise its services to building occupants, and offer transit and/or other incentives to reduce GHG emissions. A plan will be submitted by the TMA to the City within two months of project completion that outlines the measures implemented by the TMA, as well as contact information.*
- *Provide preferential parking for carpools, vanpools or other alternative fuel vehicles. Locations and configurations of proposed preferential parking for carpools and vanpools are subject to review and approval by the City. Prior to final site plan approval, delineate preferential parking for carpools and vanpools on the project site plan.*
- *Provide at least two electric vehicle charging stations. Locations and configurations of proposed charging stations are subject to review and approval by the City. Prior to issuance of the first building permit, delineate stub outs for charging stations on the project building plans.*
- *Implement compressed workweek schedules.*
- *Achieve at least 20% per year (as a percentage of previous percentage, not total trips) increase in percentage of consolidated trips carried by SmartWay carriers until it reaches a minimum of 90% of all long haul trips carried by SmartWay 1.0 or greater carriers.*
- *Achieve at least 15% per year (as a percentage of previous percentage, not total trips) increase in percentage of long haul trips carried by SmartWay carriers until it reaches a minimum of 85% of all consolidator trips carried by SmartWay 1.0 or greater carriers.*
- *Use of fleet vehicles conforming to 2010 air quality standards or better.*
- *Installation of catalytic converters on gasoline-powered equipment.*

- *Inclusion of electric powered and/or compressed natural gas fueled trucks and/or vehicles in fleets;*
- *Establishment and use of carpool/vanpool programs, complemented by parking fees for single-occupancy vehicles;*
- *Provision of preferential parking for EV and CNG vehicles;*
- *Use of electrical equipment (instead of gasoline-powered equipment) for landscape maintenance;*
- *Use of electric (instead of diesel or gasoline-powered) yard trucks;*
- *Use of SmartWay 1.25 rated trucks.*
- *Provide a display case or kiosk displaying transportation information including the RTA bus schedule in a prominent area accessible to employees.*
- *Use landscape maintenance companies that use battery powered or electric equipment or contract only with commercial landscapers who operate with equipment that complies with the most recent California Air Resources Board certification standards, or standards adopted no more than three years prior to date of use or any combination of these two themes.*

4.2.6.3B *The project shall be designed to facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills by providing easily accessible areas that are dedicated to the collection and storage of recyclable materials including: paper, cardboard, glass, plastics, and metals. Locations of proposed recyclable materials collection areas are subject to review and approval by the City. Prior to Final Site Plan approval, locations of proposed recyclable materials collection areas shall be delineated on the project site plan.*

Facts in Support of the Finding: Even after compliance with applicable SCAQMD Rules and implementation of Mitigation Measures 4.2.6.3A and 4.2.6.3B, Project operational activities will exceed SCAQMD daily emissions thresholds for ROG, NO_x, CO, and PM_{10}. (DEIR Table 4.2.K) Project operational-related impacts that exceed long-term, operational emissions thresholds are therefore determined to be significant and unavoidable air quality impacts notwithstanding mitigation. (DEIR, pgs. 4.2-26 to 4.2.28)

c. Cumulative Air Quality Impacts

Significant Unavoidable Impact: The EIR evaluated and concluded that the Project could potentially result in a cumulatively considerable net increase of criteria pollutants for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).

Finding: Based on the entire record before us, this Council finds that this impact is potentially significant as there are no known feasible mitigation measures that could reduce this impact to a level of less than significant. Accordingly, Project-related impacts cumulative air quality impacts will remain significant and unavoidable.

Facts in Support of the Finding: Included in Section 4.2 of the DEIR, Table 4.2.K indicates that the long-term operation of the Project would contribute to long-term regional air pollutants despite implementation of mitigation measures. The Basin is in nonattainment for NO_X, PM_{10}, $PM_{2.5}$, and ozone at the present time; therefore, the operation of the proposed Project would exacerbate nonattainment of air quality standards within the Basin and contribute to adverse cumulative air quality impacts. Implementation of the proposed Project would unavoidably contribute to significant long-term cumulative air quality impacts. (DEIR, pg. 4.2-29)

3. Climate Change and Greenhouse Gas

a. Cumulative Impacts of Climate Change and Greenhouse Gas

Significant Unavoidable Impact: The EIR evaluated and concluded that the Project could have a cumulative impact related to climate change and greenhouse gas emissions.

Finding: Based on the entire record before us, this Commission finds that the Project's impacts related to climate change and greenhouse gas emissions is potentially significant but will be reduced to the extent feasible through mitigation measures. The Commission finds that **Mitigation Measures 4.3.6.1A and 4.3.6.1C** are incorporated into the MMRP for the Project, and will be implemented as specified therein. However, the Commission finds that even with application of these mitigation measures, long term construction emissions-related air quality impacts are considered significant and unavoidable.

Facts in Support of the Finding: According to Section 4.3 of the DEIR, the Project is consistent with the strategies to reduce California's emissions to the levels proposed in Executive Order S-3-05.

However, the proposed Project's GHG emission contribution would result in a cumulative impact regarding climate change and greenhouse gas emissions and the cumulative impacts of the proposed Project on climate change and greenhouse gas emissions are considered to be significant and unavoidable. (DEIR, pgs. 4.3-21 4.3-27)

4. <u>Transportation</u>

a. Existing Plus Project and Cumulative Plus Project Freeway Segments and Freeway Merge/Diverge Areas

Significant Unavoidable Impact: The EIR evaluated and concluded that the Project would contribute to two freeway merge/diverge areas failing to maintain the level of service standard in the existing plus project condition. The EIR evaluated and concluded that the Project would contribute to four freeway segments and merge diverge areas failing to maintain the level of service standard in the year 2013 plus project condition.

Finding: Based on the entire record before us, this Commission finds that this impact is potentially significant as there are no known feasible mitigation measures that could reduce this impact to a level of less than significant. Accordingly, Project-related impacts to freeway segments will remain significant and unavoidable.

Facts in Support of the Finding: As indicated in Section 4.5 of the DEIR, the following two freeway segments are projected to operate at unsatisfactory levels of service in the existing plus project analysis:

- Harley Knox Boulevard Off-Ramp (diverge area) at Southbound I-215 (a.m. peak hour); and
- Harley Knox Boulevard On-Ramp (merge area) at Southbound I-215 (a.m. peak hour).

The following four freeway segments and freeway merge/diverge areas are projected to operate at unsatisfactory levels of service in the cumulative year 2013 plus project analysis:

- Freeway segment north of Harley Knox Boulevard (a.m. peak hour);
- Harley Knox Boulevard Off-Ramp (diverge area) at Southbound I-215 (a.m. and p.m. peak hours);
- Harley Knox Boulevard On-Ramp (merge area) at Southbound I-215 (a.m. peak hour); and

- Freeway segment south of Harley Knox Boulevard (a.m. peak hour).

Improvements to affected freeway segments are outside the City's jurisdiction. Since the City has no control over when and how these improvements will be in place, impacts associated with these identified freeway segments would remain significant and unavoidable until such improvements are constructed. (DEIR, pgs. 4.5-18 4.5-28)

D. ADEQUACY OF THE RANGE OF PROJECT ALTERNATIVES

The EIR analyzed four alternatives to the Project as proposed, and evaluated these alternatives for their ability to meet the Project's objectives as described in Section II.B above. CEQA requires the evaluation of a "No Project Alternative" to assess a maximum net change in the environment as a result of implementation of the Project. The No Project Alternative, referred to as the No Project/Existing Zoning Alternative, makes a reasoned assessment as to the future development of the subject site should the Project under consideration not be developed yet the site would be developed in a similar manner to the proposed Project and consistent with existing zoning for the site. A Reduced Intensity Alternative, a Commercial Center (mixed retail/office) Alternative, and an Off-site Alternative were also selected for analysis. CEQA requires the evaluation of alternatives that can reduce the significance of identified impacts and "feasibly attain most of the basic objectives of the proposed Project." Thus, in order to develop a range of reasonable alternatives, the Project Objectives must be considered when this Commission is evaluating the alternatives.

1. Alternative 1 – No Project/Existing Zoning Alternative

Description: The No Project/Existing Zoning Alternative (hereinafter referenced as the "No Project" Alternative), considers the environmental conditions that would occur if the subject site were developed consistent with its existing Specific Plan 208 zoning designation, consisting of an underlying land use of Business Park/Industrial. To allow for quantified comparison of potential impacts, the No Project Alternative was assumed to result in the development of approximately 1,420,000 square feet of industrial warehouse uses on approximately 63 acres and approximately 180,000 square feet of commercial service uses on approximately 8 acres as would be allowed under the existing zoning and land use designations. The commercial service component of this alternative would be located along the frontage of Perris Boulevard while the industrial warehouse uses would occupy the remaining portion of the site. (DEIR, pg. 6-12)

Impacts: The No Build Alternative, as referenced in Section 6.0 of the DEIR, would result in similar impacts when compared to the proposed Project. Similar to the Project, the No Build Alternative would result in less than significant impacts in the following areas: Aesthetics; Williamson Act Contracts/Agricultural Zoning and Forestry Resources; Biological Resources; Cultural Resources; Geology and Soils; Hazards and Hazardous Materials; Hydrology and Water Quality; Land Use; Mineral Resources; Noise; Population and Housing; Public Services; Recreation and Parks; and Utilities and Service Systems. The Project's significant and unavoidable agricultural impacts, air quality impacts, climate change and GHG impacts, and transportation impacts would also occur in the same manner as the proposed project. However, under the No Build Alternative, potential air quality, climate change, and traffic/transportation impacts would be greater than the proposed project because of the higher trip generation potential of the commercial uses.

Objectives: Under the No Build Alternative, the subject site would develop in a similar manner as the proposed Project, and most of the Project Objectives would be achieved. However, the objectives specifically oriented towards warehouse and industrial uses would be met at a reduced level due to the commercial component included in this Alternative.

Finding: Under the No Build Alternative, the project site would be developed with approximately 1,420,000 square feet of industrial warehouse uses on approximately 63 acres and approximately 180,000 square feet of commercial service uses on approximately 8 acres. This Alternative would result in the same significant and unavoidable impacts associated with agricultural resources, air quality, climate change and greenhouse gases, and traffic that have been identified within the DEIR. However, potential air quality, climate change, and traffic/transportation impacts would be greater than the proposed project because of the higher trip generation potential of the commercial uses. Because the No Build Alternative results in an increase in potential significant and unavoidable impacts in comparison to the proposed Project, the Planning Commission hereby rejects the No Build Alternative.

2. Alternative 2 – Reduced Intensity Alternative

Description: The Reduced Intensity Alternative assumes the same general land use type as the Project, but at a development intensity scoped to reduce the extent of regional threshold exceedances for air pollution and greenhouse gas emissions that would otherwise result from the Project. In that the same type of development is proposed, most if not all the Project Objectives would be achieved to a certain extent but at a reduced level. Implementation of the Reduced Intensity Alternative would

yield approximately 1,212,100 square feet of development, a reduction of approximately 25 percent or approximately 434,033 square feet, when compared to the approximately 1,616,133 square-foot Project analyzed in the EIR.

Impacts: Under the Reduced Intensity Alternative, impacts related to agricultural resources would be similar to the proposed Project as the same amount of land would be disturbed. Similarly, impacts related to short-term construction-related air quality would be similar to the proposed Project as the same amount of land would be disturbed and the same mix of equipment would be utilized. Because of the decrease in vehicle trips achieved under this alternative, impacts to the operation of local roadways and intersections would be proportionally reduced from what was identified for the proposed Project; however, long-term traffic impacts to state freeway segments and merge/diverge areas would remain significant and unavoidable. Long-term operational-related air quality impacts would be reduced in magnitude when compared to the Project but would remain significant and unavoidable. Impacts associated with the generation of greenhouse gas emissions would also be reduced proportionate to the reduction in building area in comparison to the proposed project, but would remain significant and unavoidable.

Objectives: The Reduced Intensity Alternative would, to some degree, realize the Project Objectives. However, because the scale of the development would be diminished under this Alternative, the resulting generation of sales tax, the number of jobs created, and potential second tier economic benefits to the City and region (e.g. wholesale/retail support sales; temporary and long-term construction jobs, and facilities maintenance employment opportunities) would likely be reduced when compared to the Project.

Finding: Under the Reduced Intensity Alternative, a light industrial warehouse/ distribution facility reduced by approximately 25 percent (or 434,033 square feet) would be realized as compared to the Project. The Planning Commission hereby finds that the Reduced Intensity Alternative will not avoid or substantially reduce the significant and unavoidable agricultural resources impacts, construction and operational air quality impacts, and cumulative greenhouse gas impacts identified in the EIR. This Alternative would not meet Project Objectives to the same extent as the Project. Furthermore, the scale of the reduction in intensity would not maximize or realize the economic potential of the site. Based on the reduced scope of development, the Reduced Intensity Alternative would diminish capacities and capabilities to satisfy existing and projected unmet market demands within the trade area. The Reduced Intensity Alternative would also result in comparatively fewer opportunities to provide jobs, as compared to the Project. Therefore, the Planning Commission rejects the Reduced

Intensity Alternative on the basis that it fails to avoid or substantially reduce the significant and unavoidable impacts of the Project and does not meet the Project Objectives as well as the Project. The Planning Commission also finds that each of these considerations constitutes a ground for rejecting this alternative that is independently sufficient to support the Planning Commission's rejection of this alternative.

3. Alternative 3—Commercial Center (Mixed Commercial/Office)

Description: As identified in Section 6.0 of the DEIR, the Commercial Center Alternative would result in the development of commercial service and office uses on the Project site. Although business and professional offices, financial institutions, and medical clinics are permitted in SP208, they are permitted only in the industrial support areas while commercial service-oriented uses are a permitted throughout the SP208 Industrial designation. For this reason, the General Plan and zoning designations for the site would need to be amended to accommodate the business and professional offices. Permitted commercial service uses include, but are not limited to, Automotive Sales/Rental/Leasing & Accessories, Automotive/Truck Repair, Business Supply/Equipment Sales/Rental & Services, and Repair Services. Approximately 760,000 square feet of commercial service uses would be developed on approximately 35 acres. The balance of the site (35 acres) would be developed with up to approximately 760,000 square feet of office uses.

Impacts: As identified in Section 6.0 of the DEIR, the Commercial Center Alternative would result in similar impacts for the following eight environmental issues: Agriculture and Forestry Resources; Biological Resources; Cultural Resources; Geology and Soils; Hazards and Hazardous Materials; Hydrology and Water Quality; Land Use and Planning; and Mineral Resources. Because of the increase in vehicle trips under this alternative, impacts to the operation of local roadways and intersections would be proportionally greater than what was identified for the proposed Project. Long-term traffic impacts to state freeway mainline segments and merge/diverge areas would remain significant and unavoidable. Under the Commercial Center Alternative, impacts related to short-term construction emissions would be similar to the proposed Project as the same amount of land would be disturbed and the same mix of equipment would be utilized. Long-term operational-related air quality emissions would be increased in magnitude because of the increase in vehicle trips when compared to the Project and would remain significant and unavoidable. Traffic-related noise would be increased in magnitude but would be similarly mitigated like the proposed Project and would remain less than significant.

Objectives: Under this alternative, some of the proposed Project objectives are not met as warehouse uses would not be built. However, development of this alternative would provide new employment opportunities for residents of Moreno Valley, but not within the industrial employment sector.

Findings: Under the Commercial Center Alternative, development of commercial service and office uses would occur. This Alternative would have similar impacts that have been identified within the DEIR. However, the Commercial Center Alternative would result in an increase in trip generation in comparison to the proposed Project, and would result in an increase in the severity of the significant and unavoidable impacts to construction and operational air pollution emissions, climate change and greenhouse gas emission, and traffic. The Planning Commission finds that the Commercial Center Alternative would fulfill some but not all of the Project Objectives. Moreno Valley residents would have more opportunities for employment but a warehouse would not be built. Because the Commercial Center Alternative will not fulfill the primary objective of the Project and the severity of significant and unavoidable impacts would be increased in comparison to the proposed Project, the Commission hereby rejects the Commercial Center Alternative.

4. Alternative 4—Off-Site Location

Description: As identified in Section 6.0 of the DEIR, this alternative would result in the same intensity of development of approximately 1,616,133 square feet of warehouse uses on approximately 70.3 acres. The alternative Project site identified by the City is bounded by Kramaria Street (extended) to the north, vacant and partially developed property and March Air Reserve Base to the west, Indian Street to the east, and the Perris Valley Storm Drain and vacant land to the south. The off-site location is approximately 1.0 miles northwest of the Project site and is within the same Industrial Area Specific Plan as the proposed Project. This alternative off-site property is not owned or under the control of the applicant. The off-site location is currently zoned SP 208 I and is designated Business Park in the City's General Plan, identical to the proposed Project development of this site would not require soil import, inherently reducing impacts form air pollution emissions during construction.

Impacts: Section 6.0 of the DEIR, identifies nine environmental issues that would have similar impacts as the proposed Project. These issues are: Cultural Resources; Geology and Soils; Hydrology and Water Quality; Land Use and Planning; Mineral Resources; Population and Housing; Public Services; Recreation; and Utilities and Service Systems. With the Off-Site Location Alternative, impacts related to air quality and traffic impacts would be similar to those identified with the

proposed Project. Short-term construction and long-term air quality operational and climate change/greenhouse gas emissions impacts under this alternative would remain significant and unavoidable and would result in similar conditions as identified for the proposed Project. Additionally, due to adjacent sensitive receptors, potential impacts to these receptors would be greater in magnitude when compared to the proposed Project. Similarly, noise impacts would be greater in magnitude due to the adjacent sensitive receptors. Operational traffic would result in increased traffic on vanity roadways and may impact different intersection and roadways in comparison to the proposed Project. Under this Alternative, impacts to agricultural resources would be eliminated.

Objectives: The Off-Site Alternative would meet most of the Project objectives. The location of the Off-Site Alternative further north of Harley Knox Boulevard would not meet the Project objectives of locating distribution services near transportation corridors and clustering such uses near the state highway system.

Finding: Under the Off-Site Alternative, development of the warehouse would occur in a different location. This Alternative would have similar impacts that have been identified within the DEIR. And most of the objectives of the proposed Project would be met, would not meet the Project objectives of locating distribution services near transportation corridors and clustering such uses near the state highway system. The Commission finds that the Off-Site Alternative would have similar impacts to all environmental issues except for agriculture because this Alternative would eliminate the significant and unavoidable impacts to agricultural resources.. Because the Off-Site Alternative will not substantially reduce the environmental impact of the Project and it would not meet the Project objectives of locating distribution services near transportation corridors and clustering such uses near the state highway system, the Commission hereby rejects the Off-Site Alternative.

5. Alternatives Considered and Rejected

A variety of additional alternatives were considered as part of the DEIR's Alternatives Analysis. (DEIR, pgs. 6-3 through 6-5) Three possible alternatives were considered and rejected because they could not accomplish the basic objectives of the Project or they were considered infeasible. Per the *CEQA Guidelines* (Section 15126.6(c)), factors that may be considered when addressing the feasibility of alternatives include failure to meet most of the stated project objectives, infeasibility, or inability to avoid significant environmental effects. The purpose of the proposed Project is to provide for and expand employment and revenue opportunities within the City

of Moreno Valley. The proposed Project would expand employment options in a location that is convenient to existing transportation corridors, convenient to existing and future City residents and would augment the City's economic base. The following provides and discussion of the three development scenarios that were considered and rejected as potential alternatives to implementation of the proposed Project based on Section 15126.6 of the *CEQA Guidelines* because they did not feasibly attaining most of the basic objectives of the Project while reducing or avoiding any of the significant effects of the proposed Project:

- No Build Alternative: No development would take place within the Project limits and no impacts would occur. However, disallowing development of the site, as suggested by this alternative, would not fulfill the primary objectives of the proposed Project and the site would likely be developed in accordance with existing zoning should the Project not move forward. Retention of the project site in its current condition would not expand employment opportunities to residents of the City. Retaining the site in its current undeveloped condition would not generate the revenue (e.g., property tax) that could augment the City's current revenue stream. Therefore, the No Build Alternative was rejected from further consideration in the EIR.

- Residential Alternative: The Residential Alternative would develop the 71-acre project site with approximately 355 single-family units based on the City's R5 zone. The R5 zone was utilized as this is the zoning designation of the nearest residential uses to the north along Perris Boulevard and north of the Perris Valley Storm Drain channel. A zone change, General Plan Amendment, and Specific Plan Amendment would be required for this alternative to change the project site from its existing Business Park/Light Industrial (BP) General Plan designation and Industrial Area Plan (SP208 I) zoning designation to a residential R5 designation. Furthermore, a Specific Plan Amendment would be required to remove the project site from the underlying Industrial Specific Plan 208. Since the Residential Alternative consists only of residential uses, employment-generating opportunities would not occur aside from temporary construction work, which would be filled predominantly by those already residing in the area. The residential uses would produce demand for public services that would exceed the amount of municipal revenues it would generate. The project's full potential to utilize the area's close proximity to various freeways and transportation corridors would not be realized as only residential uses would occur under the Residential Alternative. Additionally, the development of the entire 71-acre project site under this alternative would

result in the placement of the residential uses within an area planned for industrial uses which could result in additional adverse impacts such as exposure to air pollutants, noise, and land use incompatibilities. This alternative has been rejected because it would result in greater impacts and would not satisfy the basic City employment generating objectives for development of the Project site.

- Mixed Commercial/Residential Alternative: The Mixed Commercial/Residential Alternative would develop the 71-acre project site with approximately 690,000 square feet of Community Commercial uses and 532 multiple-family units. A zone change, General Plan Amendment, and Specific Plan Amendment would be required for this alternative to change the project site from its existing Business Park/Light Industrial (BP) General Plan designation and SP208 I zoning designation to a residential designation and commercial designation. Additionally, a Specific Plan Amendment would be required to remove the project site from the underlying Industrial Specific Plan 208. While the commercial component of this Alternative would utilize the project site's close proximity to nearby transportation corridors, the development of the remainder of the site with residential uses would not provide the varied employment and service uses and revenue associated with the proposed project. The development of approximately half of the project site under this alternative with residential uses would result in the placement of the residential uses adjacent to SP208 I industrial/business park uses which could potentially result in additional adverse impacts such as exposure to air pollutants, noise, and land use incompatibilities. The residential component of this alternative would produce demand for public services that would exceed the amount of municipal revenues it would generate, and there would be little to no employment opportunities created. Therefore, the mixed commercial/residential alternative would not meet the project objectives of providing new employment and revenue generation options in close proximity to local consumers to the same degree as the proposed project. The employment opportunities and economic benefits derived from the proposed project are superior to the Mixed Commercial/Residential Alternative. This alternative has been rejected because it would result in greater impacts and would not satisfy the basic City employment generating objectives for development of the project site.

6. Environmentally Superior Alternative

As explained by Section 6.0 in the DEIR, Alternative 2 (Reduced Intensity Alternative) reduces the severity of Project related air quality impacts. However, long-term air quality impacts, would remain significant after mitigation for this alternative for ROG, NO_x, PM_{10} and $PM_{2.5}$. In a similar manner, Alternative 2 would reduce the volume of daily traffic trips when compared to the proposed Project; however, such impacts to state freeway mainline segments and merge/diverge areas would remain significant and unavoidable until freeway improvements are completed by the state. Alternative 2 would also reduce the quantity of greenhouse gas emission when compared to the proposed Project; however, impacts to Climate Change would remain significant and unavoidable. The remaining environmental issues would ultimately be similar to the proposed Project through adherence to existing standards and mitigation measures. Based on the analysis in Section 6.0 and the summary contained in Table 6.K, Alternative 2, the Reduced Intensity Alternative, is the environmentally superior alternative. The amount of development under this alternative would be reduced when compared to the proposed Project; however, the Alternative 2 would not satisfy several of the Project objectives because it would reduce the level at which it meets the employment generating Project objectives. Because the Reduced Intensity Alternative allows the development of warehouse uses and the provision of new employment opportunities, it meets many of the City's stated Project objectives, while at the same time reduces the impacts associated with the proposed Project. However, because of the lower industrial density, the Alternative fails to meet several key employment generating objectives related to density efficiencies in the same manner as the proposed Project.

E. GROWTH-INDUCING IMPACTS

CEQA requires a discussion of ways in which the proposed Project could be growth inducing. Specifically, CEQA Guidelines Section 1512602(d) states than an EIR must describe the ways in which the proposed Project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment.

Section 5.0 of the DEIR identifies the extent to which the new jobs created by a Project are filled by existing residents is a factor that tends to reduce the growth inducing effect of a project. Construction of the proposed Project will create short-term construction jobs. Due to the existing high unemployment levels that exist in the City, the potential exists for these short-term positions to be filled by workers who, for the most part, reside in the City or neighboring

communities to the Project area. Therefore, construction of the proposed Project will not generate a permanent increase in population within the Project area.

As previously identified, the proposed Project is expected to employ 646 people. These full-time positions are also anticipated to be filled by workers who, for the most part, reside in the Project area due to high unemployment levels that exist in the City. Operations of the proposed Project will not generate a permanent increase in population within the Project area.

The area surrounding the Project site is governed by the City of Moreno Valley General Plan and the area is guided by Specific Plan 208. Specific Plan 208 guides land use within the Project area to ensure that new development and redevelopment is implemented consistent with the land use policies, controls, and standards contained in Specific Plan 208. Any development of remaining undeveloped land adjacent to the Project site would require its own discretionary approvals and is not reliant on the proposed Project. However, development of the Project site may lead to indirect growth in the Specific Plan area by making available the extension of infrastructure such as water, sewer, drainage, etc. This growth has been planned for and is guided by Specific Plan 208.

The proposed Project would occur within an area currently designated for industrial uses. The proposed Project would not require a General Plan Amendment nor does it require a change in the underlying zoning designation. In addition, the Project reflects the City of Moreno Valley's vision for the area and is consistent with Specific Plan 208. Land uses surrounding the Project site would be in conformance with the City's General Plan and Specific Plan 208. Impacts to population and housing are less than significant; see Section 13 Population and Housing of the Initial Study (Appendix A of the DEIR).

The proposed Project would not eliminate a constraint for development of an approved Project within the City of Moreno Valley. There are no projects in the City of Moreno Valley or surrounding cities that have been approved but are conditioned or dependent on additional improvements at the Project site. Specific Plan 208 guides land uses surrounding the Project site to ensure compatibility between existing operations and adjacent surrounding development. Additionally, the proposed Project would not add capacity to urban services or infrastructure that would be utilized by other project proponents in the surrounding area.

The proposed Project would not result in any significant pressure to redevelop the area around the Project site at a higher density. As previously stated, the development of remaining

undeveloped land adjacent to the Project site is independent and not reliant on the proposed Project. Therefore, implementation of the proposed Project would not result in redevelopment of adjacent lands at a higher intensity than already prescribed in the City of Moreno Valley's General Plan and Specific Plan 208.

F. SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES

Public Resources Code Section 21100(b)(2)(B) and CEQA Guidelines Sections 15126(c), 15126.2(c), and 15127, require that for certain types or categories of projects, an EIR must address significant irreversible environmental changes that would occur should the project be implemented. As presented at CEQA Guidelines Section 15127, the topic of Significant Irreversible Environmental Changes needs to be addressed in EIRs prepared in connection with any of the following activities:

(a) The adoption, amendment, or enactment of a plan, policy, or ordinance of a public agency;

(b) The adoption by a local agency formation commission of a resolution making determinations; or

(c) A project which will be subject to the requirements for preparing of an environmental impact statement pursuant to the requirements of the National Environmental Policy Act of 1969, 42 U.S.C. Sections 4321-4347.

The Project does not trigger any of the conditions cited in Guidelines §15127. Nonetheless, this EIR analysis addresses any significant irreversible environmental changes which would be involved in the proposed action should it be implemented [Guidelines, Sections 15126(e) and 15127]. An impact would fall into this category if:

- The project would involve a large commitment of nonrenewable resources;
- The primary and secondary impacts of the project would generally commit future generations of people to similar uses;
- The project involves uses in which irreversible damage could result from any potential environmental incidents associated with the project; and/or

- The proposed consumption of resources is not justified (e.g., the project could waste energy).

Determining whether the proposed project may result in significant irreversible effects requires a determination of whether key resources would be degraded or destroyed in such a way that there would be little possibility of restoring them. The project site is generally fallow agricultural land with the site historically used for sod farming operations. However, as identified within the City's General Plan, the City anticipates the eventual conversion of agricultural uses to urban uses and the proposed project would permanently alter the site by converting predominantly agricultural uses to urban uses. This is a significant irreversible environmental change that would occur as a result of project implementation. Because no significant mineral resources were identified within the project limits, no significant impacts related to these issues would result from development of the project site. Natural resources in the form of construction materials would be utilized in the construction of the proposed project and energy resources in the form of electricity and natural gas would be used during the long-term operation of the project; however, their use is justified in supporting the City's planned use of the site and is not expected to negatively impact the availability of these resources.

In addition, this industrial warehouse project, in concert with the other built or approved industrial warehouse projects, will fundamentally change the character and land use pattern of this portion of the City. Many of the project-specific impacts are addressed, as outlined above, but the change in the use of the land from agricultural to industrial represents a substantial irreversible change for this area. However, this is an intended change a verified by the City's General Plan land use designations and zoning for the area. (DEIR pgs. 5-2 and 5-3)

VI. STATEMENT OF OVERRIDING CONSIDERATIONS

The Moreno Valley Planning Commission adopts this Statement of Overriding Considerations with respect to the significant unavoidable impacts associated with adoption of the Project as addressed in the EIR, specifically:

1. Agricultural Impacts—Conversion of State Designated Farmland;

2. Agricultural Impacts—Conversion to a Non-Agricultural Use; and

3. Cumulative Agricultural Impacts

4. Air Quality Impact—Construction Air Pollutant Emissions;

5. Air Quality Impact—Operational Air Pollutant Emissions; and

6. Cumulative Air Pollutant Emissions.

7. Climate Change and GHG Emissions —

8. Transportation—Existing and Cumulative Impacts to State Freeway Segments and Freeway Merge/Diverge Areas

The Moreno Valley Planning Commission hereby declares that, pursuant to CEQA Guidelines Section 15093, the Planning Commission has balanced the benefits of the proposed Project against any significant and unavoidable environmental impacts in determining whether to approve the proposed Project. If the benefits of the proposed Project outweigh the unavoidable adverse environmental impacts, those impacts are considered "acceptable."

The Planning Commission hereby declares that the EIR has identified and discussed significant effects that may occur as a result of the Project. With the implementation of the mitigation measures discussed in the EIR, these impacts can be mitigated to a level of less than significant except for the unavoidable and significant impacts discussed in Section V(C) herein.

The Planning Commission hereby declares that it has made a reasonable and good faith effort to eliminate or substantially mitigate the potential impacts resulting from the Project.

The Planning Commission hereby declares that to the extent any mitigation measures recommended to the City are not incorporated, such mitigation measures are infeasible because they would impose restrictions on the Project that would prohibit the realization of specific economic, social, and other benefits that this Planning Commission finds outweigh the unmitigated impacts.

The Planning Commission further finds that except for the Project, all other alternatives set forth in the EIR are infeasible because they would prohibit the realization of the Project objectives and/or specific economic, social or other benefits that this Planning Commission finds outweigh any environmental benefits of the alternatives or the other alternatives do not substantively reduce the severity of unavoidable and significant impacts.

The Planning Commission hereby declares that, having reduced the adverse significant environmental effects of the Project, to the extent feasible by adopting the proposed mitigation measures, having considered the entire administrative record on the Project and having weighed the benefits of the Project against its unavoidable significant impact after mitigation, the Planning Commission has determined that the social, economic and environmental benefits of the Project outweigh the potential unavoidable significant impacts and render those potential significant impacts acceptable based on the following considerations:

- The Project will provide development consistent with the General Plan and in conformance with SP 208, municipal standards, codes and policies;
- The Project provides development that improves and maximizes economic viability of a vacant site by transitioning the Project site into a productive light industrial use;
- The Project creates additional employment-generating opportunities for the City of Moreno Valley and surrounding communities; and
- The Project provides adequate infrastructure and public amenities, including upgrading and widened streets, signal upgrades and utility improvements.

As the CEQA Lead Agency for the proposed action, the City of Moreno Valley has reviewed the Project description and the alternatives presented in the EIR, and fully understands the Project and Project alternatives proposed for development. Further, this Commission finds that all potential adverse environmental impacts and all feasible mitigation measures to reduce the impacts from the Project have been identified in the Draft EIR, the Final EIR and public testimony. This Commission also finds that a reasonable range of alternatives was considered in the EIR and this document, Section V(E) above, and finds that approval of the Project is appropriate.

This Commission has identified economic and social benefits and important policy objectives, Section V above, which result from implementing the Project. The Commission has balanced these substantial social and economic benefits against the unavoidable significant adverse effects of the Project. Given the substantial social and economic benefits that will accrue from the Project, this Commission finds that the benefits identified herein override the unavoidable environmental effects.

California Public Resource Code 21002 provides: "In the event specific economic, social and other conditions make infeasible such Project alternatives or such mitigation measures, individual projects can be approved in spite of one or more significant effects thereof." Section 21002.1(c) provides: "In the event that economic, social, or other conditions make it infeasible to mitigate one or more significant effects of a project on the environment, the project may nonetheless be approved or carried out at the discretion of a public agency…" Finally, California Administrative Code, Title 4, 15093 (a) states: "If the benefits of a proposed Project outweigh the unavoidable adverse environmental effects, the adverse environmental effects may be considered „acceptable."

The Planning Commission hereby declares that the foregoing benefits provided to the public through approval and implementation of the Project outweighs the identified significant adverse environmental impacts of the Project that cannot be mitigated. The Planning Commission finds that each of the Project benefits outweighs the unavoidable adverse environmental impacts identified in the EIR and, therefore, finds those impacts to be acceptable.

VII. CERTIFICATION OF THE FINAL ENVIRONMENTAL IMPACT REPORT

The Moreno Valley Planning Commission finds that it has reviewed and considered the FEIR in evaluating the Project, that the FEIR is an accurate and objective statement that fully complies with CEQA and the CEQA Guidelines, and that the FEIR reflects the independent judgment of the Planning Commission.

The Planning Commission declares that no new significant information as defined by CEQA Guidelines Section 15088.5 has been received by the Planning Commission after the circulation of the DEIR that would require recirculation. All of the information added to the FEIR merely clarifies, amplifies or makes insignificant modifications to an already adequate DEIR pursuant to CEQA Guidelines Section 15088.5(b).

The Planning Commission hereby certifies the EIR based on the following findings and conclusions:

A. Findings

1. CEQA Compliance

As the decision-making body for the Project, the Planning Commission has reviewed and considered the information contained in the Findings and supporting documentation. The Planning Commission determines that the Findings contain a complete and accurate reporting of the environmental impacts and mitigation measures associated with the Project, as well as complete and accurate reporting of the unavoidable impacts and benefits of the Proposed Project as detailed in the Statement of Overriding Considerations. The Planning Commission finds that the EIR was prepared in compliance with CEQA and that the Planning Commission complied with CEQA"s procedural and substantive requirements.

2. Significant Unavoidable Impacts/Statement of Overriding Considerations

The Project will have significant adverse impacts even following adoption of all feasible mitigation measures which are required by the Planning Commission. The following significant environmental impacts have been identified in the FEIR and will require mitigation but cannot be mitigated to a level of insignificance as set forth in Section V(C) of these Findings: Agricultural Impacts—Conversion of State Designated Farmland; Agricultural Impacts—Conversion to a Non-Agricultural Use; Cumulative Agricultural Impacts; Air Quality Impact—Construction Air Pollutant Emissions; Air Quality Impact—Operational Air Pollutant Emissions; Cumulative Air Pollutant Emissions; Climate Change and GHG Emissions; Transportation—Existing Year (2007) with Project Level of Service; and Transportation—Existing and Cumulative Impacts to State Freeway Segments and Freeway Merge/Diverge Areas.

The Planning Commission has eliminated or substantially reduced environmental impacts where feasible as described in the Findings, and the Planning Commission determines that the remaining unavoidable significant adverse impacts are acceptable due to the reasons set forth in the preceding Statement of Overriding Considerations.

3. Conclusions

a. All potentially significant environmental impacts from implementation of the proposed Project have been identified in the

EIR and, with the implementation of the mitigation measures defined herein and set forth in the MMRP, will be mitigated to a less-than-significant level, except for the impacts identified in Section V(C) above.

b. Other reasonable alternatives to the proposed Project that could feasibly achieve the basic objectives of the proposed Project have been considered and rejected in favor of the proposed Project.

c. Environmental, economic, social and other considerations and benefits derived from the development of the proposed Project override and make infeasible any alternatives to the proposed Project or further mitigation measures beyond those incorporated into the proposed Project.

VII. ADOPTION OF MITIGATION MONITORING AND REPORTING PROGRAM

Pursuant to *Public Resources Code* Section 21081.6, the Planning Commission hereby adopts, as conditions of approval of the Project, the Mitigation Monitoring and Reporting Plan (MMRP) set forth in Section 4.0 of the Final EIR. In the event of any inconsistencies between the mitigation measures as set forth herein and the MMRP, the MMRP shall control, except to the extent that a mitigation measure contained herein is inadvertently omitted from the MMRP, in which case such mitigation measure shall be deemed as if it were included in the MMRP.

4. MITIGATION MONITORING AND REPORTING PROGRAM

4.1 INTRODUCTION

This Mitigation Monitoring and Reporting Program has been prepared for use in implementing mitigation for the:

VIP Moreno Valley Project

The program has been prepared in compliance with State law and the Environmental Impact Report (EIR) (State Clearinghouse No. 2011081084) prepared for the project by the City of Moreno Valley.

The California Environmental Quality Act (CEQA) requires adoption of a reporting or monitoring program for those measures placed on a project to mitigate or avoid adverse effects on the environment (Public Resource Code Section 21081.6). The law states that the reporting or monitoring program shall be designed to ensure compliance during project implementation.

The monitoring program contains the following elements:

1) The mitigation measures are recorded with the action and procedure necessary to ensure compliance. In some instances, one action may be used to verify implementation of several mitigation measures.
2) A procedure for compliance and verification has been outlined for each action necessary. This procedure designates who will take action, what action will be taken and when, and to whom and when compliance will be reported.
3) The program has been designed to be flexible. As monitoring progresses, changes to compliance procedures may be necessary based upon recommendations by those responsible for the program. As changes are made, new monitoring compliance procedures and records will be developed and incorporated into the program.

This Mitigation Monitoring and Reporting Program includes mitigation identified in the Initial Study and the Final EIR.

4.2 MITIGATION MONITORING AND RESPONSIBILITIES

As the Lead Agency, the City of Moreno Valley is responsible for ensuring full compliance with the mitigation measures adopted for the proposed project. The City will monitor and report on all mitigation activities. Mitigation measures will be implemented at different stages of development throughout the project area. In this regard, the responsibilities for implementation have been assigned to the Applicant, Contractor, or a combination thereof. If during the course of project implementation, any of the mitigation measures identified herein cannot be successfully implemented, the City shall be immediately informed, and the City will then inform any affected responsible agencies. The City, in conjunction with any affected responsible agencies, will then determine if modification to the project is required and/or whether alternative mitigation is appropriate.

EXHIBIT B

4.3 MITIGATION MONITORING AND REPORTING PROGRAM CHECKLIST

Project File Name: VIP Moreno Valley Project **Applicant: Vogel Engineers, Inc.**

Date: June 2012

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
AIR QUALITY						
4.2.6.1A Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall place construction equipment staging areas at least 200 feet away from sensitive receptors. Contract specifications shall be included in the proposed project construction documents, which shall be reviewed by the City.	City of Moreno Valley Engineering and Building and Safety Planning Division	Prior to Grading and during grading operations.	Prior to Issuance of Grading Permit	Review of construction documents and on-site inspection		Withhold Grading Permit or Issuance of a Stop Work Order
4.2.6.1B Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall utilize power sources (e.g., power poles) or clean-fuel (e.g., fuel other than diesel or gasoline) generators where feasible. Contract specifications shall be included in the proposed project construction documents, which shall be reviewed by the City.	City of Moreno Valley Engineering and Building and Safety Planning Division	Prior to Grading	Prior to Issuance of Grading Permit	Review of construction documents and on-site inspection		Withhold Grading Permit or Issuance of a Stop Work Order
4.2.6.1C Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall utilize California Air Resources Board (CARB) Tier II Certified equipment or better during the rough/mass grading phase for the following pieces of equipment: rubber-tired dozers and scrapers. Contract specifications shall be included in the proposed project construction documents,	City of Moreno Valley Engineering and Building and Safety Planning Division	Prior to Grading	Prior to Issuance of Grading Permit	Review of construction documents and on-site inspection		Withhold Grading Permit

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
which shall be reviewed by the City.						
4.2.6.1D All clearing, grading, earthmoving, or excavation activities shall cease when winds exceed 25 mph per SCAQMD guidelines in order to limit fugitive dust emissions.	City of Moreno Valley Engineering and Building and Safety Planning Division	Throughout construction	During grading	Review of construction documents and on-site inspection		Issuance of a Stop Work Order
4.2.6.1E The contractor shall ensure that all disturbed unpaved roads and disturbed areas within the project are watered at least three times daily during dry weather. Watering, with complete coverage of disturbed areas, shall occur at least three times a day, preferably in the mid-morning, afternoon, and after work is done for the day.	City of Moreno Valley Engineering and Building and Safety Planning Division	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1F The contractor shall ensure that traffic speeds on unpaved roads and project site areas are reduced to 15 miles per hour or less to reduce PM10 and PM2.5 fugitive dust haul road emissions. Speed limit signs (15 mph maximum) shall be posted at entry points to the project site, and along any unpaved roads providing access to or within the project site and/or any unpaved designated on-site travel routes.	City of Moreno Valley Engineering and Building and Safety Planning Division	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1G Groundcover shall be replaced, and/or non-toxic soil stabilizers shall be applied (according to manufacturers' specifications) to any inactive construction areas (previously graded areas inactive for ten days or more).	City of Moreno Valley Engineering and Building and Safety Planning Division	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1H The contractor shall minimize	City of Moreno	Throughout	During	On-site inspection		Issuance of a

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
pollutant emissions by maintaining equipment engines in good condition and in proper tune according to manufacturer's specifications and during smog season (May through October) by not allowing construction equipment to be left idling for more than five minutes (per California law).	Valley Engineering and Building and Safety	construction	Construction			Stop Work Order
4.2.6.1I The contractor shall ensure use of low-sulfur diesel fuel in construction equipment as required by the California Air Resources Board (CARB) (diesel fuel with sulfur content of 15 ppm by weight or less).	City of Moreno Valley Engineering and Building and Safety	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1J If available, the project applicant shall use "Low-Volatile Organic Compounds" paints, coatings, and solvents with a VOC content lower than required under Rule 1113 (not to exceed 150 grams/liter; 1.25 pounds/gallon). High Pressure Low Volume (HPLV) applications of paints, coatings, and solvents shall be consistent with South Coast Air Quality Management District Rule 1113. Alternatively, the project applicant shall use materials that do not require painting or are pre-painted.	City of Moreno Valley Engineering and Building and Safety Planning Division	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1K Grading plans, construction specifications and bid documents shall also include the following notations: • Off-road construction equipment shall utilize alternative fuels where feasible e.g., biodiesel fuel (a minimum of B20), natural gas (CNG), liquefied natural gas (LNG), propane, except	City of Moreno Valley Engineering and Building and Safety Planning Division	Prior to Grading and during grading operations.	Prior to Issuance of Grading Permit	Review of construction documents and on-site inspection		Withhold Grading Permit or Issuance of a Stop Work Order

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
for equipment where use of such fuels would void the equipment warranty; • Gravel pads shall be provided at all access points to prevent tracking of mud onto public roads; • Install and maintain trackout control devices at all access points where paved and unpaved access or travel routes intersect; • The contractor or builder shall designate a person or person(s) to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust off site; • The contractor or builder shall post a publicly visible sign with the telephone number and person to contact regarding dust complaints. The contact person shall take corrective action within 24 hours; • High pressure injectors shall be provided on diesel construction equipment where feasible; • Engine size of construction equipment shall be limited to the minimum practical size; • Substitute gasoline-powered for diesel-powered construction equipment where feasible; • Use electric construction equipment						

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
where feasible; • Install catalytic converters on gasoline-powered equipment where feasible; • Ride-sharing program for the construction crew shall be encouraged and shall be supported by contractor(s) via incentives or other inducement; • Documentation shall be provided to the City of Moreno Valley indicating that construction workers have been encouraged to carpool or otherwise reduce VMT to the greatest extent practical, including providing information on available park and ride programs; • Lunch vendor services shall be permitted onsite during construction to minimize the need for offsite vehicle trips; • All forklifts used during construction and in subsequent operation of the project shall be electric or natural gas powered. • Suspend use of all construction equipment operations during second stage smog alerts.						
4.2.6.1L Throughout project construction, a construction relations officer/community liaison, appointed by the Applicant, shall be retained on-site. In coordination and	City of Moreno Valley Engineering and Building and Safety	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
cooperation with the City, the construction relations officer/community liaison shall respond to any concerns related to PM10 (fugitive dust) generation or other construction-related air quality issues.						
4.2.6.1M All project entrances shall be posted with signs which state: • Truck drivers shall turn off engines when not in use; • Diesel delivery trucks servicing the project shall not idle for more than three (3) minutes; and • Telephone numbers of the building facilities manager and CARB, to report violations.	City of Moreno Valley Engineering and Building and Safety	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1N When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.	City of Moreno Valley Engineering and Building and Safety	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1O All streets shall be swept at least once a day using SCAQMD Rule 1186 certified street sweepers utilizing reclaimed water trucks if visible soil materials are carried to adjacent streets.	City of Moreno Valley Engineering and Building and Safety	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1P Any vegetative cover to be utilized onsite shall be planted as soon as possible to reduce the disturbed area subject to wind erosion. Irrigation systems required for these plants shall be installed as soon as possible to maintain good ground cover and to minimize wind erosion of the soil.	City of Moreno Valley Engineering and Building and Safety Planning Division	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
4.2.6.1Q. Provide temporary traffic controls such as a flag person, during all phases of construction to maintain smooth traffic flow.	City of Moreno Valley Engineering and Building and Safety	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1R All roadways, driveways, sidewalks, etc., should be completed as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.	City of Moreno Valley Engineering and Building and Safety	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1S Implement activity management techniques including a) development of a comprehensive construction management plan designed to minimize the number of large construction equipment operating during any given time period; b) scheduling of construction truck trips during non-peak hours to reduce peak hour emissions; c) limitation of the length of construction work-day period; and d) phasing of construction activities.	City of Moreno Valley Engineering and Building and Safety and Planning Division	Prior to Grading and during grading and construction operations.	Prior to Issuance of Grading Permit	Review of construction documents and on-site inspection		Withhold Grading Permit or Issuance of a Stop Work Order
4.2.6.1T Reroute construction trucks away from congested streets and sensitive receptor areas.	City of Moreno Valley Engineering and Building and Safety and Planning Division	Prior to Grading and during grading and construction operations.	Prior to Issuance of Grading Permit	Review of construction documents and on-site inspection		Withhold Grading Permit or Issuance of a Stop Work Order
4.2.6.3A Prior to issuance of the first building permit, building and site plan designs shall ensure that the project's energy efficiencies surpass applicable 2008 California Title 24, Part 6 Energy Efficiency Standards by a minimum of 20 percent. Verification of increased energy	City of Moreno Valley Building and Safety Planning Division	Prior to Construction (once)	Prior to Issuance of Building Permits	Review of building plans and on-site inspection		Withhold Building Permits

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
efficiencies shall be documented in Title 24 Compliance Reports provided by the Applicant, and reviewed and approved by the City. Any combination of design features, including but not limited to the following list, may be used to fulfill this requirement provided that the total increase in energy efficiency meets or exceeds 20 percent: • Exceed California Title 24 Energy Efficiency performance standards for water heating and space heating and cooling, as deemed acceptable by the City. • Increase in insulation such that heat transfer and thermal bridging is minimized. • Limit air leakage through the structure or within the heating and cooling distribution system to minimize energy consumption. • Incorporate dual-paned or other energy efficient windows. • Incorporate energy efficient space heating and cooling equipment. • Use interior and exterior energy efficient lighting which exceeds the California Title 24 Energy Efficiency performance standards, as deemed acceptable by the City. Use automatic devices to turn off lights when they are not needed. • To the extent that they are compatible with landscaping guidelines established by the City,						

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
use shade-producing trees, particularly those that shade paved surfaces such as streets and parking lots and buildings at the project site. • Use paints and a surface color palette for the project emphasizing light and off-white colors which reflect heat away from the buildings. • Install a photovoltaic array (solar panels) or other source of renewable energy generation on-site, or otherwise acquire energy from the local utility that has been generated by renewable resources, to meet the project's office electricity needs. • Reduce energy demand associated with potable water conveyance using the following: o Landscaping palette emphasizing drought-tolerant plants; o Use of water-efficient irrigation techniques; and, o U.S. EPA Certified WaterSense labeled for equivalent faucets, high-efficiency toilets (HETs), and water-conserving shower heads. • Provide on-site bicycle storage/parking consistent with City of Moreno Valley requirements. • Provide on-site showers (one for males and one for females). Provide lockers for employees.						

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
• Establish a Transportation Management Association (TMA). The TMA will coordinate with other TMAs within the City to encourage and coordinate carpooling among building occupants. The TMA will advertise its services to building occupants, and offer transit and/or other incentives to reduce GHG emissions. A plan will be submitted by the TMA to the City within two months of project completion that outlines the measures implemented by the TMA, as well as contact information. • Provide preferential parking for carpools, vanpools or other alternative fuel vehicles. Locations and configurations of proposed preferential parking for carpools and vanpools are subject to review and approval by the City. Prior to final site plan approval, delineate preferential parking for carpools and vanpools on the project site plan. • Provide at least two electric vehicle charging stations. Locations and configurations of proposed charging stations are subject to review and approval by the City. Prior to issuance of the first building permit, delineate stub outs for charging stations on the project building plans. • Implement compressed workweek schedules; • Achieve at least 20% per year (as a percentage of previous percentage,						

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
not total trips) increase in percentage of consolidated trips carried by SmartWay carriers until it reaches a minimum of 90% of all long haul trips carried by SmartWay 1.0 or greater carriers. • Achieve at least 15% per year (as a percentage of previous percentage, not total trips) increase in percentage of long haul trips carried by SmartWay carriers until it reaches a minimum of 85% of all consolidator trips carried by SmartWay 1.0 or greater carriers. • Use of fleet vehicles conforming to 2010 air quality standards or better. • Installation of catalytic converters on gasoline-powered equipment. • Inclusion of electric powered and/or compressed natural gas fueled trucks and/or vehicles in fleets; • Establishment and use of carpool/vanpool programs, complemented by parking fees for single-occupancy vehicles; • Provision of preferential parking for EV and CNG vehicles; • Use of electrical equipment (instead of gasoline-powered equipment) for landscape maintenance; • Use of electric (instead of diesel or gasoline-powered) yard trucks; • Use of SmartWay 1.25 rated trucks. • Provide a display case or kiosk						

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
displaying transportation information including the RTA bus schedule in a prominent area accessible to employees. • Use landscape maintenance companies that use battery powered or electric equipment or contract only with commercial landscapers who operate with equipment that complies with the most recent California Air Resources Board certification standards, or standards adopted no more than three years prior to date of use or any combination of these two themes.						
4.2.6.3B The project shall be designed to facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills by providing easily accessible areas that are dedicated to the collection and storage of recyclable materials including: paper, cardboard, glass, plastics, and metals. Locations of proposed recyclable materials collection areas are subject to review and approval by the City. Prior to Final Site Plan approval, locations of proposed recyclable materials collection areas shall be delineated on the project site plan.	City of Moreno Valley Building and Safety	Prior to Construction (once)	Prior to Issuance of Building Permits and Final Site Plan Approval	Review of final site plan and building plans and on-site inspection		Withhold Building Permits
BIOLOGICAL RESOURCES						
Mitigation Measure BIO-1: No more than 72 hours prior to initiation of ground-	City of Moreno Valley Planning	Prior to Grading	Prior to Issuance of Grading Permit	Submittal of Evidence that the		Withhold Grading Permit

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
disturbing activities, a pre-construction survey shall be completed by a qualified biologist. The survey will identify special status avian species (if any) within the area of intended disturbance. In the event no special status avian species are identified within the limits of disturbance, no further mitigation is required. In the event such species are identified within the limits of ground disturbance, **Mitigation Measure BIO-3** shall apply.	Division			pre-construction survey has been completed.		
Mitigation Measure BIO-2: No more than 72 hours prior to initiation of ground-disturbing activities, a pre-construction burrowing owl survey shall be completed by a qualified biologist for the planned disturbance area. The pre-construction burrowing owl surveys may be conducted as part of the survey required in **Mitigation Measure BIO-1**. A report detailing the findings of the pre-construction survey shall be submitted to the City prior to the initiation of ground-disturbing activities. In the event no burrowing owls are identified within the limits of ground disturbance, no further mitigation is required. In the event burrowing owls are identified within the limits of ground disturbance, **Mitigation Measures BIO-3** and **BIO-4** shall apply.	City of Moreno Valley Planning Division	Prior to grading	Prior to Issuance of Grading Permit	Submittal of Evidence that a qualified biologist has been hired and the pre-construction survey has been completed. Submittal of a report of the survey findings.		Withhold Grading Permit
Mitigation Measures BIO-3. If nesting special status avian or burrowing owl species are determined to occupy a proposed area of disturbance a biological monitor will be present during construction to ensure no construction	City of Moreno Valley Planning Division	Prior to grading	Prior to Issuance of Grading Permit			Withhold Grading Permit

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
activity shall take place within 500 feet of an active nest/burrow until it has been determined by the biological monitor that the nest/burrow is no longer active, and all juveniles have fledged the nest/burrow.						
Mitigation Measure BIO-4: If active burrowing owl burrows are detected outside the breeding season, then passive and/or active relocation may be approved following consultation with the CDFG and/or USFWS. One-way doors may be installed as part of a passive relocation program. Burrowing owl burrows shall be excavated with hand tools by a qualified biologist when determined to be unoccupied, and backfilled to ensure that animals do not re-enter the holes/dens.	City of Moreno Valley Planning Division	Prior to grading	Prior to Issuance of Grading Permit	Provide evidence to the City that the passive relocation plan has been approved by CDFG and USFWS.		Withhold Grading Permit
CULTURAL RESOURCES						
Mitigation Measure CUL-1: Prior to construction involving excavation four feet or more below existing surface grade, the construction contractor shall provide evidence that a qualified paleontologist has been retained, and that the paleontologist(s) shall be present during all grading and other significant ground-disturbing activities that reach four feet or more below existing surface grade. If the paleontologist(s) do not find evidence for Pleistocene-era deposits once the maximum excavation depth is reached, monitoring shall be discontinued. In the event fossiliferous deposits are encountered, the following measures shall be implemented:	City of Moreno Valley Planning Division	Prior to grading and on-going during ground disturbing activities.	Prior to Issuance of Grading Permit	Provide evidence to the City that a qualified paleontologist has been retained, and that the paleontologist(s) will be present during all grading and other significant ground-disturbing activities that reach four feet or more below existing surface grade. A report of findings		Withhold Grading Permit/ Issuance of a Stop Work Order

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
• Monitoring shall be conducted by qualified paleontological monitor(s) of excavation in areas identified as likely to contain paleontological resources, including undisturbed older Pleistocene alluvium. Paleontological monitors shall be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors shall be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring may be reduced if the potentially fossiliferous units are determined upon exposure and examination by qualified paleontological personnel to have low potential to contain fossil resources. • Paleontological monitoring of any earthmoving will be conducted by a monitor, under direct guidance of a qualified paleontologist. Earthmoving in areas of the parcel where previously undisturbed sediments are buried, but not otherwise disturbed, will not be monitored. • Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates.				shall be submitted to the City after the finalization of construction.		

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
• Identification and curation of specimens into a professional, fully accredited museum repository with permanent retrievable storage. The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities. • Preparation or a report of findings with and appended itemized inventory of specimens. The report and report and inventory, when submitted to the City of Moreno Valley along with confirmation of the curation of recovered of recovered specimens into an established, accredited museum repository, will signify completion of the program to mitigate impacts to paleontological resources						
GEOLOGY AND SOILS						
Mitigation Measure GEO-1: Prior to the issuance of grading permits, any existing low density soils and/or saturated soils shall be removed to competent natural soil under the inspection of the Soils Engineering Firm. After the exposed surface has been cleansed of debris and/or vegetation, it shall be scarified until it is uniform in consistency, brought to the proper moisture content and compacted to a minimum of 90 percent relative compaction (in accordance with ASTM: D-1557). In any area where a transition between fill and native soil or between bedrock and soil are encountered,	City of Moreno Valley Planning Division Engineering	Prior to grading	Prior to Issuance of Grading Permit	Review of construction documents and on-site inspection		Withhold Grading Permit

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
additional excavation beneath foundations and slabs will be necessary in order to provide uniform support and avoid differential settlement of the structure. The on-site soils or approved import soils may be utilized for the compacted fill, provided they are free of any deleterious materials and shall not contain any rocks, brick, asphaltic concrete, concrete, or other hard materials greater than eight inches in maximum dimensions. Any import soil must be approved by the Soils Engineering firm a minimum of 24 hours prior to importation to the site. The approved fill soils shall be placed in layers not in excess of six inches in thickness. Each lift shall be uniform in thickness and thoroughly blended. The fill soils shall be brought to within 2 percent of the optimum moisture content, unless otherwise specified by the Soils Engineering firm. Each lift shall be compacted to a minimum of 90 percent relative compaction (in accordance with ASTM: D-1557) and approved prior to the placement of the next layer of soil. Compaction tests shall be obtained at the discretion of the Soils Engineering firm but to a minimum of one test for every 500 cubic yards placed and/or for every two feet of compacted fill placed. The minimum relative compaction shall be obtained in accordance with accepted methods in the construction industry. The final grade of the structural areas shall be						

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
in a dense and smooth condition prior to placement of slabs-on-grade or pavement areas. No fill soils shall be placed, spread, or compacted during unfavorable weather conditions. When the grading is interrupted by heavy rains, compaction operations shall not be resumed until approved by the Soils Engineering firm. It should be noted that the above measure may be modified by the Final Geotechnical or Soils Report.						
Mitigation Measure GEO-2: Prior the issuance of grading permits, the project proponent shall inform the project engineers, architects, owner, maintenance personnel, and other interested parties of the Expansive Soil Guidelines provided in the project's geotechnical analysis [Geotechnical Engineering Investigation Proposed Industrial Development Southwest Corner of Perris Boulevard and Grove View Road Moreno Valley, California, NorCal Engineering, March 7, 2007]. The recommendations identified in the project's Expansive Soil Guidelines shall be implemented by the project engineers, architects, owner, maintenance personnel, and other interested parties in the applicable design guidelines. Applicable design guidelines shall be included and implemented in the project's grading plans.	City of Moreno Valley Planning Division Building and Safety Engineering	Prior to grading	Prior to Issuance of Grading Permit	Review of grading and construction documents and on-site inspection		Withhold Grading Permit
GREENHOUSE GASES AND GLOBAL CLIMATE CHANGE						
4.3.6.1A Prior to the issuance of building	City of Moreno	Prior to	Prior to issuance	Review of		Withhold

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
permits, the project applicant shall provide evidence to the City of Moreno Valley that building features have been incorporated in building plans as required by Title 24 of the California Code of Regulations. These features include but are not limited to the following: • Exterior windows in the office areas shall utilize window treatments for efficient energy conservation. • Per CALGreen Code requirements, water-efficient fixtures and appliances, including but not limited to low-flow faucets, dual-flush toilets minimizing water consumption by 20 percent from the Building Standards Code baseline water consumption shall be used. • Per CALGreen Code requirements, a Commissioning Plan shall be prepared and all building systems (e.g., heating, ventilation, and air-conditioning [HVAC], irrigation systems, lighting, water heating) shall be commissioned by the Commissioning Authority. • Per CALGreen Code, restrict watering methods (e.g., prohibit systems that apply water to non-vegetated surfaces) and control runoff.	Valley Building and Safety Planning Division	construction	of building permits	construction documents and on-site inspection		Building Permit
4.3.6.1B Prior to the issuance of building permits, the project applicant shall provide evidence to the City of Moreno	City of Moreno Valley Building and Safety	Prior to construction	Prior to issuance of building permits	Review of construction documents/building		Withhold Building Permit

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
Valley that the following measures have been be incorporated into the design and construction of the project: • Encourage use of locally produced and/or manufactured building materials for at least 10 percent of the construction materials used for the project. • Encourage use of "Green Building Materials," such as those materials that are resource efficient, and recycled and manufactured in an environmentally friendly way, for at least 10 percent of the project. • Limit unnecessary idling of construction equipment. A reduction in equipment idling would reduce fuel consumption, and therefore, GHG emissions. • Maximize the use of electricity from the power grid by replacing diesel- or gasoline-powered equipment where feasible. This would reduce GHG emissions because electricity can be produced more efficiently at centralized power plants. • Design the project building to exceed the California Building Code's (CBC) 2008 Title 24 energy standard by 20%, including, but not limited to, any combination of the following: o Increase insulation such that heat transfer and thermal	Planning Division			plans and on-site inspection		

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
bridging is minimized. o Limit air leakage through the structure or within the heating and cooling distribution system to minimize energy consumption. o Incorporate ENERGY STAR or better rated windows in the office area, space heating and cooling equipment, light fixtures, appliances, or other applicable electrical equipment. • Provide a landscape and development plan for the project that takes advantage of shade, prevailing winds, and landscaping. The landscaping plan shall be prepared by a registered landscape architect who will consider the following: o Plant at least 50 percent low-ozone forming potential (Low-OFP) trees and shrubs, preferably native, drought-resistant species, to meet city/county landscaping requirements. o Plant Low-OFP, native, drought-resistant, tree and shrub species, 20% in excess of that already required by city or county ordinance. Consider roadside, sidewalk, and driveway shading. • Install efficient lighting and lighting control systems. Use daylight as an						

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
integral part of the lighting systems in buildings. • Install light-colored "cool" roof and cool pavements. • Install energy-efficient heating and cooling systems, appliances and equipment, and control systems. • Install solar or light-emitting diodes (LEDs) for outdoor lighting. • Install electrical outlets on the exterior walls of the warehouse/office building (and perhaps parking lots) to promote the use of electric landscape maintenance equipment.						
4.3.6.1C Prior to the issuance of occupancy permits, the project applicant shall provide evidence to the City of Moreno Valley that the following measures have been incorporated into the operation of the project: • The project applicant shall use low Global Warming refrigerants or natural refrigerants (ammonia, propane, carbon dioxide [CO_2]) for refrigeration and fire suppression equipment. • Provide vegetative or man-made exterior wall shading devices for east-, south-, and west facing walls with windows in the office areas.	City of Moreno Valley Building and Safety Planning Division	Prior to building permit and occupancy	Prior to issuance of occupancy permit	Review of construction documents and on-site inspection		Withhold Occupancy Permit

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
• Devise a comprehensive water conservation strategy appropriate for the project and its location. The strategy may include the following, plus other innovative measures that may be appropriate: • Install drought tolerant plants for landscaping. • Use reclaimed water for landscape irrigation within the project. Install the infrastructure to deliver and use reclaimed water. • Install water-efficient irrigations systems, such as weather-based and soil-moisture-based irrigation controllers and sensors for landscaping according to the California Department of Water Resources Model Efficient Landscape Ordinance. • Provide employee education about reducing waste and available recycling services.						
HYDROLOGY AND WATER QUALITY						
Mitigation Measure HYD-01: Prior to grading plan approval and the issuance of a grading permit by the City, the project proponent shall provide evidence to the City that a Notice of Intent (NOI) with the Regional Water Quality Control Board has been filed to be covered under the State NPDES General Construction Permit for discharge of stormwater associated with	City of Moreno Engineering	Prior to grading	Prior to the Issuance of Grading Permits	Submittal of copy of Notice of Intent to City filed with the RWQCB		Withhold Grading Permits

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
construction activities.						
Mitigation Measure HYD-02: Prior to grading plan approval and the issuance of a grading permit by the City, the project proponent shall submit to the State Water Quality Control Board, a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP shall include a surface water control plan and erosion control plan citing specific measures to control on-site and off-site erosion during the entire grading and construction period. Additionally, the SWPPP shall identify structural and nonstructural BMPs to control sediment and non-visible discharges from the site. BMPs to be implemented in the SWPPP may include but shall not be limited to the following: Sediment discharges from the site may be controlled by the following: gravel bags, silt fences, straw wattles and temporary debris basins (if deemed necessary), and other discharge control devices. The construction and condition of the BMPs will be periodically inspected during construction, and repairs will be made when necessary as required by the SWPPP. Materials that have the potential to contribute non-visible pollutants to stormwater must not be placed in drainage ways and must be contained, elevated, and placed in temporary storage containment areas.	City of Moreno Engineering	Prior to grading	Prior to the Issuance of Grading Permits	Review and approval of SWPPP		Withhold Grading Permits

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
All loose piles of soil, silt, clay, sand, debris, and other earthen material shall be protected in a reasonable manner to eliminate any discharge from the site. Stockpiles will be surrounded by silt fences. The SWPPP will include inspection forms for routine monitoring of the site during the construction phase to ensure NPDES compliance. Additional BMPs and erosion control measures will be documented in the SWPPP and utilized if necessary. The SWPPP will be kept on site for the entire duration of project construction and will also be available to the local RWQCB for inspection at any time. In the event that it is not feasible to implement the above BMPs, the City of Moreno Valley can make a determination that other BMPs will provide equivalent or superior treatment either on or off site.						
Mitigation Measure HYD-03: Prior to the issuance of grading permits, the project proponent shall provide evidence to the City that the following provisions have been added to construction contracts for the project: • The Construction Contractor shall be responsible for performing and documenting the application of BMPs identified in the SWPPP. Weekly inspections shall be performed on	City of Moreno Engineering	During grading and construction	Prior to Grading	Review of construction documents and on-site inspection		Withhold Grading Permit

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
sediment control measures called for in the SWPPP. Monthly reports shall be maintained by the Contractor and submitted to the City for inspection. In addition, the Contractor will also be required to maintain an inspection log and have the log on site to be reviewed by the City of Moreno Valley and the representatives of the Regional Water Quality Control Board.						
Mitigation Measure HYD-04: Prior to grading plan approval and the issuance of a grading permit by the City, the project proponent shall receive approval from the City of Moreno Valley for a Final Water Quality Management Plan (F-WQMP). The F-WQMP shall specifically identify pollutants of concern, site design, source control, and treatment control BMPs that shall be used on site to control predictable pollutant runoff in order to reduce impacts to water quality to the maximum extent practicable.	City of Moreno Engineering	Prior to grading	Prior to Issuance of Grading Permit	Submittal of WQMP to City for review and approval		Withhold Grading Permit
Mitigation Measure HYD-05: Prior to grading plan approval and the issuance of a grading permit, the project proponent shall submit a detailed grading plan and drainage report, with supporting engineering calculations, to the City Engineer for review and approval. The plan and report shall incorporate relevant requirements identified by the City and/or site-specific geotechnical investigations. The plan and report shall provide evidence that the storm drainage system would be adequate to convey water for	City of Moreno Engineering	Prior to grading	Prior to Issuance of Grading Permits	Submittal of evidence that all requirements are fulfilled		Withhold Grading Permit

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
the 100-year storm event from the project site and that the post-development flows exiting the proposed project site are less than or equal to pre-development flows.						
NOISE						
4.4.6.1A During all project site excavation and grading on site, the project contractor shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.	City of Moreno Valley Building and Safety Engineering Planning Division	Throughout construction	Prior to Issuance of Grading Permit	Review of construction documents and on-site inspection		Withhold Grading Permit
4.4.6.1B The project contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest to the project site.	City of Moreno Valley Building and Safety Engineering Planning Division	Throughout construction /on-site inspection	Prior to Issuance of Grading Permit	Review of construction documents and on-site inspection		Withhold Grading Permit or Stop Work Order
4.4.6.1C The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receptors nearest to the project site during all project construction.	City of Moreno Valley Building and Safety Engineering Planning Division	Throughout construction /on-site inspection	Prior to Issuance of Grading Permit	Review of construction documents and on-site inspection		Withhold Grading Permit or Stop Work Order
4.9.6.1D During all project site construction activities, the construction contractor shall limit all construction-	City of Moreno Valley Building and Safety	Throughout construction /on-site inspection	Prior to Issuance of Grading Permit	Review of construction documents and on-		Withhold Grading Permit or Stop Work

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
related activities that would result in high noise levels to between the hours of 6:00 a.m. and 8:00 p.m. on weekdays and between the hours of 7:00 a.m. to 8:00 p.m. on weekends and holidays, unless written approval is obtained from the City Building Official or City Engineer. For grading activity, the hours are limited to between 7 am and 6 pm weekdays and 8 am to 4 pm on weekends and holidays.	Engineering Planning Division			site inspection		Order
TRANSPORTATION						
4.5.6.1A. Prior to the issuance of building permits, the project applicant shall participate in the City of Moreno Valley Development Impact (DIF) Fee Program and pay the project's fair share for local circulation improvements as outlined in the VIP Moreno Valley Project Traffic Study. The City shall ensure that the intersection and street improvements outlined in the VIP Moreno Valley Project Traffic Study will be constructed pursuant to the timeframes established by the City of Moreno Valley Development Impact Fee Program.	City of Moreno Valley Building and Safety Engineering Planning Division	Once after construction	Prior to the Issuance of Certificate of Occupancy	Evidence of Payment of City DIF fees		Withhold Certificate of Occupancy
4.5.6.1B. Prior to the issuance of building permits, the project applicant shall participate in the County of Riverside Transportation Uniform Mitigation Fee (TUMF) Program and pay the project's fair share for regional circulation improvements. The City shall ensure that the intersection and street improvements outlined in the VIP Moreno Valley Project Traffic Study will be constructed pursuant to the timeframe established by the	City of Moreno Valley Building and Safety Engineering	Once after construction	Prior to the Issuance of Certificate of Occupancy	Evidence of Payment of Riverside County TUMF fees		Withhold Certificate of Occupancy

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
County of Riverside TUMF Program.						
4.5.6.2A. Prior to the issuance of occupancy permits, the project applicant shall have constructed the site access roadway improvements outlined below. • Indian Street/South Project Driveway: Restripe to convert center turn lane on Indian Street to a two-way left-turn lane. This location does not meet a peak hour signal warrant. This is a site-adjacent improvement to be constructed by the project applicant.	City of Moreno Valley Engineering	Once after construction	Prior to the Issuance of Occupancy Permits	Review of construction documents and on-site inspection		Withhold Occupancy Permits

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RESOLUTION NO. 2012-17

A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF MORENO VALLEY APPROVING APPLICATION NO'S. PA09-0004 (PLOT PLAN FOR A 1,616,133 SQUARE FOOT WAREHOUSE), AND PA09-0012 (TENTATIVE PARECEL MAP NO. 36162).

Section 1:

WHEREAS, Vogel Engineers, Inc., has filed an application for the approval of PA09-0004, a plot plan for a 1,616,133 square foot warehouse distribution facility on 80 acres, as described in the title of this Resolution.

WHEREAS, on July 12, 2012, the Planning Commission of the City of Moreno Valley held a meeting to consider the application.

WHEREAS, all legal prerequisites to the adoption of this Resolution have occurred.

WHEREAS, there is hereby imposed on the subject development project certain fees, dedications, reservations and other exactions pursuant to state law and City ordinances;

WHEREAS, pursuant to Government Code Section 66020(d)(1), **NOTICE IS HEREBY GIVEN** that this project is subject to certain fees, dedications, reservations and other exactions as provided herein.

NOW, THEREFORE, BE IT RESOLVED, it is hereby found, determined and resolved by the Planning Commission of the City of Moreno Valley as follows:

A. This Planning Commission hereby specifically finds that all of the facts set forth above in this Resolution are true and correct.

B. Based upon substantial evidence presented to this Planning Commission during the above-referenced meeting on July 12, 2012, including written and oral staff reports, and the record from the public hearing, this Planning Commission hereby specifically finds as follows:

1. **Conformance with General Plan Policies –** The proposed use is consistent with the General Plan, and its goals, objectives, policies and programs.

ATTACHMENT 3

FACT: The General Plan encourages a mix of industrial uses to provide a diversified economic base and ample employment opportunities. Stated policies require the avoidance of adverse impacts on surrounding properties and the screening of industrial uses to reduce glare, noise, dust, vibrations and unsightly views. The project as designed and conditioned would achieve the objectives of the City of Moreno Valley's General Plan. The proposed project is consistent with the General Plan and do not conflict with the goals, objectives, policies, and programs established within the Plan.

2. **Conformance with Zoning Regulations –** The proposed use complies with all applicable zoning and other regulations.

FACT: The project site is currently zoned Industrial. The proposed use will comply with all applicable zoning regulations and the requirements of the Moreno Valley Industrial Area Plan (SP #208). The project is designed in accordance with the provisions of Chapter 9.05 Industrial Districts of the City's Municipal Code.

3. **Health, Safety and Welfare –** The proposed use will not be detrimental to the public health, safety or welfare or materially injurious to properties or improvements in the vicinity.

FACT: The proposed 1,616,133 square warehouse facility as designed and conditioned will not adversely affect the public health, safety or general welfare. A Final EIR has been prepared to address the potential environmental impacts of the project in accordance with the provisions of the California Environmental Quality Act (CEQA).

4. **Location, Design and Operation –** The location, design and operation of the proposed project will be compatible with existing and planned land uses in the vicinity.

FACT: The project is located in the Moreno Valley Industrial Area Plan (SP 208), south side of Grove View Road between Perris Boulevard and Indian Street at the City's southern boundary.

Land uses to the north include a Waste Management facility and a 426,700 square foot warehouse building. Land uses to the west include the 360,440 square foot i-Herb warehouse building, approximately 20 acres of vacant Industrial zoned land and a site currently used for container storage. Further to the west is the southern approach to the runways at March Air Reserve Base. Land uses to the east include a ministorage facility, the

approximately 255,000 square foot Masonite Door factory, and the approximate 1.2 million square foot Ross Dress For Less distribution facility.

The project site is located at the southerly City limits with a mixture of vacant Industrial zoned land and developed distribution land uses within the City of Perris on the south side of the Perris Valley Storm Drain.

The proposed warehouse distribution facility is a permitted use in the project site's Industrial zone. As designed and conditioned the project is compatible with existing and proposed land uses in the vicinity.

Section 2:

WHEREAS, the applicant, Vogel Engineers, Inc., has filed an application for the approval of PA09-0012 or Tentative Parcel Map No. 36162 to combine the existing four parcels located within the project site into a single 80 acre.

WHEREAS, on July 12, 2012, the Planning Commission of the City of Moreno Valley held a public hearing to consider the subject applications and the environmental documentation prepared for the project.

WHEREAS, all legal prerequisites to the adoption of this Resolution have occurred.

WHEREAS, there is hereby imposed on the subject development project certain fees, dedications, reservations and other exactions pursuant to state law and City ordinances;

WHEREAS, pursuant to Government Code Section 66020(d)(1), **NOTICE IS HEREBY GIVEN** that this project is subject to certain fees, dedications, reservations and other exactions as provided herein.

NOW, THEREFORE, BE IT RESOLVED, it is hereby found, determined and resolved by the Planning Commission of the City of Moreno Valley as follows:

A. This Planning Commission hereby specifically finds that all of the facts set forth above in this Resolution are true and correct.

B. Based upon substantial evidence presented to this Planning Commission during the above-referenced meeting on July 12, 2012, including written and oral staff reports, and the record from the public hearing, this Planning Commission hereby specifically finds as follows:

1. **Conformance with General and Specific Plans –** That the proposed land division is consistent with applicable general and specific plans.

   FACT: The proposed tentative parcel map is consistent with the General Plan designation of Business Park for the project site. The proposed parcel map will combine the existing four parcels located within the project site into a single 80 acre parcel. The proposed land division is consistent with existing goals, objectives, policies and programs of the general plan.

2. **Design Conformance with General and Specific Plans –** That the design or improvement of the proposed land division is consistent with applicable general and specific plans.

   FACT: The tentative parcel map as designed and conditioned will provide improvements that are consistent with the requirements of the project site's General Plan land use designation of Business Park.

3. **Physically Suitable for Proposed Development –** That the site of the proposed land division is physically suitable for the type of development.

   FACT: The project site is comprised of multiple vacant rectangular shaped parcels that are mostly flat. The project is located in the Moreno Valley Industrial Area Plan (SP 208), south side of Grove View Road between Perris Boulevard and Indian Street at the City's southern boundary. Land uses to the north include a Waste Management facility and a 426,700 square foot warehouse building. Land uses to the west include the 360,440 square foot i-Herb warehouse building, approximately 20 acres of vacant Industrial zoned land and a site currently used for container storage. Further to the west is the southern approach to the runways at March Air Reserve Base. Land uses to the east include a ministorage facility, the approximately 255,000 square foot Masonite Door factory, and the approximate 1.2 million square foot Ross Dress For Less distribution facility.

   The project site is located at the southerly City limits with a mixture of vacant Industrial zoned land and developed distribution land uses within the City of Perris on the south side of the Perris Valley Storm Drain.

   Overall, the project site is well suited for future development of industrial land uses.

4. **Physically Suitable for Proposed Density –** That the site of the proposed land division is physically suitable for the proposed density of the development.

   FACT: The project site is mostly flat and at grade along Perris Boulevard, Indian Street and Grove View Road. The parcel map is designed in accordance with the provisions of the City's Municipal Code. The project site is physically suitable for the subdivision.

5. **Protection of Fish or Wildlife Habitat –** That the design of the proposed land division or the proposed improvements are not likely to cause substantial environmental damage or substantially and unavoidably injure fish or wildlife or their habitat.

   FACT: A Final EIR has been prepared in accordance with the provisions of the California Environmental Quality Act (CEQA), concluding that with mitigation and as conditioned and designed, the proposed subdivision would result in less than significant impacts to Fish and Wildlife resources. The project has also been determined to be consistent with the Multiple Species Habitat Conservation Plan (MSHCP).

6. **Health, Safety and Welfare –** That the design of the proposed land division or the type of improvements are unlikely to cause serious public health problems.

   FACT: As conditioned, the proposed parcel map would not cause serious public health problems. The Eastern Municipal Water District will provide water and sewer services to the project site. There are no known hazardous conditions associated with the property, the design of the land division or the type of improvements.

7. **Easements –** That the design of the land division or the type of improvements will not conflict with easements acquired by the public at large for access through or use of property within the proposed subdivision.

   FACT: The tentative parcel map has been designed to accommodate and not conflict with existing easements on the subject site including utility and storm drain easements.

8. **Consistent with Applicable City Ordinances –** That the proposed land division and the associated design and improvements are consistent with applicable ordinances of the city.

FACT: The tentative parcel map is designed in accordance with the provisions of the City's Municipal Code.

9. **Passive or Natural Heating and Cooling –** That the design of the land division provides, to the extent feasible, for future passive or natural heating and cooling opportunities in the subdivision.

FACT: The design of this parcel map, to the extent feasible, allows solar access for passive heating and opportunities for placement of shade trees and other vegetation for cooling.

10. **Regional Housing –** That the effect of the proposed land division on the housing needs of the region were considered and balanced against the public service needs of the residents of Moreno Valley and available fiscal and environmental resources.

FACT: The project does not exceed the planned density, the associated public service demand, or the demand for environmental resources envisioned by the Moreno Valley General Plan. The project will supplement the City's fiscal resources by paying impact fees for public facilities. Additionally, future residents will pay Community Services District fees, property tax, sales tax and other taxes and fees that will be used to provide landscape maintenance as well as police, fire and other public services.

Section 3:

FEES, DEDICATIONS, RESERVATIONS, AND OTHER EXACTIONS

1. **FEES**

Impact, mitigation and other fees are due and payable under currently applicable ordinances and resolutions. These fees may include but are not limited to: Development Impact Fee, Transportation Uniform Mitigation Fee (TUMF), Multi-species Habitat Conservation Plan (MSHCP) Mitigation Fee, Stephens Kangaroo Habitat Conservation fee, Underground Utilities in lieu Fee, Area Drainage Plan fee, Bridge and Thoroughfare Mitigation fee (Future) and Traffic Signal Mitigation fee. The final amount of fees payable is dependent upon information provided by the applicant and will be determined at the time the fees become due and payable.

Unless otherwise provided for by this resolution, all impact fees shall be calculated and collected at the time and in the manner provided in Chapter 3.32 of the City of Moreno Valley Municipal

Code or as so provided in the applicable ordinances and resolutions. The City expressly reserves the right to amend the fees and the fee calculations consistent with applicable law.

2. DEDICATIONS, RESERVATIONS, AND OTHER EXACTIONS

The adopted Conditions of Approval for PA08-0097 and PA09-0022, incorporated herein by reference, may include dedications, reservations, and exactions pursuant to Government Code Section 66020 (d) (1).

3. CITY RIGHT TO MODIFY/ADJUST; PROTEST LIMITATIONS

The City expressly reserves the right to establish, modify or adjust any fee, dedication, reservation or other exaction to the extent permitted and as authorized by law.

Pursuant to Government Code Section 66020(d)(1), NOTICE IS FURTHER GIVEN that the 90 day period to protest the imposition of any impact fee, dedication, reservation, or other exaction described in this resolution begins on the effective date of this resolution and any such protest must be in a manner that complies with Section 66020(a) and failure to timely follow this procedure will bar any subsequent legal action to attack, review, set aside, void or annul imposition.

The right to protest the fees, dedications, reservations, or other exactions does not apply to planning, zoning, grading, or other similar application processing fees or service fees in connection with this project and it does not apply to any fees, dedication, reservations, or other exactions of which a notice has been given similar to this, nor does it revive challenges to any fees for which the Statute of Limitations has previously expired.

Section 4:

BE IT FURTHER RESOLVED that the Planning Commission **HEREBY APPROVES** Resolution No. 2012-17:

1. **APPROVING** PA09-0004 (Plot Plan), subject to the attached conditions of approval included as Exhibit A; and

2. **APPROVING** PA09-0012 (Tentative Parcel Map No. 36162), subject to the attached conditions of approval included as Exhibit B.

APPROVED this 12th day of July, 2012.

_____
Meli Van Natta
Chair, Planning Commission

ATTEST:

_____
John C. Terell, Planning Official
Secretary to the Planning Commission

APPROVED AS TO FORM:

_____
City Attorney

Attachments

CITY OF MORENO VALLEY
CONDITIONS OF APPROVAL FOR
PLOT PLAN PA09-0004 FOR A WAREHOUSE DISTRIBUTION FACILITY
ASSESSOR'S PARCEL NUMBERS: 316-210-071, -073, -075 and -076

APPROVAL DATE:
EXPIRATION DATE:

- X **Planning (P), including Building (B), School District (S), Post Office (PO)**
- X **Fire Prevention Bureau (F)**
- X **Land Development (LD)**
- X **Public Works – Special Districts (SD)**
- X **Public Works – Transportation Engineering (TE)**
- X **Public Works – Moreno Valley Utilities (MVU)**
- ___ **Parks & Community Services (PCS)**
- X **Police (PD)**

Note: All Special conditions are in bold lettering. All other conditions are standard to all or most development projects.

COMMUNITY & ECONOMIC DEVELOPMENT DEPARTMENT

Planning Division

P1. Approval of Plot Plan PA09-0004 is subject to certification of an Environmental Impact Report by the City of Moreno Valley.

P2. Plot Plan PA09-0004 has been approved for development of a 1,616,133 square foot warehouse distribution facility, to be built on a 80 acre site within Assessor's Parcel Numbers 316-210-071, -073, -075 and -076. The facility includes 268 dock doors and 44,000 square feet of office. Required parking for this use equates to a total of 589 employee/visitor parking spaces and 368 truck/trailer parking spaces.

P3. Development of the warehouse facility is subject to approval of Tentative Parcel Map No. 36162 and the subsequent recordation of this map.

P4. A mitigation monitoring fee, as provided by City ordinance, shall be paid by the applicant within 30 days of project approval. No City permit or approval shall be issued until such fee is paid. (CEQA)

P5. Bicycle racks shall be provided at a minimum of five (5) percent of the required vehicular parking and shall be located near the designated office area(s).

EXHIBIT A

P6. The gates into truck loading and parking areas that are within view of a public street shall be of solid metal construction or wrought iron with mesh to screen the interior of the loading area.

P7. This project shall comply with South Coast Air Quality Management District (SCAQMD) rules related to dust generation (Rule 403) and the use of architectural coatings (Rule 1113).

P8. The design of all swales and basins that are visible from the public right-of-way shall be integrated with the surrounding landscape areas.

P9. Screening walls of decorative block or concrete tilt-up construction shall be provided to fully screen the truck loading and parking area for from view from Perris Boulevard, Indian Street and Grove View Road.

P10. Enhanced landscape shall be provided in the planter areas near each driveway and near the office portions of the facilities.

P11. All loudspeakers, bells, gongs, buzzers or other noise attention devices installed on the project site shall be designed to ensure that the noise level at all property lines will be at or below 55 dBA for consistency with the Municipal Code.

P12. Loading or unloading activities shall be conducted from the truck bays or designated loading areas only. (MC 9.10.140, CEQA)

P13. No outdoor storage is permitted on the project site, except for truck and trailer storage in designated areas within the screened truck courts.

P14. If the proposed project requires blasting, it shall be used only as a last resort. In such cases, it shall be approved by the Fire Marshall, and the developer shall comply with the current City ordinance governing blasting. (Ord)

P15. This approval shall expire three years after the approval date of this project unless used or extended as provided for by the City of Moreno Valley Municipal Code; otherwise it shall become null and void and of no effect whatsoever. Use means the beginning of substantial construction contemplated by this approval within the three-year period, which is thereafter pursued to completion, or the beginning of substantial utilization contemplated by this approval. (MC 9.02.230)

P16. PA09-0004 shall be developed in accordance with the approved plans on file in the Community & Economic Development Department - Planning Division, the Municipal Code regulations, General Plan, the Moreno Valley Industrial Area Plan and the conditions contained herein. Prior to any use of the project site or business activity being commenced thereon, all Conditions of Approval shall be completed to the satisfaction of the City Planning Official. (MC 9.14.020)

P17. The developer, or the developer's successor-in-interest, shall be responsible for maintaining any undeveloped portion of the project site in a manner that provides for the control of weeds, erosion and dust. (MC 9.02.030)

P18. A drought tolerant, low water using landscape palette shall be utilized throughout the project.

P19. All landscaped areas shall be maintained in a healthy and thriving condition, free from weeds, trash and debris. (MC 9.02.030)

P20. Any signs indicated on the submitted plans are not included with this approval. Any signs proposed for this development shall be designed in conformance with the sign provisions of the Municipal Code or approved sign program, if applicable, and shall require separate application and approval by the Community & Economic Development Department - Planning Division. (MC 9.12.020)

Prior to Issuance of Grading Permits

P21. (GP) All site plans, grading plans, landscape and irrigation plans, fence/wall plans, lighting plans and street improvement plans shall be coordinated for consistency with this approval.

P22. (GP) If potential historic, archaeological, or paleontological resources are uncovered during excavation or construction activities at the project site, work in the affected area will cease immediately and a qualified person (meeting the Secretary of the Interior's standards (36CFR61)) shall be consulted by the applicant to evaluate the find, and as appropriate recommend alternative measures to avoid, minimize or mitigate negative effects on the historic, prehistoric, or paleontological resource. Determinations and recommendations by the consultant shall be implemented as deemed appropriate by the Community & Economic Development Director, in consultation with the State Historic Preservation Officer (SHPO) and any and all affected Native American Tribes before any further work commences in the affected area.

If human remains are discovered, work in the affected area shall cease immediately and the County Coroner shall be notified. If it is determined that the remains are potentially Native American, the California Native American Heritage Commission and any and all affected Native American Indians tribes such as the Morongo Band of Mission Indians or the Pechanga Band of Luiseno Indians shall be notified and appropriate measures provided by State law shall be implemented. (GP Objective 23.3, DG, CEQA).

P23. (GP) Prior to the issuance of grading permits, final erosion control landscape and irrigation plans for all cut or fill slopes over 3 feet in height shall be submitted to the Planning Division for review and approval for the phase in process. The plans shall be designed in accordance with the slope erosion plan as required by the City Engineer for that phase. Man-made slopes greater than 10 feet in height shall be

"land formed" to conform to the natural terrain and shall be landscaped and stabilized to minimize visual scarring. (GP Objective 1.5, MC 9.08.080, DG)

P24. (GP) Prior to approval of any grading permit, the developer shall submit for review and approval of a tree plan to the Planning Division. The plan shall identify all mature trees (4 inch trunk diameter or larger) on the subject property, City right-of-way or Caltrans right-of-way. Using the grading plan as a base, the plan shall indicate trees to be relocated, retained, and removed. Replacement trees shall be: shown on the plan; be a minimum size of 24 inch box; and meet a ratio of three replacement trees for each mature tree removed or as approved by the Community Development Director. (GP Objective 4.4, 4.5, DG)

P25. (GP) Prior to issuance of grading permits, the developer shall pay the applicable Stephens' Kangaroo Rat (SKR) Habitat Conservation Plan mitigation fee. (Ord)

P26. (GP) Prior to approval of any grading permits, plans for any security gate system shall be submitted to the Community Development Department - Planning Division for review and approval.

P27. (GP) If a median is required, then prior to approval of any grading permits, final median enhancement/landscape/irrigation plans shall be submitted to the Community Development Department - Planning Division and Public Works Department – Special Districts for review and approval by each division. Timing of installation shall be determined by PW- Special Districts. (GP - Circulation Master Plan)

P28. (GP) Prior to issuance of any grading permits, mitigation measures contained in the Mitigation Monitoring Program approved with this project shall be implemented as provided therein.

P29. (GP) Prior to the issuance of grading permits, the grading plan shall show decorative treatment for all driveway ingress/egress locations of the project. Accessible pedestrian pathways interior to the site cannot be painted. If delineation is necessary, then an alternative material is required.

P30. (GP) Prior to the issuance of a grading permit, all required planter areas, curbs, including twelve-inch concrete step outs, and required parking space striping shall be shown on the precise grading plan.

P31. (GP) Prior to the issuance of grading permits, the following burrowing owl survey requirements shall be incorporated into the grading plans in accordance with the Riverside County Multi-species Habitat Conservation Plan: Within 30 days of and prior to disturbance, a burrowing owl focused survey shall be conducted by a qualified biologist using accepted protocols. The survey shall be submitted to the Planning Division for review and approval.

P32. (GP) Prior to issuance of grading permits, landscape plans (trees, shrubs and groundcover) for basins maintained by an POA or other private entity shall be submitted to the Planning Division for review and approval for the sides and/or slopes. A hydroseed mix with irrigation is acceptable for the bottom of all the basin areas. All detention basins shall include trees, shrubs and groundcover up to the concreted portion of the basin. A solid decorative wall with pilasters, tubular steel fence with pilasters or other fence or wall approved by the Community Development Director is required to secure all water quality and detention basins more than 18 inches in depth.

P33. (GP) Prior to issuance of grading permits, the developer shall submit wall/fence plans to the Planning Division for review and approval as follows:

- **A. A maximum 3 foot high decorative wall in lieu of a hedge or berm may be placed in setback areas adjacent to a parking lot.**
- **B. Any proposed retaining walls shall also be decorative in nature, while the combination of retaining and other walls on top shall not exceed the height requirement for the specific plan and/or Municipal Code.**
- **C. A 14 foot tall solid wall of decorative block with pilasters and a cap or concrete tilt-up construction shall be provided to screen the trucks, parked trailers and the loading areas and loading docks from view from Perris Boulevard, Indian Street and Grove View Road.**
- **D. An 8 foot tall chain link fence with slats is required along the southern property line along the Riverside County Flood Control maintenance road.**

Prior to Issuance of Building Permits

P34. (BP) Prior to issuance of building permits, the Community & Economic Development Department - Planning Division shall review and approve the location and method of enclosure or screening of transformer cabinets, commercial gas meters and back flow preventers as shown on the final working drawings. Location and screening shall comply with the following criteria: transformer cabinets and commercial gas meters shall not be located within required setbacks and shall be screened from public view either by architectural treatment or with landscaping; multiple electrical meters shall be fully enclosed and incorporated into the overall architectural design of the building(s); back-flow preventers shall be screened by landscaping that will provide complete screening upon maturity. (GP Objective 43.30, DG)

P35. (BP) Prior to issuance of building permits, screening details shall be addressed on plans for roof top equipment and trash enclosures submitted for Community & Economic Development Department - Planning Division review and approval. All equipment shall be completely screened so as not to be visible from public view, and the screening shall be an integral part of the building. For trash enclosures, landscaping shall be included on at least three sides. The trash enclosure, including any roofing, shall be compatible with the architecture for the building(s). (GP Objective 43.6, DG)

P36. (BP) Prior to issuance of building permits, two copies of a detailed, on-site, computer generated, point-by-point comparison lighting plan, including exterior building, parking lot, and landscaping lighting, shall be submitted to the Community & Economic Development Department - Planning Division for review and approval. The lighting plan shall be generated on the plot plan and shall be integrated with the final landscape plan. The plan shall indicate the manufacturer's specifications for light fixtures used and shall include style, illumination, location, height and method of shielding. The lighting shall be designed in such a manner so that it does not exceed 0.5 foot candles illumination beyond at the property line. The lighting level for all parking lots or structures shall be a minimum coverage of one foot-candle of light with a maximum of eight foot-candles. After the third plan check review for lighting plans, an additional plan check fee will apply. (MC 9.08.100, DG)

P37. (BP) Prior to issuance of building permits or as permitted by current City policy, the developer or developer's successor-in-interest shall pay all applicable impact fees, including but not limited to Transportation Uniform Mitigation fees (TUMF), Multi-species Habitat Conservation Plan (MSHCP) mitigation fees, and the City's adopted Development Impact Fees. (Ord)

P38. (BP) Prior to issuance of building permits, final landscaping and irrigation plans shall be submitted to the Community & Economic Development Department - Planning Division for review. All landscape plans shall be approved prior to the release of any building permits for the site. After the third plan check review for landscape plans, an additional plan check fee shall apply. The plans shall be prepared in accordance with the City's Landscape Standards and Specifications and shall include:

A. A landscape berm, hedge or a maximum 3 foot decorative wall is required adjacent to parking areas along public rights-of-way.
B. All finger and end planters shall be included at an interval of one per 12 parking stalls, be a minimum 5' x 16', and include additional 12" concrete step-outs and 6" curbing. (MC9.08.230, City's Landscape Standards)
C. All diamond planters shall be included at an interval of one per 3 parking stalls.
D. Drought tolerant landscape shall be provided. Sod shall be limited to public gathering areas only and not be included along the perimeter of the project site.
E. On site trees shall be planted at an equivalent of one (1) tree per thirty (30) linear feet of building dimension. Trees may be massed for pleasing aesthetic effects.
F. **Enhanced landscaping shall be included at all driveway and corner locations.**
G. All site perimeter and parking lot landscape and irrigation shall be installed prior to the release of certificate of any occupancy permits for the site or pad in question.
H. The review of all utility boxes, transformers etc. shall be coordinated to provide adequate screening from public view. (Landscape Guidelines)

I. **Street trees planted at 40 feet on center spacing shall be provided along the site's Perris Boulevard, Indian Street and Grove View Road frontages.**

J. **Along property boundaries visible from the public view and accessible to the general public, trees shall be planted at a rate of one tree per 30 linear feet of the interior property line. Tree clusters may satisfy this requirement.**

K. **The design of all swales and basins that are visible from the public right-of-way shall be integrated with the surrounding landscape areas.**

P44. (BP) Prior to the issuance of building permits, the landscape plans shall include landscape treatment for trash enclosures located outside of a truck court, to include landscape on three sides, and trash enclosures shall include decorative enhancements such as an enclosed roof and other decorative features that are consistent with the architecture of the proposed commercial buildings on the site, subject to the approval of the Community & Economic Development Director.

P45. (BP) Prior to the issuance of building permits, all fences and walls required or proposed on site, shall be approved by the Community & Economic Development Director. (MC 9.08.070)

P46. (BP) Prior to the issuance of building permits, downspouts will be interior to the building, or if exterior, integrated into the architecture of the building to include compatible colors and materials to the satisfaction of the Community & Economic Development Director.

P47. (BP) Prior to the issuance of building permits the building site plan shall include decorative concrete or pavers for all driveway ingress/egress locations for the project.

P48. (BP) Prior to issuance of building permits, a final map for Tentative Parcel Map No. 36162 (PA09-0012) must be approved and recorded and all conditions of approval related to the parcel map must be satisfied.

P49. (BP) Prior to issuance of any building permits, mitigation measures contained in the Mitigation Monitoring Program approved with this project shall be implemented as provided therein. (CEQA)

<u>Prior to Issuance of Certificate of Occupancy or Building Final</u>

P50. (CO) Prior to issuance of any Certificates of Occupancy or building final, mitigation measures contained in the Mitigation Monitoring Program approved with this project shall be implemented as provided therein. (CEQA) (Advisory)

P51. (CO) Prior to the issuance of Certificates of Occupancy or building final, all required and proposed fences and walls shall be constructed according to the approved plans on file in the Community & Economic Development Department – Planning Division. (MC 9.080.070).

P52. (CO) Prior to issuance of Certificate of Occupancy or building final, installed landscaping and irrigation shall be reviewed by the Community & Economic Development Department - Planning Division. The landscaping shall be installed in accordance with the City's Landscape Standards and the approved landscape plans.

P53. (CO) All rooftop equipment shall be appropriately screened and not visible from the public rights of way.

MITIGATION MEASURES

Air Quality

P54. **4.2.6.1A** Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall place construction equipment staging areas at least 200 feet away from sensitive receptors. Contract specifications shall be included in the proposed project construction documents, which shall be reviewed by the City.

P55. **4.2.6.1B** Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall utilize power sources (e.g., power poles) or clean-fuel (e.g., fuel other than diesel or gasoline) generators where feasible. Contract specifications shall be included in the proposed project construction documents, which shall be reviewed by the City.

P56. **4.2.6.1C** Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall utilize California Air Resources Board (CARB) Tier II Certified equipment or better during the rough/mass grading phase for the following pieces of equipment: rubber-tired dozers and scrapers. Contract specifications shall be included in the proposed project construction documents, which shall be reviewed by the City.

P57. **4.2.6.1D** All clearing, grading, earthmoving, or excavation activities shall cease when winds exceed 25 mph per SCAQMD guidelines in order to limit fugitive dust emissions.

P58. **4.2.6.1E** The contractor shall ensure that all disturbed unpaved roads and disturbed areas within the project are watered at least three times daily during dry weather. Watering, with complete coverage of disturbed areas, shall occur at least three times a day, preferably in the mid-morning, afternoon, and after work is done for the day.

P59. **4.2.6.1F** The contractor shall ensure that traffic speeds on unpaved roads and project site areas are reduced to 15 miles per hour or less to reduce PM10 and PM2.5 fugitive dust haul road emissions. Speed limit signs (15 mph maximum) shall be posted at entry points to the project site, and along any unpaved roads providing access to or within the project site and/or any unpaved designated on-site travel routes.

P60. **4.2.6.1G** Groundcover shall be replaced, and/or non-toxic soil stabilizers shall be applied (according to manufacturers' specifications) to any inactive construction areas (previously graded areas inactive for ten days or more).

P61. **4.2.6.1H** The contractor shall minimize pollutant emissions by maintaining equipment engines in good condition and in proper tune according to manufacturer's specifications and during smog season (May through October) by not allowing construction equipment to be left idling for more than five minutes (per California law).

P62. **4.2.6.1I** The contractor shall ensure use of low-sulfur diesel fuel in construction equipment as required by the California Air Resources Board (CARB) (diesel fuel with sulfur content of 15 ppm by weight or less).

P63. **4.2.6.1J** If available, the project applicant shall use "Low-Volatile Organic Compounds" paints, coatings, and solvents with a VOC content lower than required under Rule 1113 (not to exceed 150 grams/liter; 1.25 pounds/gallon). High Pressure Low Volume (HPLV) applications of paints, coatings, and solvents shall be consistent with South Coast Air Quality Management District Rule 1113. Alternatively, the project applicant shall use materials that do not require painting or are pre-painted.

P64. **4.2.6.1K** Grading plans, construction specifications and bid documents shall also include the following notations:

- Off-road construction equipment shall utilize alternative fuels where feasible e.g., biodiesel fuel (a minimum of B20), natural gas (CNG), liquefied natural gas (LNG), propane, except for equipment where use of such fuels would void the equipment warranty;
- Gravel pads shall be provided at all access points to prevent tracking of mud onto public roads;
- Install and maintain trackout control devices at all access points where paved and unpaved access or travel routes intersect;
- The contractor or builder shall designate a person or person(s) to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust off site;
- The contractor or builder shall post a publicly visible sign with the telephone number and person to contact regarding dust complaints. The contact person shall take corrective action within 24 hours.

- High pressure injectors shall be provided on diesel construction equipment where feasible;
- Engine size of construction equipment shall be limited to the minimum practical size;
- Substitute gasoline-powered for diesel-powered construction equipment where feasible;
- Use electric construction equipment where feasible;
- Install catalytic converters on gasoline-powered equipment where feasible;
- Ride-sharing program for the construction crew shall be encouraged and shall be supported by contractor(s) via incentives or other inducement;
- Documentation shall be provided to the City of Moreno Valley indicating that construction workers have been encouraged to carpool or otherwise reduce VMT to the greatest extent practical, including providing information on available park and ride programs;
- Lunch vendor services shall be permitted onsite during construction to minimize the need for offsite vehicle trips;
- All forklifts used during construction and in subsequent operation of the project shall be electric or natural gas powered.
- Suspend use of all construction equipment operations during second stage smog alerts.

P65. **4.2.6.1L** Throughout project construction, a construction relations officer/community liaison, appointed by the Applicant, shall be retained on-site. In coordination and cooperation with the City, the construction relations officer/community liaison shall respond to any concerns related to PM10 (fugitive dust) generation or other construction-related air quality issues.

P66. **4.2.6.1M** All project entrances shall be posted with signs which state:

- Truck drivers shall turn off engines when not in use;
- Diesel delivery trucks servicing the project shall not idle for more than three (3) minutes; and
- Telephone numbers of the building facilities manager and CARB, to report violations.

P67. **4.2.6.1N** When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.

P68. **4.2.6.1O** All streets shall be swept at least once a day using SCAQMD Rule 1186 certified street sweepers utilizing reclaimed water trucks if visible soil materials are

carried to adjacent streets.

P69. **4.2.6.1P** Any vegetative cover to be utilized onsite shall be planted as soon as possible to reduce the disturbed area subject to wind erosion. Irrigation systems required for these plants shall be installed as soon as possible to maintain good ground cover and to minimize wind erosion of the soil.

P70. **4.2.6.1Q.** Provide temporary traffic controls such as a flag person, during all phases of construction to maintain smooth traffic flow.

P71. **4.2.6.1R** All roadways, driveways, sidewalks, etc., should be completed as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.

P72. **4.2.6.1S** Implement activity management techniques including a) development of a comprehensive construction management plan designed to minimize the number of large construction equipment operating during any given time period; b) scheduling of construction truck trips during non-peak hours to reduce peak hour emissions; c) limitation of the length of construction work-day period; and d) phasing of construction activities.

P73. **4.2.6.1T** Reroute construction trucks away from congested streets and sensitive receptor areas.

P74. **4.2.6.3A** Prior to issuance of the first building permit, building and site plan designs shall ensure that the project's energy efficiencies surpass applicable 2008 California Title 24, Part 6 Energy Efficiency Standards by a minimum of 20 percent. Verification of increased energy efficiencies shall be documented in Title 24 Compliance Reports provided by the Applicant, and reviewed and approved by the City. Any combination of design features, including but not limited to the following list, may be used to fulfill this requirement provided that the total increase in energy efficiency meets or exceeds 20 percent:

- Exceed California Title 24 Energy Efficiency performance standards for water heating and space heating and cooling, as deemed acceptable by the City.
- Increase in insulation such that heat transfer and thermal bridging is minimized.
- Limit air leakage through the structure or within the heating and cooling distribution system to minimize energy consumption.
- Incorporate dual-paned or other energy efficient windows.
- Incorporate energy efficient space heating and cooling equipment.
- Use interior and exterior energy efficient lighting which exceeds the California Title 24 Energy Efficiency performance standards, as deemed acceptable by the City. Use automatic devices to turn off lights when they are not needed.

- To the extent that they are compatible with landscaping guidelines established by the City, use shade-producing trees, particularly those that shade paved surfaces such as streets and parking lots and buildings at the project site.
- Use paints and a surface color palette for the project emphasizing light and off-white colors which reflect heat away from the buildings.
- Install a photovoltaic array (solar panels) or other source of renewable energy generation on-site, or otherwise acquire energy from the local utility that has been generated by renewable resources, to meet the project's office electricity needs.
- Reduce energy demand associated with potable water conveyance using the following:
  - Landscaping palette emphasizing drought-tolerant plants;
  - Use of water-efficient irrigation techniques; and,
  - U.S. EPA Certified WaterSense labeled for equivalent faucets, high-efficiency toilets (HETs), and water-conserving shower heads.
- Provide on-site bicycle storage/parking consistent with City of Moreno Valley requirements.
- Provide on-site showers (one for males and one for females). Provide lockers for employees.
- Establish a Transportation Management Association (TMA). The TMA will coordinate with other TMAs within the City to encourage and coordinate carpooling among building occupants. The TMA will advertise its services to building occupants, and offer transit and/or other incentives to reduce GHG emissions. A plan will be submitted by the TMA to the City within two months of project completion that outlines the measures implemented by the TMA, as well as contact information.
- Provide preferential parking for carpools, vanpools or other alternative fuel vehicles. Locations and configurations of proposed preferential parking for carpools and vanpools are subject to review and approval by the City. Prior to final site plan approval, delineate preferential parking for carpools and vanpools on the project site plan.
- Provide at least two electric vehicle charging stations. Locations and configurations of proposed charging stations are subject to review and approval by the City. Prior to issuance of the first building permit, delineate stub outs for charging stations on the project building plans.
- Implement compressed workweek schedules;
- Achieve at least 20% per year (as a percentage of previous percentage, not total trips) increase in percentage of consolidated trips carried by SmartWay carriers until it reaches a minimum of 90% of all long haul trips carried by SmartWay 1.0 or greater carriers.
- Achieve at least 15% per year (as a percentage of previous percentage, not total trips) increase in percentage of long haul trips carried by SmartWay carriers until it

reaches a minimum of 85% of all consolidator trips carried by SmartWay 1.0 or greater carriers.

- Use of fleet vehicles conforming to 2010 air quality standards or better.
- Installation of catalytic converters on gasoline-powered equipment.
- Inclusion of electric powered and/or compressed natural gas fueled trucks and/or vehicles in fleets;
- Establishment and use of carpool/vanpool programs, complemented by parking fees for single-occupancy vehicles;
- Provision of preferential parking for EV and CNG vehicles;
- Use of electrical equipment (instead of gasoline-powered equipment) for landscape maintenance;
- Use of electric (instead of diesel or gasoline-powered) yard trucks;
- Use of SmartWay 1.25 rated trucks.
- Provide a display case or kiosk displaying transportation information including the RTA bus schedule in a prominent area accessible to employees.
- Use landscape maintenance companies that use battery powered or electric equipment or contract only with commercial landscapers who operate with equipment that complies with the most recent California Air Resources Board certification standards, or standards adopted no more than three years prior to date of use or any combination of these two themes.

P75. **4.2.6.3B** The project shall be designed to facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills by providing easily accessible areas that are dedicated to the collection and storage of recyclable materials including: paper, cardboard, glass, plastics, and metals. Locations of proposed recyclable materials collection areas are subject to review and approval by the City. Prior to Final Site Plan approval, locations of proposed recyclable materials collection areas shall be delineated on the project site plan.

Biological Resources

P76. **Mitigation Measure BIO-1:** No more than 72 hours prior to initiation of ground-disturbing activities, a pre-construction survey shall be completed by a qualified biologist. The survey will identify special status avian species (if any) within the area of intended disturbance. In the event no special status avian species are identified within the limits of disturbance, no further mitigation is required. In the event such species are identified within the limits of ground disturbance, **Mitigation Measure BIO-3** shall apply.

P77. **Mitigation Measure BIO-2:** No more than 72 hours prior to initiation of ground-disturbing activities, a pre-construction burrowing owl survey shall be completed by a qualified biologist for the planned disturbance area. The pre-construction burrowing owl surveys may be conducted as part of the survey required in

Mitigation Measure BIO-1. A report detailing the findings of the pre-construction survey shall be submitted to the City prior to the initiation of ground-disturbing activities. In the event no burrowing owls are identified within the limits of ground disturbance, no further mitigation is required. In the event burrowing owls are identified within the limits of ground disturbance, **Mitigation Measures BIO-3** and **BIO-4** shall apply.

P78. **Mitigation Measures BIO-3.** If nesting special status avian or burrowing owl species are determined to occupy a proposed area of disturbance a biological monitor will be present during construction to ensure no construction activity shall take place within 500 feet of an active nest/burrow until it has been determined by the biological monitor that the nest/burrow is no longer active, and all juveniles have fledged the nest/burrow.

P79. **Mitigation Measure BIO-4:** If active burrowing owl burrows are detected outside the breeding season, then passive and/or active relocation may be approved following consultation with the CDFG and/or USFWS. One-way doors may be installed as part of a passive relocation program. Burrowing owl burrows shall be excavated with hand tools by a qualified biologist when determined to be unoccupied, and backfilled to ensure that animals do not re-enter the holes/dens.

Cultural Resources

P80. **Mitigation Measure CUL-1:** Prior to construction involving excavation four feet or more below existing surface grade, the construction contractor shall provide evidence that a qualified paleontologist has been retained, and that the paleontologist(s) shall be present during all grading and other significant ground-disturbing activities that reach four feet or more below existing surface grade. If the paleontologist(s) do not find evidence for Pleistocene-era deposits once the maximum excavation depth is reached, monitoring shall be discontinued. In the event fossiliferous deposits are encountered, the following measures shall be implemented:

- Monitoring shall be conducted by qualified paleontological monitor(s) of excavation in areas identified as likely to contain paleontological resources, including undisturbed older Pleistocene alluvium. Paleontological monitors shall be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors shall be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring may be reduced if the potentially fossiliferous units are determined upon exposure and examination by qualified paleontological personnel to have low potential to contain fossil resources.

- Paleontological monitoring of any earthmoving will be conducted by a monitor, under direct guidance of a qualified paleontologist. Earthmoving in areas of the parcel where previously undisturbed sediments are buried, but not otherwise disturbed, will not be monitored.

- Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates.
- Identification and curation of specimens into a professional, fully accredited museum repository with permanent retrievable storage. The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities.
- Preparation or a report of findings with and appended itemized inventory of specimens. The report and report and inventory, when submitted to the City of Moreno Valley along with confirmation of the curation of recovered of recovered specimens into an established, accredited museum repository, will signify completion of the program to mitigate impacts to paleontological resources

Geology and Soils

P81. **Mitigation Measure GEO-1:** Prior to the issuance of grading permits, any existing low density soils and/or saturated soils shall be removed to competent natural soil under the inspection of the Soils Engineering Firm. After the exposed surface has been cleansed of debris and/or vegetation, it shall be scarified until it is uniform in consistency, brought to the proper moisture content and compacted to a minimum of 90 percent relative compaction (in accordance with ASTM: D-1557). In any area where a transition between fill and native soil or between bedrock and soil are encountered, additional excavation beneath foundations and slabs will be necessary in order to provide uniform support and avoid differential settlement of the structure.

The on-site soils or approved import soils may be utilized for the compacted fill, provided they are free of any deleterious materials and shall not contain any rocks, brick, asphaltic concrete, concrete, or other hard materials greater than eight inches in maximum dimensions. Any import soil must be approved by the Soils Engineering firm a minimum of 24 hours prior to importation to the site.

The approved fill soils shall be placed in layers not in excess of six inches in thickness. Each lift shall be uniform in thickness and thoroughly blended. The fill soils shall be brought to within 2 percent of the optimum moisture content, unless otherwise specified by the Soils Engineering firm. Each lift shall be compacted to a minimum of 90 percent relative compaction (in accordance with ASTM: D-1557) and approved prior to the placement of the next layer of soil. Compaction tests shall be obtained at the discretion of the Soils Engineering firm but to a minimum of one test for every 500 cubic yards placed and/or for every two feet of compacted fill placed.

The minimum relative compaction shall be obtained in accordance with accepted methods in the construction industry. The final grade of the structural areas shall be in a dense and smooth condition prior to placement of slabs-on-grade or pavement areas. No fill soils shall be placed, spread, or compacted during unfavorable weather conditions. When the grading is interrupted by heavy rains, compaction operations shall not be resumed until approved by the Soils Engineering firm.

It should be noted that the above measure may be modified by the Final Geotechnical or Soils Report.

P82. **Mitigation Measure GEO-2:** Prior the issuance of grading permits, the project proponent shall inform the project engineers, architects, owner, maintenance personnel, and other interested parties of the Expansive Soil Guidelines provided in the project's geotechnical analysis [Geotechnical Engineering Investigation Proposed Industrial Development Southwest Corner of Perris Boulevard and Grove View Road Moreno Valley, California, NorCal Engineering, March 7, 2007]. The recommendations identified in the project's Expansive Soil Guidelines shall be implemented by the project engineers, architects, owner, maintenance personnel, and other interested parties in the applicable design guidelines. Applicable design guidelines shall be included and implemented in the project's grading plans.

Greenhouse Gases and Global Climate Change

P83. **4.3.6.1A** Prior to the issuance of building permits, the project applicant shall provide evidence to the City of Moreno Valley that building features have been incorporated in building plans as required by Title 24 of the California Code of Regulations. These features include but are not limited to the following:

- Exterior windows in the office areas shall utilize window treatments for efficient energy conservation.
- Per CALGreen Code requirements, water-efficient fixtures and appliances, including but not limited to low-flow faucets, dual-flush toilets minimizing water consumption by 20 percent from the Building Standards Code baseline water consumption shall be used.
- Per CALGreen Code requirements, a Commissioning Plan shall be prepared and all building systems (e.g., heating, ventilation, and air-conditioning [HVAC], irrigation systems, lighting, water heating) shall be commissioned by the Commissioning Authority.
- Per CALGreen Code, restrict watering methods (e.g., prohibit systems that apply water to non-vegetated surfaces) and control runoff.

P84. **4.3.6.1B** Prior to the issuance of building permits, the project applicant shall provide evidence to the City of Moreno Valley that the following measures have been be incorporated into the design and construction of the project:

- Encourage use of locally produced and/or manufactured building materials for at least 10 percent of the construction materials used for the project.
- Encourage use of "Green Building Materials," such as those materials that are resource efficient, and recycled and manufactured in an environmentally friendly way, for at least 10 percent of the project.
- Limit unnecessary idling of construction equipment. A reduction in equipment idling would reduce fuel consumption, and therefore, GHG emissions.

- Maximize the use of electricity from the power grid by replacing diesel- or gasoline-powered equipment where feasible. This would reduce GHG emissions because electricity can be produced more efficiently at centralized power plants.
- Design the project building to exceed the California Building Code's (CBC) 2008 Title 24 energy standard by 20%, including, but not limited to, any combination of the following:
  - Increase insulation such that heat transfer and thermal bridging is minimized.
  - Limit air leakage through the structure or within the heating and cooling distribution system to minimize energy consumption.
  - Incorporate ENERGY STAR or better rated windows in the office area, space heating and cooling equipment, light fixtures, appliances, or other applicable electrical equipment.
- Provide a landscape and development plan for the project that takes advantage of shade, prevailing winds, and landscaping. The landscaping plan shall be prepared by a registered landscape architect who will consider the following:
  - Plant at least 50 percent low-ozone forming potential (Low-OFP) trees and shrubs, preferably native, drought-resistant species, to meet city/county landscaping requirements.
  - Plant Low-OFP, native, drought-resistant, tree and shrub species, 20% in excess of that already required by city or county ordinance. Consider roadside, sidewalk, and driveway shading.
- Install efficient lighting and lighting control systems. Use daylight as an integral part of the lighting systems in buildings.
- Install light-colored "cool" roof and cool pavements.
- Install energy-efficient heating and cooling systems, appliances and equipment, and control systems.
- Install solar or light-emitting diodes (LEDs) for outdoor lighting.
- Install electrical outlets on the exterior walls of the warehouse/office building (and perhaps parking lots) to promote the use of electric landscape maintenance equipment.

P85. **4.3.6.1C** Prior to the issuance of occupancy permits, the project applicant shall provide evidence to the City of Moreno Valley that the following measures have been incorporated into the operation of the project:

- The project applicant shall use low Global Warming refrigerants or natural refrigerants (ammonia, propane, carbon dioxide [CO_2]) for refrigeration and fire suppression equipment.
- Provide vegetative or man-made exterior wall shading devices for east-, south-, and west facing walls with windows in the office areas.

- Devise a comprehensive water conservation strategy appropriate for the project and its location. The strategy may include the following, plus other innovative measures that may be appropriate:
- Install drought tolerant plants for landscaping.
- Use reclaimed water for landscape irrigation within the project. Install the infrastructure to deliver and use reclaimed water.
- Install water-efficient irrigations systems, such as weather-based and soil-moisture-based irrigation controllers and sensors for landscaping according to the California Department of Water Resources Model Efficient Landscape Ordinance.
- Provide employee education about reducing waste and available recycling services.

Hydrology and Water Quality

P86. **Mitigation Measure HYD-01:** Prior to grading plan approval and the issuance of a grading permit by the City, the project proponent shall provide evidence to the City that a Notice of Intent (NOI) with the Regional Water Quality Control Board has been filed to be covered under the State NPDES General Construction Permit for discharge of stormwater associated with construction activities.

P87. **Mitigation Measure HYD-02:** Prior to grading plan approval and the issuance of a grading permit by the City, the project proponent shall submit to the State Water Quality Control Board, a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP shall include a surface water control plan and erosion control plan citing specific measures to control on-site and off-site erosion during the entire grading and construction period. Additionally, the SWPPP shall identify structural and nonstructural BMPs to control sediment and non-visible discharges from the site. BMPs to be implemented in the SWPPP may include but shall not be limited to the following:

Sediment discharges from the site may be controlled by the following: gravel bags, silt fences, straw wattles and temporary debris basins (if deemed necessary), and other discharge control devices. The construction and condition of the BMPs will be periodically inspected during construction, and repairs will be made when necessary as required by the SWPPP.

Materials that have the potential to contribute non-visible pollutants to stormwater must not be placed in drainage ways and must be contained, elevated, and placed in temporary storage containment areas.

All loose piles of soil, silt, clay, sand, debris, and other earthen material shall be protected in a reasonable manner to eliminate any discharge from the site. Stockpiles will be surrounded by silt fences.

The SWPPP will include inspection forms for routine monitoring of the site during the construction phase to ensure NPDES compliance.

Additional BMPs and erosion control measures will be documented in the SWPPP and utilized if necessary.

The SWPPP will be kept on site for the entire duration of project construction and will also be available to the local RWQCB for inspection at any time.

In the event that it is not feasible to implement the above BMPs, the City of Moreno Valley can make a determination that other BMPs will provide equivalent or superior treatment either on or off site.

P88. **Mitigation Measure HYD-03:** Prior to the issuance of grading permits, the project proponent shall provide evidence to the City that the following provisions have been added to construction contracts for the project:

- The Construction Contractor shall be responsible for performing and documenting the application of BMPs identified in the SWPPP. Weekly inspections shall be performed on sediment control measures called for in the SWPPP. Monthly reports shall be maintained by the Contractor and submitted to the City for inspection. In addition, the Contractor will also be required to maintain an inspection log and have the log on site to be reviewed by the City of Moreno Valley and the representatives of the Regional Water Quality Control Board.

P89. **Mitigation Measure HYD-04:** Prior to grading plan approval and the issuance of a grading permit by the City, the project proponent shall receive approval from the City of Moreno Valley for a Final Water Quality Management Plan (F-WQMP). The F-WQMP shall specifically identify pollutants of concern, site design, source control, and treatment control BMPs that shall be used on site to control predictable pollutant runoff in order to reduce impacts to water quality to the maximum extent practicable.

P90. **Mitigation Measure HYD-05:** Prior to grading plan approval and the issuance of a grading permit, the project proponent shall submit a detailed grading plan and drainage report, with supporting engineering calculations, to the City Engineer for review and approval. The plan and report shall incorporate relevant requirements identified by the City and/or site-specific geotechnical investigations. The plan and report shall provide evidence that the storm drainage system would be adequate to convey water for the 100-year storm event from the project site and that the post-development flows exiting the proposed project site are less than or equal to pre-development flows.

Noise

P91. **4.4.6.1A** During all project site excavation and grading on site, the project contractor shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.

P92. **4.4.6.1B** The project contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest to the project site.

P93. **4.4.6.1C** The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receptors nearest to the project site during all project construction.

P94. **4.9.6.1D** During all project site construction activities, the construction contractor shall limit all construction-related activities that would result in high noise levels to between the hours of 6:00 a.m. and 8:00 p.m. on weekdays and between the hours of 7:00 a.m. to 8:00 p.m. on weekends and holidays, unless written approval is obtained from the City Building Official or City Engineer. For grading activity, the hours are limited to between 7 am and 6 pm weekdays and 8 am to 4 pm on weekends and holidays.

Transportation

P95. **4.5.6.1A.** Prior to the issuance of building permits, the project applicant shall participate in the City of Moreno Valley Development Impact (DIF) Fee Program and pay the project's fair share for local circulation improvements as outlined in the VIP Moreno Valley Project Traffic Study. The City shall ensure that the intersection and street improvements outlined in the VIP Moreno Valley Project Traffic Study will be constructed pursuant to the timeframes established by the City of Moreno Valley Development Impact Fee Program.

P96. **4.5.6.1B.** Prior to the issuance of building permits, the project applicant shall participate in the County of Riverside Transportation Uniform Mitigation Fee (TUMF) Program and pay the project's fair share for regional circulation improvements. The City shall ensure that the intersection and street improvements outlined in the VIP Moreno Valley Project Traffic Study will be constructed pursuant to the timeframe established by the County of Riverside TUMF Program.

P97. **4.5.6.2A.** Prior to the issuance of occupancy permits, the project applicant shall have constructed the site access roadway improvements outlined below.

Indian Street/South Project Driveway: Restripe to convert center turn lane on Indian Street to a two-way left-turn lane. This location does not meet a peak hour signal warrant. This is a site-adjacent improvement to be constructed by the project applicant.

Building and Safety Division

B1. The above project shall comply with the current California Codes (CBC, CEC, CMC and the CPC) as well as all other city ordinances. All new projects shall provide a soils report. Plans shall be submitted to the Building Department as a separate submittal.

COMMERCIAL, INDUSTRIAL, MULTI-FAMILY PROJECTS INCLUDING CONDOMINIUMS, TOWNHOMES, DUPLEXES AND TRIPLEX BUILDINGS REQUIRE THE FOLLOWING:

Prior to final inspection, all plans will be placed on a CD Rom for reference and verification. Plans will include "as built" plans, revisions and changes. The CD will also include Title 24 energy calculations, structural calculations and all other pertinent information. It will be the responsibility of the developer and or the building or property owner(s) to bear all costs required for this process. The CD will be presented to the Building Department for review prior to final inspection and building occupancy. The CD will become the property of the Moreno Valley Building Department at that time. In addition, a site plan showing the path of travel from public right of way and building to building access with elevations will be required.

B2. (BP) Prior to the issuance of a building permit, the applicant shall submit a properly completed "Waste Management Plan" (WMP), as required, to the Compliance Official (Building Official) as a portion of the building or demolition permit process.

SCHOOL DISTRICT

S1. (BP) Prior to issuance of building permits, the developer shall provide to the Community Development Director a written certification by the affected school district that either: (1) the project has complied with the fee or other exaction levied on the project by the governing board of the district, pursuant to Government Code Section 65996; or (2) the fee or other requirement does not apply to the project.

UNITED STATES POSTAL SERVICE

PO1. (BP) Prior to the issuance of building permits, the developer shall contact the U.S. Postal Service to determine the appropriate type and location of mailboxes.

FIRE PREVENTION BUREAU

1. **Please complete and return attached fire flow letter.**
2. The following Standard Conditions shall apply.

With respect to the conditions of approval, the following fire protection measures shall be provided in accordance with Moreno Valley City Ordinances and/or recognized fire protection standards:

F1. Final fire and life safety conditions will be addressed when the Fire Prevention Bureau reviews building plans. These conditions will be based on occupancy, use, California Building Code (CBC), California Fire Code (CFC), and related codes, which are in force at the time of building plan submittal.

F2. The Fire Prevention Bureau is required to set a minimum fire flow for the remodel or construction of all commercial buildings per CFC Appendix B and Table B105.1. The applicant/developer shall provide documentation to show there exists a water system capable of delivering 4000 GPM for 4 hour(s) duration at 20-PSI residual operating pressure. The required fire flow may be adjusted during the approval process to reflect changes in design, construction type, or automatic fire protection measures as approved by the Fire Prevention Bureau. Specific requirements for the project will be determined at time of submittal. (CFC 508.3, Appendix B and MVMC 8.36.100 Section D) **The 50% reduction in fire flow was granted for the use of fire sprinklers throughout the facility. The reduction shall only apply to fire flow, hydrant spacing shall be per the fire flow requirements listed in CFC Appendix B and C.**

F3. Industrial, Commercial, Multi-family, Apartment, Condominium, Townhouse or Mobile Home Parks. A combination of on-site and off-site super enhanced fire hydrants (6" x 4" x 4" x 2 ½") shall not be closer than 40 feet and more than 150 feet from any portion of the building as measured along approved emergency vehicular travel ways. The required fire flow shall be available from any adjacent fire hydrant(s) in the system. Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, super or enhanced fire hydrants as determined by the fire code official shall be provided at spacing not to exceed 500 feet of frontage for transportation hazards. (CFC 508.5.7 & MVMC 8.36.050 Section O and 8.36.100 Section E)

F4. During phased construction, dead end roadways and streets which have not been completed shall have a turn-around capable of accommodating fire apparatus. (CFC 503.1 and 503.2.5)

F5. Prior to issuance of Building Permits, the applicant/developer shall provide the Fire Prevention Bureau with an approved site plan for Fire Lanes and signage. (MVMC 8.36.050 and CFC 501.3)

F6. Prior to construction and issuance of building permits, all locations where structures are to be built shall have an approved Fire Department emergency vehicular access road (all weather surface) capable of sustaining an imposed load of 80,000 lbs. GVW, based on street standards approved by the Public Works Director and the Fire Prevention Bureau. (CFC 501.4 and MVMC 8.36.050 Section A)

F7. Prior to construction and issuance of Building Permits, fire lanes and fire apparatus access roads shall have an unobstructed width of not less than twenty–four (24) or thirty (30) feet as approved by the Fire Prevention Bureau and an unobstructed vertical clearance of not less the thirteen (13) feet six (6) inches. (CFC 503.2.1.1 and MVMC 8.36.050)

F8. Prior to construction, all roads, driveways and private roads shall not exceed 12 percent grade. (CFC 503.2.7 and MVMC 8.36.050)

F9. If construction is phased, each phase shall provide an approved emergency vehicular access way for fire protection prior to any building construction. (CFC 501.4 and MVMC 8.36.050 Section A)

F10. Prior to construction, all locations where structures are to be built shall have an approved Fire Department access based on street standards approved by the Public Works Director and the Fire Prevention Bureau. (CFC 501.3 and MVMC 8.36.050)

F11. Prior to building construction, dead end roadways and streets which have not been completed shall have a turnaround capable of accommodating fire apparatus. (CFC 503.2.5 and MVMC 8.36.050)

F12. Prior to issuance of Building Permits, the applicant/developer shall participate in the Fire Impact Mitigation Program. (Fee Resolution as adopted by City Council)

F13. Prior to issuance of Building Permits, the applicant/developer shall furnish one copy of the water system plans to the Fire Prevention Bureau for review. Plans shall:

a) Be signed by a registered civil engineer or a certified fire protection engineer;
b) Contain a Fire Prevention Bureau approval signature block; and
c) Conform to hydrant type, location, spacing of new and existing hydrants and minimum fire flow required as determined by the Fire Prevention Bureau.

After the local water company signs the plans, the originals shall be presented to the Fire Prevention Bureau for signatures. The required water system, including fire hydrants, shall be installed, made serviceable, and be accepted by the Moreno Valley Fire Department prior to beginning construction. They shall be maintained accessible.

Existing fire hydrants on public streets are allowed to be considered available. Existing fire hydrants on adjacent properties shall not be considered available unless

fire apparatus access roads extend between properties and easements are established to prevent obstruction of such roads. (CFC 508.1 and MVMC 8.36.100)

F14. Prior to issuance of Certificate of Occupancy or Building Final, "Blue Reflective Markers" shall be installed to identify fire hydrant locations in accordance with City specifications. (CFC 510.1)

F15. Prior to issuance of Certificate of Occupancy or Building Final, all commercial buildings shall display street numbers in a prominent location on the street side and rear access locations. The numerals shall be a minimum of twelve (12) inches in height for buildings and six (6) inches in height for suite identification on a contrasting background. Unobstructed lighting of the address(s) shall be by means approved by the Fire Prevention Bureau and Police Department. In multiple suite centers (strip malls), businesses shall post the name of the business on the rear door(s). (CFC 505.1)

F16. Prior to issuance of Certificate of Occupancy or Building Final, the applicant/developer shall install a fire sprinkler system based on square footage and type of construction, occupancy or use. Fire sprinkler plans shall be submitted to the Fire Prevention Bureau for approval prior to installation. (CFC Chapter 9)

F17. Prior to issuance of Certificate of Occupancy or Building Final, the applicant/developer shall install a fire alarm system monitored by an approved Underwriters Laboratory listed central station based on a requirement for monitoring the sprinkler system, occupancy or use. Fire alarm panel shall be accessible from exterior of building in an approved location. Plans shall be submitted to the Fire Prevention Bureau for approval prior to installation. (CFC Chapter 9 and MVMC 8.36.070)

F18. Prior to issuance of a Certificate of Occupancy or Building Final, a "Knox Box Rapid Entry System" shall be provided. The Knox-Box shall be installed in an accessible location approved by the Fire Chief. The Knox-Box shall be supervised by the alarm system and all exterior security emergency access gates shall be electronically operated and be provided with Knox key switches for access by emergency personnel. (CFC 506.1)

F19. Prior to issuance of Certificate of Occupancy, approval shall be required from the County of Riverside Community Health Agency (Department of Environmental Health) and Moreno Valley Fire Prevention Bureau to maintain, store, use, handle materials, or conduct processes which produce conditions hazardous to life or property, and to install equipment used in connection with such activities. (CFC 2701.5)

F20. Prior to issuance of Certificate of Occupancy or Building Final, the applicant/developer must submit a simple plot plan, a simple floor plan, and other plans as requested, each as an electronic file in .dwg format, to the Fire Prevention Bureau. Alternate file formats may be acceptable with approval by the Fire Chief.

F21. The angle of approach and departure for any means of Fire Department access shall not exceed 1 ft drop in 20 ft (0.3 m drop in 6 m), and the design limitations of the fire apparatus of the Fire Department shall be subject to approval by the AHJ. (CFC 503.2.7 and MVMC 8.36.050 Section I)

F22. Prior to issuance of the building permit for development, independent paved access to the nearest paved road, maintained by the City shall be designed and constructed by the developer within the public right of way in accordance with City Standards. (MVMC 8.36.050)

F23. Prior to construction, “private” driveways over 150 feet in length shall have a turn-around as determined by the Fire Prevention Bureau capable of accommodating fire apparatus. Driveway grades shall not exceed 12 percent. (CFC 503 and MVMC 8.36.050)

F24. Complete plans and specifications for fire alarm systems, fire-extinguishing systems (including automatic sprinklers or standpipe systems), clean agent systems (or other special types of automatic fire-extinguishing systems), as well as other fire-protection systems and appurtenances thereto shall be submitted to the Moreno Valley Fire Prevention Bureau for review and approval prior to system installation. Submittals shall be in accordance with CFC Chapter 9 and associated accepted national standards.

F25. A permit is required to maintain, store, use or handle materials, or to conduct processes which produce conditions hazardous to life or property, or to install equipment used in connection with such activities. Such permits shall not be construed as authority to violate, cancel or set aside any of the provisions of this code. Such permit shall not take the place of any license required by law. Applications for permits shall be made to the Fire Prevention Bureau in such form and detail as prescribed by the Bureau. Applications for permits shall be accompanied by such plans as required by the Bureau. Permits shall be kept on the premises designated therein at all times and shall be posted in a conspicuous location on the premises or shall be kept on the premises in a location designated by the Fire Chief. Permits shall be subject to inspection at all times by an officer of the fire department or other persons authorized by the Fire Chief in accordance with Appendix Chapter 1 and MVMC 8.36.100.

F26. Approval of the safety precautions required for buildings being constructed, altered or demolished shall be required by the Fire Chief in addition to other approvals required for specific operations or processes associated with such construction, alteration or demolition. (CFC Chapter 14 & CBC Chapter 33)

F27. Prior to issuance of Certificate of Occupancy, permits are required to store, dispense, use or handle hazardous material. Each application for a permit shall include a hazardous materials management plan (HMMP). The location of the HMMP shall be posted adjacent to (other) permits when an HMMP is provided. The HMMP shall include a facility site plan designating the following:

a) Storage and use areas;
b) Maximum amount of each material stored or used in each area;
c) Range of container sizes;
d) Locations of emergency isolation and mitigation valves and devises;
e) Product conveying piping containing liquids or gases, other than utility-owned fuel gas lines and low-pressure fuel gas lines;
f) On and off positions of valves for valves which are of the self-indicating type;
g) Storage plan showing the intended storage arrangement, including the location and dimensions of aisles. The plans shall be legible and approximately to scale. Separate distribution systems are allowed to be shown on separate pages; and
h) Site plan showing all adjacent/neighboring structures and use.

NOTE: Each application for a permit shall include a hazardous materials inventory statement (HMIS).

F28. Before a Hazardous Materials permit is issued, the Fire Chief shall inspect and approve the receptacles, vehicles, buildings, devices, premises, storage spaces or areas to be used. In instances where laws or regulations are enforceable by departments other than the Fire Prevention Bureau, joint approval shall be obtained from all departments concerned. (CFC Appendix H)

F29. Construction or work for which the Fire Prevention Bureau's approval is required shall be subject to inspection by the Fire Chief and such construction or work shall remain accessible and exposed for inspection purposes until approved. (CFC Section 106)

F30. The Fire Prevention Bureau shall maintain the authority to inspect, as often as necessary, buildings and premises, including such other hazards or appliances designated by the Fire Chief for the purpose of ascertaining and causing to be corrected any conditions which would reasonably tend to cause fire or contribute to its spread, or any violation of the purpose or provisions of this code and of any other law or standard affecting fire safety. (CFC Section 106)

F31. Permit requirements issued, which designate specific occupancy requirements for a particular dwelling, occupancy, or use, shall remain in effect until such time as amended by the Fire Chief. (CFC Section 104)

F32. In accordance with the California Fire Code Appendix Chapter 1, where no applicable standards or requirements are set forth in this code, or contained within other laws, codes, regulations, ordinances or bylaws adopted by the jurisdiction, compliance with applicable standards of the National Fire Protection Association or other nationally recognized fire safety standards as are approved shall be deemed as prima facie evidence of compliance with the intent of this code as approved by the Fire Chief. (CFC Section 102.7)

F33. Any alterations, demolitions, or change in design, occupancy and use of buildings or site will require plan submittal to the Fire Prevention Bureau with review and approval prior to installation. (CFC Appendix Chapter 1)

F34. Emergency and Fire Protection Plans shall be provided when required by the Fire Prevention Bureau. (CFC Section 105)

F35. Prior to construction, all traffic calming designs/devices must be approved by the Fire Marshal and City Engineer.

FIRE FLOW LETTER

Date:	02/24/2009	**Address:**	
Case Number:	PA09-0004	**A.P.N.:**	316-210-071, 073, 075, 076

This is certification the water system is capable of meeting the following required fire flows as determined by the California Fire Code Appendix B.

Based on the information provided on the above referenced case. The fire flow required for this project will be 4000 G.P.M. for duration of 4-HOURS measured at 20-psi residual pressure.

The required fire flow may be adjusted during the approval process to reflect changes in design, construction type or automatic fire protection measures as approved by the Fire Prevention Bureau.

Applicant/ Developer: _____

By: _____ **Date:** _____

Title: _____

WATER AGENCY APPROVAL

Name of Agency: _____

Address: _____

Telephone: _____ **Date:** _____

By: _____ **Title:** _____

NOTE: **THE COMPLETION AND SUBMITTAL OF THIS LETTER TO THE FIRE PREVENTION BUREAU SHALL NOT BE CONSTRUED AS APPROVAL FOR THE INSTALLATION OF THE REQUIRED FIRE HYDRANT (S) AND/OR WATER SYSTEM.**

COMMUNITY & ECONOMIC DEVELOPMENT DEPARTMENT – LAND DEVELOPMENT DIVISION

The following are the Land Development Division Conditions of Approval for this project and shall be completed at no cost to any government agency. All questions regarding the intent of the following conditions shall be referred to the Land Development Division.

General Conditions

LD1. (G) The developer shall comply with all applicable City ordinances and resolutions including the City's Municipal Code (MC) and if subdividing land, the Government Code (GC) of the State of California, specifically Sections 66410 through 66499.58, said sections also referred to as the Subdivision Map Act (SMA). (MC 9.14.010)

LD2. (G) It is understood that the tentative map correctly shows all existing easements, traveled ways, and drainage courses, and that their omission may require the map or plans associated with this application to be resubmitted for further consideration. (MC 9.14.040)

LD3. (G) In the event right-of-way or offsite easements are required to construct offsite improvements necessary for the orderly development of the surrounding area to meet the public health and safety needs, the developer shall make a good faith effort to acquire the needed right-of-way in accordance with the Land Development Division's administrative policy. In the event that the developer is unsuccessful, he shall enter into an agreement with the City to acquire the necessary right-of-way or offsite easements and complete the improvements at such time the City acquires the right-of-way or offsite easements which will permit the improvements to be made. The developer shall be responsible for all costs associated with the right-of-way or easement acquisition. (GC 66462.5)

LD4. (G) If improvements associated with this project are not initiated within two years of the date of approval of the Public Improvement Agreement, the City Engineer may require that the improvement cost estimate associated with the project be modified to reflect current City construction costs in effect at the time of request for an extension of time for the Public Improvement Agreement or issuance of a permit.

LD5. (G) The developer shall monitor, supervise and control all construction and construction supportive activities, so as to prevent these activities from causing a public nuisance, including but not limited to, insuring strict adherence to the following:

(a) Removal of dirt, debris, or other construction material deposited on any public street no later than the end of each working day.

(b) Observance of working hours as stipulated on permits issued by the Public Works Department.

(c) The construction site shall accommodate the parking of all motor vehicles used by persons working at or providing deliveries to the site.

(d) All dust control measures per South Coast Air Quality Management District (SCAQMD) requirements shall be adhered to during the grading operations.

Violation of any condition or restriction or prohibition set forth in these conditions shall subject the owner, applicant, developer or contractor(s) to remedies as noted in the City Municipal Code 8.14.090. In addition, the City Engineer or Building Official may suspend all construction related activities for violation of any condition, restriction or prohibition set forth in these conditions until such time as it has been determined that all operations and activities are in conformance with these conditions.

LD6. (G) The developer shall protect downstream properties from damage caused by alteration of drainage patterns, i.e., concentration or diversion of flow. Protection shall be provided by constructing adequate drainage facilities, including, but not limited to, modifying existing facilities or by securing a drainage easement. (MC 9.14.110)

LD7. (G) A detailed drainage study shall be submitted to the City Engineer for review and approval at the time of any improvement or grading plan submittal. The study shall be prepared by a registered civil engineer and shall include existing and proposed hydrologic conditions. Hydraulic calculations are required for all drainage control devices and storm drain lines. (MC 9.14.110). Prior to approval of the related improvement or grading plans, the developer shall submit the approved drainage study, on compact disk, in (.pdf) digital format to the Land Development Division of the Public Works Department.

LD8. (G) Prior to occupancy, the developer shall enter into a Development Impact Fee (DIF) Improvement Credit Agreement to secure credit and reimbursement for the construction of applicable **Indian Street** improvements. If the developer fails to complete this agreement prior to the timing as specified above, no credits or reimbursements will be given. The applicant shall pay Arterial Streets, Traffic Signals, and Interchange Improvements development impact fees adopted by the City Council by resolution. (Ord. 695 § 1.1 (part), 2005) (MC 3.38.030, .040, .050)

LD9. (G) Prior to occupancy, the developer shall enter into a Transportation Uniform Mitigation Fee (TUMF) Improvement Credit Agreement to secure credit and reimbursement for the construction of applicable **Perris Boulevard** improvements. If the developer fails to complete this agreement by the timing as specified above, no credits or reimbursements will be given for any work. Prior to approval of the TUMF Improvement Credit Agreement, an approved engineer's cost estimate and street improvement plan are required.

LD10. (G) The final conditions of approval issued by the Planning Division subsequent to Planning Commission approval shall be photographically or electronically placed on

mylar sheets and included in the Grading and Street Improvement plan sets on twenty-four (24) inch by thirty-six (36) inch mylar and submitted with the plans for plan check. These conditions of approval shall become part of these plan sets and the approved plans shall be available in the field during grading and construction.

Prior to Grading Plan Approval or Grading Permit

LD11. (GPA) Prior to approval of the grading plans, plans shall be drawn on twenty-four (24) inch by thirty-six (36) inch mylar and signed by a registered civil engineer and other registered/licensed professional as required.

LD12. (GPA) Prior to approval of grading plans, the developer shall ensure compliance with the City Grading ordinance, these Conditions of Approval and the following criteria:

a. The project street and lot grading shall be designed in a manner that perpetuates the existing natural drainage patterns with respect to tributary drainage area and outlet points. Unless otherwise approved by the City Engineer, lot lines shall be located at the top of slopes.

b. Any grading that creates cut or fill slopes adjacent to the street shall provide erosion control, sight distance control, and slope easements as approved by the City Engineer.

c. A grading permit shall be obtained from the Public Works Department Land Development Division prior to commencement of any grading outside of the City maintained road right-of-way.

d. All improvement plans are substantially complete and appropriate clearance and at-risk letters are provided to the City. (MC 9.14.030)

e. The developer shall submit a soils and geologic report to the Public Works Department – Land Development Division. The report shall address the soil's stability and geological conditions of the site.

LD13. (GPA) Prior to grading plan approval, the developer shall select and implement treatment control best management practices (BMPs) that are medium to highly effective for treating Pollutants of Concern (POC) for the project. Projects where National Pollution Discharge Elimination System (NPDES) mandates water quality treatment control best management practices (BMPs) shall be designed per the City of Moreno Valley guidelines or as approved by the City Engineer.

LD14. (GPA) Prior to approval of the grading plans for projects that will result in discharges of storm water associated with construction with a soil disturbance of one or more acres of land, the developer shall submit a Notice of Intent (NOI) and obtain a Waste Discharger's Identification number (WDID#) from the State Water Quality Control

Board (SWQCB). The WDID# shall be noted on the grading plans prior to issuance of the first grading permit.

LD15. (GPA) Prior to the grading plan approval, or issuance of a building permit, if a grading permit is not required, the Developer shall submit two (2) copies of the final project-specific Water Quality Management Plan (WQMP) for review by the City Engineer that :

a. Addresses Site Design Best Management Practices (BMPs) such as minimizing impervious areas, maximizing permeability, minimizes directly connected impervious areas to the City's street and storm drain systems, and conserves natural areas;
b. Incorporates Source Control BMPs and provides a detailed description of their implementation;
c. Incorporates Treatment Control BMPs and provides information regarding design considerations;
d. Describes the long-term operation and maintenance requirements for BMPs requiring maintenance; and
e. Describes the mechanism for funding the long-term operation and maintenance of the BMPs.

A copy of the final WQMP template can be obtained on the City's Website or by contacting the Land Development Division of the Public Works Department.

LD16. (GPA) Prior to the grading plan approval, or issuance of a building permit, if a grading permit is not required, the Developer shall record a "Stormwater Treatment Device and Control Measure Access and Maintenance Covenant," to provide public notice of the requirement to implement the approved final project-specific WQMP and the maintenance requirements associated with the WQMP.

A boilerplate copy of the "Stormwater Treatment Device and Control Measure Access and Maintenance Covenant," can be obtained by contacting the Land Development Division of the Public Works Department

LD17. (GPA) Prior to the grading plan approval, or issuance of a building permit, if a grading permit is not required, the Developer shall secure approval of the final project-specific WQMP from the City Engineer. The final project-specific WQMP shall be submitted at the same time of grading plan submittal. The approved final WQMP shall be submitted to the Storm Water Program Manager on compact disk(s) in Microsoft Word format prior to grading plan approval.

LD18. (GPA) Prior to the grading plan approval, or issuance of a building permit as determined by the City Engineer, the approved final project-specific WQMP shall be incorporated by reference or attached to the project's Storm Water Pollution Prevention Plan as the Post-Construction Management Plan.

LD19. (GPA) Prior to grading plan approval, the developer shall prepare a Storm Water Pollution Prevention Plan (SWPPP) in conformance with the state's Construction Activities Storm Water General Permit. A copy of the current SWPPP shall be kept at the project site and be available for review upon request. The SWPPP shall be submitted to the Storm Water Program Manager on compact disk(s) in Microsoft Word format.

LD20. (GPA) Prior to the approval of the grading plans, the developer shall pay applicable remaining grading plan check fees.

LD21. (GP) Prior to issuance of a grading permit, or building permit when a grading permit is not required, for projects that require a project-specific Water Quality Management Plan (WQMP), a project-specific final WQMP (F-WQMP) shall be approved. Upon approval, a WQMP Identification Number is issued by the Storm Water Management Section and shall be noted on the rough grading plans as confirmation that a project-specific F-WQMP approval has been obtained.

LD22. (GP) Prior to issuance of a grading permit, if the fee has not already been paid prior to map approval or prior to issuance of a building permit if a grading permit is not required, the developer shall pay Area Drainage Plan (ADP) fees. The developer shall provide a receipt to the City showing that ADP fees have been paid to Riverside County Flood Control and Water Conservation District. (MC 9.14.100)

LD23. (GP) Prior to issuance of a grading permit, security, in the form of a cash deposit (preferable), letter of credit, or performance bond shall be required to be submitted as a guarantee of the completion of the grading required as a condition of approval of the project.

LD24. (GP) Prior to issuance of a grading permit, the developer shall pay the applicable grading inspection fees.

Prior to Map Approval or Recordation

LD25. (MA) Prior to approval of the map, the developer shall submit a copy of the Covenants, Conditions and Restrictions (CC&Rs) to the Land Development Division for review and approval. The CC&Rs shall include, but not be limited to, access easements, reciprocal access, private and/or public utility easements as may be relevant to the project.

LD26. (MA) Prior to approval of the map, all street dedications shall be irrevocably offered to the public and shall continue in force until the City accepts or abandons such offers, unless otherwise approved by the City Engineer. All dedications shall be free of all encumbrances as approved by the City Engineer.

LD27. (MA) Prior to approval of the map, security shall be required to be submitted as a guarantee of the completion of the improvements required as a condition of approval of the project. A public improvement agreement will be required to be executed.

LD28. (MR) Prior to recordation of the map, the developer shall submit the map, on compact disks, in (.dxf) digital format to the Land Development Division of the Public Works Department.

Prior to Improvement Plan Approval or Construction Permit

LD29. (IPA) Prior to approval of the improvement plans, the improvement plans shall be drawn on twenty-four (24) inch by thirty-six (36) inch mylar and signed by a registered civil engineer and other registered/licensed professional as required.

LD30. (IPA) Prior to approval of the improvement plans, the developer shall submit clearances from all applicable agencies, and pay all outstanding plan check fees. (MC 9.14.210)

LD31. (IPA) All public improvement plans prepared and signed by a registered civil engineer in accordance with City standards, policies and requirements shall be approved by the City Engineer in order for the Public Improvement Agreement and accompanying security to be executed.

LD32. (IPA) Prior to approval of the improvement plans, securities and a public improvement agreement shall be required to be submitted and executed as a guarantee of the completion of the improvements required as a condition of approval of the project.

LD33. (IPA) The street improvement plans shall comply with all applicable City standards and the following design standards throughout this project:

a. Corner cutbacks in conformance with City Standard 208 shall be shown on the final map or, if no map is to be recorded, offered for dedication by separate instrument.

b. Lot access to major thoroughfares shall be restricted except at intersections and approved entrances and shall be so noted on the final map. (MC 9.14.100)

c. The minimum centerline and flow line grades shall be one percent unless otherwise approved by the City Engineer. (MC 9.14.020)

d. All street intersections shall be at ninety (90) degrees plus or minus five (5) degrees per City Standard No. 706A, or as approved by the City Engineer. (MC 9.14.020)

LD34. (IPA) Prior to approval of the improvement plans, the plans shall indicate any restrictions on trench repair pavement cuts to reflect the City's moratorium on disturbing newly-constructed pavement less than three years old and recently slurry sealed streets less than one year old. Pavement cuts for trench repairs may be

allowed for emergency repairs or as specifically approved in writing by the City Engineer.

LD35. (IPA) Prior to approval of the improvement plans, the developer is required to bring any existing access ramps adjacent to and fronting the project to current ADA (Americans with Disabilities Act) requirements. However, when work is required in an intersection that involves or impacts existing access ramps, those access ramps in that intersection shall be retrofitted to comply with current ADA requirements, unless approved otherwise by the City Engineer.

LD36. (IPA) Prior to approval of the improvement plans, drainage facilities with sump conditions shall be designed to convey the tributary 100-year storm flows. Secondary emergency escape shall also be provided. (MC 9.14.110)

LD37. (IPA) Prior to the approval of the improvement plans, the hydrology study shall show that the 10-year storm flow will be contained within the curb and the 100-year storm flow shall be contained within the street right-of-way. In addition, one lane in each direction shall not be used to carry surface flows during any storm event for street sections equal to or larger than a minor arterial. When any of these criteria is exceeded, additional drainage facilities shall be installed. (MC 9.14.110 A.2)

LD38. (IPA) The project shall be designed to accept and properly convey all off-site drainage flowing onto or through the site. All storm drain design and improvements shall be subject to review and approval of the City Engineer. In the event that the City Engineer permits the use of streets for drainage purposes, the provisions of the Development Code will apply. Should the quantities exceed the street capacity or the use of streets be prohibited for drainage purposes, as in the case where one travel lane in each direction shall not be used for drainage conveyance for emergency vehicle access on streets classified as minor arterials and greater, the developer shall provide adequate facilities as approved by the Public Works Department – Land Development Division. (MC 9.14.110)

LD39. (CP) All work performed within the City right-of-way requires a construction permit. As determined by the City Engineer, security may be required for work within the right-of-way. Security shall be in the form of a cash deposit or other approved means. The City Engineer may require the execution of a public improvement agreement as a condition of the issuance of the construction permit. All inspection fees shall be paid prior to issuance of construction permit. (MC 9.14.100)

LD40. (CP) Prior to issuance of a construction permit, all public improvement plans prepared and signed by a registered civil engineer in accordance with City standards, policies and requirements shall be approved by the City Engineer.

LD41. (CP) Prior to issuance of construction permits, the developer shall submit all improvement plans on compact disks, in (.dxf) digital format to the Land Development Division of the Public Works Department.

LD42. (CP) Prior to issuance of construction permits, the developer shall pay all applicable inspection fees.

Prior to Building Permit

LD43. (BP) Prior to issuance of a building permit, if the project involves a non-residential subdivision, the map shall be recorded.

LD44. (BP) Prior to issuance of a building permit (excluding model homes), an approval by the City Engineer is required of the water quality control basin(s). The developer shall provide certification to the line, grade, flow test and system invert elevations.

LD45. (BP) Prior to issuance of a building permit, all pads shall meet pad elevations per approved plans as noted by the setting of "Blue-top" markers installed by a registered land surveyor or licensed engineer.

LD46. (BP) Prior to issuance of a building permit, the developer shall submit for review and approval, a Waste Management Plan (WMP) that shows data of waste tonnage, supported by original or certified photocopies of receipts and weight tags or other records of measurement from recycling companies and/or landfill and disposal companies. The Waste Management Plan shall contain the following:

a. The estimated volume or weight of project waste to be generated by material type. Project waste or debris may consist of vegetative materials including trees, tree parts, shrubs, stumps, logs, brush, or any other type of plants that are cleared from a site. Project waste may also include roadwork removal, rocks, soils, concrete and other material that normally results from land clearing.
b. The maximum volume or weight of such materials that can be feasibly diverted via reuse and recycling.
c. The vendor(s) that the applicant proposes to use to haul the materials.
d. Facility(s) the materials will be hauled to, and their expected diversion rates.
e. Estimated volume or weight of clearing, grubbing, and grading debris that will be landfilled.

Approval of the WMP requires that at least fifty (50) percent of all clearing, grubbing, and grading debris generated by the project shall be diverted, unless the developer is granted an exemption. Exemptions for diversions of less than fifty (50) percent will be reviewed on a case by case basis. (AB939, MC 8.80)

Prior to Certificate of Occupancy

LD47. (CO) Prior to issuance of the last certificate of occupancy or building final, the developer shall pay all outstanding fees.

LD48. (CO) Prior to issuance of a certificate of occupancy, this project is subject to requirements under the current permit for storm water activities required as part of

the National Pollutant Discharge Elimination System **(NPDES)** as mandated by the Federal Clean Water Act. In compliance with Proposition 218, the developer shall agree to approve the City of Moreno Valley NPDES Regulatory Rate Schedule that is in place at the time of certificate of occupancy issuance. Following are the requirements:

a. Select one of the following options to meet the financial responsibility to provide storm water utilities services for the required continuous operation, maintenance, monitoring system evaluations and enhancements, remediation and/or replacement, all in accordance with Resolution No. 2002-46.
   i. Participate in the mail ballot proceeding in compliance with Proposition 218, for the Common Interest, Commercial, Industrial and Quasi-Public Use NPDES Regulatory Rate Schedule and pay all associated costs with the ballot process; or
   ii. Establish an endowment to cover future City costs as specified in the Common Interest, Commercial, Industrial and Quasi-Public Use NPDES Regulatory Rate Schedule.

b. Notify the Special Districts Division of the intent to request building permits 90 days prior to their issuance and the financial option selected. The financial option selected shall be in place prior to the issuance of certificate of occupancy. (California Government Code & Municipal Code)

LD49. (CO) The City of Moreno Valley has an adopted Development Impact Fee (DIF) nexus study. All projects unless otherwise exempted shall be subject to the payment of the DIF prior to issuance of occupancy. The fees are subject to the provisions of the enabling ordinance and the fee schedule in effect at the time of occupancy.

LD50. (CO) The City of Moreno Valley has an adopted area wide Transportation Uniform Mitigation Fee (TUMF). All projects unless otherwise exempted shall be subject to the payment of the TUMF prior to issuance of occupancy. The fees are subject to the provisions of the enabling ordinance and the fee schedule in effect at the time of occupancy.

LD51. (CO) Prior to issuance of a certificate of occupancy or building final, the developer shall construct all public improvements in conformance with applicable City standards, except as noted in the Special Conditions, including but not limited to the following applicable improvements:

a. Street improvements including, but not limited to: pavement, base, curb and/or gutter, cross gutters, spandrel, sidewalks, drive approaches, pedestrian ramps, street lights, signing, striping, under sidewalk drains, landscaping and irrigation, medians, redwood header boards, pavement tapers/transitions and traffic control devices as appropriate.

b. Storm drain facilities including, but not limited to: storm drain pipe, storm drain laterals, open channels, catch basins and local depressions.

c. City-owned utilities.

d. Sewer and water systems including, but not limited to: sanitary sewer, potable water and recycled water.

e. Under grounding of existing and proposed utility lines less than 115,000 volts.

f. Relocation of overhead electrical utility lines including, but not limited to: electrical, cable and telephone.

LD52. (CO) Prior to issuance of a certificate of occupancy or building final, all existing and new utilities adjacent to and on-site shall be placed underground in accordance with City of Moreno Valley ordinances. (MC 9.14.130)

LD53. (CO) Prior to issuance of a certificate of occupancy or building final for any Commercial/Industrial facility, whichever occurs first, the owner may have to secure coverage under the State's General Industrial Activities Storm Water Permit as issued by the State Water Resources Control Board.

SPECIAL CONDITIONS

LD54. Prior to parcel map approval, the map shall show the following:

a. A 4-foot minimum pedestrian right-of-way dedication behind any driveway approach per City Standard 118C, on Perris Boulevard, Indian Street, and Grove View Road.

b. A 2-foot public access easement for the portions of sidewalk which are outside of the public right-of-way, along Perris Boulevard and Indian Street.

c. The appropriate additional right-of-way required for a bus turn-out on Perris Boulevard as depicted on the approved project plans and as conditioned by the City's Transportation Department.

d. Corner cutback right-of-way dedications per City Standard 208 at the southeast corner of Indian Street and Grove View Road and the southwest corner of Perris Boulevard and Grove View Road.

LD55. Prior to parcel map approval, the Developer shall guarantee the construction of the following improvements by entering into a public improvement agreement and posting security. The improvements shall be completed prior to occupancy of the first building or as otherwise determined by the City Engineer.

a. Perris Boulevard, Divided Arterial, City Standard 103C (110-foot RW / 86-foot CC) shall be constructed to half-width plus an additional 18 feet east of the centerline, along the entire project's east frontage. Additional right-of-way dedications at driveway approaches as well as a 2-foot pedestrian access easement, along the project's west property line, shall be shown on the parcel map. Improvements shall consist of, but not be limited to, pavement, base, curb, gutter, sidewalk, driveway approaches, drainage structures, any necessary offsite improvement transition/joins to existing, streetlights, pedestrian ramps, removal/relocation and/or undergrounding of any power poles with overhead utility lines less than 115,000 volts, and dry and wet utilities.

b. Indian Street, Minor Arterial, Modified City Standard 105A (88-foot RW / 64-foot CC) shall be constructed to half-width plus an additional 18 feet west of the centerline, along the entire project's east frontage. Additional right-of-way dedications at driveway approaches as well as a 2-foot pedestrian access easement, along the project's west property line, shall be shown on the parcel map. Improvements shall consist of, but not be limited to, pavement, base, curb, gutter, sidewalk, driveway approaches, drainage structures, streetlights, pedestrian ramps, removal/relocation and/or undergrounding of any power poles with overhead utility lines less than 115,000 volts, and dry and wet utilities.

c. Grove View Road, Industrial Collector, City Standard 106 (78-foot RW / 56-foot CC) shall be constructed to half-width plus an additional 18 feet north of the centerline, along the entire project's north frontage. Additional right-of-way dedications at driveway approaches along the project's north property line, shall be shown on the parcel map.. Improvements shall consist of, but not be limited to, pavement, base, curb, gutter, sidewalk, driveway approaches, drainage structures, any necessary offsite, streetlights, pedestrian ramps, dry and wet utilities.

d. Driveway approaches shall be constructed per City Standard No. 118C or as modified as shown on the project plans. The parcel map shall show an additional 4-foot minimum right-of-way dedication behind driveway approaches. No decorative pavers shall be placed within the public right-of-way. Certain project entrance(s) may be required to be constructed as a public street intersection.

e. Pavement core samples of existing pavement may be taken and findings submitted to the City for review and consideration of pavement improvements. The City will determine the adequacy of the existing pavement structural section. If the existing pavement structural section is found to be adequate, the developer may still be required to perform a one-tenth inch grind and overlay or slurry seal depending on the severity of existing pavement cracking, as required by the City

Engineer. If the existing pavement section is found to be inadequate, the Developer shall replace the pavement to meet or exceed the City's pavement structural section standard.

LD56. Prior to precise grading plan or improvement plan approval, as applicable, the plans shall show all driveway approaches to be constructed per City Standard Plan 118C modified, as accepted by the City. There shall be 4-foot minimum wide pedestrian sidewalk area at 2% maximum behind the conventional right-of-way. A minimum 4-foot pedestrian right-of-way dedication shall be made on the final parcel map PM 35672.

LD57. Prior to precise grading plan approval, the grading plan shall show any proposed trash enclosure as dual bin; one bin for trash and one bin for recyclables. The trash enclosure shall be per City Standard Plan 627.

LD58. Prior to precise grading plan approval, the grading plan shall show that the lowest finished floor elevation is a minimum of one foot above the base flood elevation.

LD59. Prior to precise grading plan approval, the grading plans shall clearly show that the parking lot conforms to City standards. The parking lot shall be 5% maximum, 1% minimum, 2% maximum at or near any disabled parking stall and travel way. Ramps, curb openings and travel paths shall all conform to current ADA standards as outlined in Department of Justice's "ADA Standards for Accessible Design", Excerpt from 28 CFR Part 36. (www.usdoj.gov) and as approved by the City's Building and Safety Division.

LD60. Prior to occupancy, the developer shall obtain an encroachment permit from Riverside County Flood Control & Water Conservation District in order to connect proposed onsite storm drain to the Perris Valley Channel Lateral B.

LD61. Prior to occupancy, the developer shall make a good faith effort to cause Riverside County Flood Control & Water Conservation District to dedicate additional public street right-of-way on Indian Street and Perris Boulevard along their property frontage between the project's south property line and the bridges.

LD62. Prior to occupancy, all overhead utility lines less than 115,000 volts fronting or within the entire project site boundary shall be placed underground per Section 9.14.130C of the City Municipal Code.

LD63. The Applicant shall select and implement treatment control BMPs that are medium to highly effective for treating Pollutants of Concern (POC) for the project. POC include project pollutants associated with a 303(d) listing or a Total Maximum Daily Load (TMDL) for receiving waters. Project POC include sediment/turbidity, nutrients, oxygen demanding substances, and pathogens

(bacteria and viruses). Exhibit C of the document, "Riverside County Water Quality Management Plan for Urban Runoff" dated July 24, 2006 shall be consulted for determining the effectiveness of proposed treatment BMPs.

LD64. Overall, the proposed treatment control concept is accepted as the conceptual treatment control BMP for the proposed site.

LD65. The Applicant has proposed to incorporate the use of vegetated swales, hydrodynamic separators, and sand filters. Final design details of the treatment control BMPs must be provided in the first submittal of the F-WQMP. The size of the treatment control BMPs is to be determined using the procedures set forth in Exhibit C of the Riverside County Guidance Document. The Applicant acknowledges that more area than currently shown on the plans may be required to treat site runoff as required by the WQMP guidance.

LD66. The Applicant shall substantiate the applicable Hydrologic Condition of Concern (HCOC) (WQMP Section IV) in the F-WQMP. The HCOC designates that the project will comply with Condition A; therefore, the condition must be addressed in the F-WQMP.

LD67. The Applicant shall, prior to building or grading permit closeout or the issuance of a certificate of occupancy, demonstrate:

a. That all structural BMPs have been constructed and installed in conformance with the approved plans and specifications;

b. That all structural BMPs described in the F-WQMP have been implemented in accordance with approved plans and specifications;

c. That the Applicant is prepared to implement all non-structural BMPs included in the F-WQMP, conditions of approval, and building/grading permit conditions; and

d. That an adequate number of copies of the approved F-WQMP are available for the future owners/occupants of the project.

PUBLIC WORKS DEPARTMENT – SPECIAL DISTRICTS DIVISION

Note: All Special Conditions, Modified Conditions, or Clarification of Conditions are in bold lettering. All other conditions are standard to all or most development projects.

Acknowledgement of Conditions

The following items are Special Districts' Conditions of Approval for project **PA09-0004**; this project shall be completed at no cost to any Government Agency. All questions regarding Special Districts' Conditions including but not limited to, intent, requests for change/modification, variance and/or request for extension of time shall be sought from the Special Districts Division of the Public Works Department 951.413.3480. The applicant is fully responsible for communicating with each designated Special Districts staff member regarding their conditions.

General Conditions

SD1. The parcel(s) associated with this project have been incorporated into the Moreno Valley Community Services Districts Zones A (Parks & Community Services) and C (Arterial Street Lighting). All assessable parcels therein shall be subject to annual Zone A and Zone C charges for operations and capital improvements.

SD2. Plans for parkway, median, slope, and/or open space landscape areas designated on the tentative map or in these Conditions of Approval for incorporation into Moreno Valley Community Services District **Zone M**, shall be prepared and submitted in accordance with the *City of Moreno Valley Public Works Department Landscape Design Guidelines*. Contact the Special Districts Division of the Public Works Department to obtain copies of this document.

SD3. The developer, or the developer's successors or assignees shall be responsible for all parkway and/ or median landscaping maintenance until such time as the District accepts maintenance duties.

SD4. Any damage to existing landscape easement areas due to project construction shall be repaired/replaced by the developer, or developer's successors in interest, at no cost to the Moreno Valley Community Services District.

Prior to Building Permit Issuance

SD5. (BP) This project has been identified to be included in the formation of a Community Facilities District (Mello-Roos) for **Public Safety** services, including but not limited to Police, Fire Protection, Paramedic Services, Park Rangers, and Animal Control services. The property owner(s) shall not protest the formation; however, they retain the right to object to the rate and method of maximum special tax. In compliance with Proposition 218, the developer shall agree to approve the mail ballot proceeding (special election) for either formation of the CFD or annexation into an existing district that may already be established. The Developer must notify Special

Districts of intent to request building permits 90 days prior to their issuance. (California Government Code)

SD6. (BP) This project is conditioned to provide a funding source for the capital improvements and/or maintenance for the **Perris Blvd.** median landscape. In order for the Developer to meet the financial responsibility to maintain the defined service, one of the following options shall be selected:

a. Participate in the mail ballot proceeding in compliance with Proposition 218, for Moreno Valley Community Services District **Zone M** (Commercial, Industrial and Multifamily Improved Median Maintenance), and pay all associated costs with the ballot process; or

b. Establish an endowment to cover the future maintenance costs of the landscaped area.

The developer must notify Special Districts of intent to request building permits 90 days prior to their issuance and the financial option selected to fund the continued maintenance.

SD7. *Commercial* (BP) If Land Development, a Division of the Public Works Department, requires this project to supply a funding source necessary to provide, but not limited to, stormwater utilities services for the monitoring of on site facilities and performing annual inspections of the affected areas to ensure compliance with state mandated stormwater regulations, the developer must notify Special Districts 90 days prior to the City's issuance of a building permit and the financial option selected to fund the continued maintenance. (California Government Code)

SD8. (BP) Prior to release of building permit, the developer, or the developer's successors or assignees, shall record with the County Recorder's Office a **Declaration of Covenant and Acknowledgement of Assessments** for each assessable parcel therein, whereby the developer covenants and acknowledges the existence of the Moreno Valley Community Services District, its established benefit zones, and that said parcel(s) is (are) liable for payment of annual benefit zone charges and the appropriate National Pollutant Discharge Elimination System (NPDES) maximum regulatory rate schedule when due. A copy of the recorded Declaration of Covenant and Acknowledgement of Assessments shall be submitted to the Special Districts Division.

**For a copy of the Declaration of Covenant and Acknowledgement of the Assessments form, please contact Special Districts, phone 951.413.3480.

SD9. (BP) Final median, parkway, slope, and/or open space landscape/irrigation plans for those areas designated on the tentative map or in these Conditions of Approval for inclusion into Community Services District shall be reviewed and approved by the Community Development Department–Planning Division, and the Public Works

Department–Special Districts and Transportation Divisions prior to the issuance of the first Building Permit.

Prior to Certificate of Occupancy

SD10. (CO) Prior to issuance of a Certificate of Occupancy or building final, the developer shall submit a letter to Special Districts from the Utility service responsible for providing final electrical energy connections and energization of the streetlights for the development project. The letter must identify, by pole number, each streetlight in the development and state the corresponding date of its electrical energization.

SD11. (CO) All parkway and/or median landscaping specified in the tentative map or in these Conditions of Approval shall be constructed prior to the issuance of the Certificate of Occupancy/Building Final for this project.

SD12. (CO) Prior to the issuance of the first Certificate of Occupancy or building final for this project, the developer shall pay Advanced Energy fees for all applicable Zone B (Residential Street Lighting) and/or Zone C (Arterial Street Lighting and Intersection Lighting) streetlights required for this development. The developer shall provide a receipt to the Special Districts Division showing that the Advanced Energy fees have been paid in full for the number of streetlights to be accepted into the CSD Zone B and/or Zone C program. Payment shall be made to the City of Moreno Valley, as collected by the Land Development Division, based upon the Advanced Energy fee rate at the time of payment and as set forth in the current Listing of City Fees, Charges and Rates, as adopted by City Council. Any change in the project which may increase the number of streetlights to be installed will require payment of additional Advanced Energy fees at the then current fee.

PUBLIC WORKS DEPARTMENT – TRANSPORTATION ENGINEERING DIVISION

Note: All Special conditions are in bold lettering. All other conditions are standard to all or most development projects.

Based on the information contained in our standard review process we recommend the following conditions of approval be placed on this project:

GENERAL CONDITIONS

TE1. Conditions of approval may be modified if project is phased or altered from any approved plans.

TE2. Perris Boulevard is classified as a Divided Arterial (110'RW/86'CC) per City Standard Plan No. 103C. The sidewalk shall be curb-separated. Any modifications or improvements undertaken by this project shall be consistent with the City's standards for this facility.

TE3. Indian Street is designated as a Minor Arterial (88'RW/64'CC) per City Standard Plan No. 105A. Any modifications or improvements undertaken by this project shall be consistent with the City's standards for this facility.

TE4. Grove View Road is designated as an Industrial Collector (78'RW/56'CC) per City Standard Plan No. 106. Any modifications or improvements undertaken by this project shall be consistent with the City's standards for this facility.

PRIOR TO GRADING PERMIT

TE5. (GP) Prior to issuance of a grading permit, the project applicant shall submit conceptual striping plans for improvements identified in condition TE11 as well as Indian Street for the City Traffic Engineer's approval.

PRIOR TO IMPROVEMENT PLAN APPROVAL OR CONSTRUCTION PERMIT

TE6. The driveways less than 40 feet in width shall conform to Section 9.16.250, and Table 9.16.250A of the City's Development Code - Design Guidelines, and City Standard Plan No. 118C. Driveways wider than 40' shall be designed as intersections with pedestrian access ramps per City standards.

TE7. Sight distance at driveways and on streets shall conform to City of Moreno Valley Standard No. 125A, B, C at the time of preparation of final grading, landscape, and street improvements.

TE8. Prior to the final approval of the street improvement plans, a signing and striping plan shall be prepared per City of Moreno Valley Standard Plans - Section 4 for all streets with a cross section of 66'/44' and wider.

TE9. Prior to issuance of a construction permit, construction traffic control plans prepared by a qualified, Registered Civil or Traffic engineer may be required.

TE10. Prior to the final approval of the street improvement plans, the project applicant shall design Perris Boulevard to include a bus bay per City Standard Plan No. 121 in the southbound direction, south of Grove View Road. The bus bay may be designed to serve as a combination right turn lane/bus bay to the satisfaction of the City Engineer.

TE11. Prior to the final approval of the street improvement plans, the project applicant shall design the intersection/traffic signal at Perris Boulevard and the South Project Driveway to provide the following (at a minimum):

Northbound: One left turn lane, one shared through/right turn lane
Southbound: One left turn lane, one through lane, one right turn lane
Eastbound: One left turn lane, one shared through/right turn lane
Westbound: One left turn lane, one shared through/right turn lane

NOTE: The curb return radii on the northwest/southwest corners shall be 50 feet.

TE12. Prior to the final approval of the street improvement plans, the project applicant shall design and modify the intersection of Perris Boulevard at Grove View Road to include a 200' northbound left turn lane with raised median. This modification may include relocation of the traffic detector loops and other traffic signal modifications.

PRIOR TO BUILDING PERMIT

TE13. (BP) Prior to issuance of a building permit, traffic signal plans shall be prepared by a registered civil or electrical engineer and shall be submitted to the City Traffic Engineer for the following intersections:

- **Perris Boulevard at South Project Driveway (signal modifications).**
- **Perris Boulevard at Grove View Road (signal modifications).**

TE14. (BP) Prior to issuance of a building permit, the project applicant shall make a fair-share contribution in the amount of $45,150 to the City of Moreno Valley for the construction of a traffic signal at Perris Boulevard and Suburban Lane. As this traffic signal is not in any existing fee program, payment of DIF and/or TUMF are not considered satisfaction of this obligation.

PRIOR TO CERTIFICATE OF OCCUPANCY OR BUILDING FINAL

TE15. (CO) Prior to issuance of a certificate of occupancy, all approved signing and striping shall be installed per current City Standards and the approved plans.

TE16. (CO) Each gated entrance shall be provided with the following, or as approved by the City Traffic Engineer:

a) A storage lane with a minimum of 75 feet queuing length for entering traffic.
b) Appropriate signing and striping.

All of these features must be kept in working order.

TE17. (CO) Prior to the issuance of a certificate of occupancy, the project applicant shall construct the traffic signal modifications identified in TE13. Construction shall be completed per the approved plans and coordinated with the street improvements.

TE18. (CO) Prior to issuance of a certificate of occupancy, the project applicant shall construct the intersection/roadway improvements identified in TE10, TE11, and TE12 per the approved plans.

TE19. (CO) Prior to the issuance of a certificate of occupancy for the project, driveway access at the following locations will be installed as follows:

- **North Perris Boulevard Driveway: Right-in, right-out access by means of a raised median.**
- **South Perris Boulevard Driveway: Full access by means of a traffic signal.**
- **Grove View Road Driveways: Full access.**
- **Indian Street Driveways: Full access.**

NOTE: All truck driveways shall have curb return radii of 50 feet.

PRIOR TO ACCEPTANCE OF STREETS INTO THE CITY-MAINTAINED ROAD SYSTEM

TE20. Prior to the acceptance of streets into the City-maintained road system, all approved traffic control and signing and striping shall be installed per current City Standards and the approved plans.

PUBLIC WORKS DEPARTMENT – MORENO VALLEY UTILITY

Note: All Special Conditions, Modified Conditions, or Clarification of Conditions are in bold lettering. All other conditions are standard to all or most development projects.

Acknowledgement of Conditions

The following items are Moreno Valley Utility's Conditions of Approval for project(s) PA09-0004 & PA09-0012; this project shall be completed at no cost to any Government Agency. All questions regarding Moreno Valley Utility's Conditions including but not limited to, intent, requests for change/modification, variance and/or request for extension of time shall be sought from Moreno Valley Utility (the Electric Utility Division) of the Public Works Department 951.413.3512. The applicant is fully responsible for communicating with Moreno Valley Utility staff regarding their conditions.

PRIOR TO RECORDATION OF FINAL MAP

MVU1. (R) For single family subdivisions, a three foot easement along each side yard property line shall be shown on the final map and offered for dedication to the City of Moreno Valley for public utility purposes, unless otherwise approved by the City Engineer. If the project is a multi-family development, townhome, condominium, apartment, commercial or industrial project, and it requires the installation of electric distribution facilities within common areas, a non-exclusive easement shall be provided to Moreno Valley Utility to include all such common areas. All easements shall include the rights of ingress and egress for the purpose of operation, maintenance, facility repair, and meter reading.

PRIOR TO ISSUANCE OF BUILDING PERMIT

MVU2. (BP) **City of Moreno Valley Municipal Utility Service – Electrical Distribution**: Prior to issuance of building permit, the developer shall submit a detailed engineering plan showing design, location and schematics for the utility system to be approved by the City Engineer. In accordance with Government Code Section 66462, the Developer **shall** execute an agreement with the City providing for the installation, construction, improvement and dedication of the utility system following recordation of final map and concurrent with trenching operations and other subdivision improvements so long as said agreement incorporates the approved engineering plan and provides financial security to guarantee completion and dedication of the utility system.

The Developer **shall** coordinate and receive approval from the City Engineer to install, construct, improve, and dedicate to the City, or the City's designee, all utility infrastructure (including but not limited to conduit, equipment, vaults, ducts, wires, switches, conductors, transformers, resistors, amplifiers, and "bring-up" facilities including electrical capacity to serve the identified development and other adjoining/abutting/ or benefiting projects as determined by Moreno Valley Utility) – collectively referred to as "utility system" (to and through the development), along with any appurtenant real property easements, as determined by the City Engineer to be necessary for the distribution and /or delivery of any and all "utility services" to each lot and unit within the Tentative Map. For purposes of this condition, "utility services" shall mean electric, cable television, telecommunication (including video, voice, and data) and other similar services designated by the City Engineer. "Utility services" shall not include sewer, water, and natural gas services, which are addressed by other conditions of approval. Properties within development will be subject to an electrical system capacity charge and that contribution will be collected prior to issuance of building permits.

The City, or the City's designee, shall utilize dedicated utility facilities to ensure safe, reliable, sustainable and cost effective delivery of utility services and maintain the integrity of streets and other public infrastructure. Developer shall, at developer's sole expense, install or cause the installation of such interconnection facilities as may be necessary to connect the electrical distribution infrastructure within the project to the Moreno Valley Utility owned and controlled electric distribution system. Alternatively, developer may cause the project to be included in or annexed to a community facilities district established or to be established by the City for the purpose of financing the installation of such interconnection and distribution facilities. The project shall be deemed to have been included in or annexed to such a community facilities district upon the expiration of the statute of limitations to any legal challenges to the levy of special taxes by such community facilities district within the property. The statute of limitations referred to above will expire 30 days after the date of the election by the qualified electors within the project to authorize the levy of special taxes and the issuance of bonds.

MVU3. This Project is **subject** to a Reimbursement Agreement. The Project is responsible for a proportionate share of costs associated with electrical distribution infrastructure previously installed that directly benefits the Project. The developer shall be responsible to pay to the City of Moreno Valley the sum of **$423,150.00** for this electrical distribution infrastructure prior to the issuance of building permits.

POLICE DEPARTMENT

Note: All Special conditions are in bold lettering. All other conditions are standard to all or most development projects

Standard Conditions

PD1. Prior to the start of any construction, temporary security fencing shall be erected. The fencing shall be a minimum of six (6) feet high with locking, gated access and shall remain through the duration of construction. Security fencing is required if there is: construction, unsecured structures, unenclosed storage of materials and/or equipment, and/or the condition of the site constitutes a public hazard as determined by the Public Works Department. If security fencing is required, it shall remain in place until the project is completed or the above conditions no longer exist. (MC 9.08.080)

PD2. (GP) Prior to the issuance of grading permits, a temporary project identification sign shall be erected on the site in a secure and visible manner. The sign shall be conspicuously posted at the site and remain in place until occupancy of the project. The sign shall include the following:

a. The name (if applicable) and address of the development.

b. The developer's name, address, and a 24-hour emergency telephone number. (MC 9.08.080)

PD3. (CO) Prior to the issuance of a Certificate of Occupancy, an Emergency Contact Information Form for the project shall be completed at the permit counter of the Community & Economic Development Department - Building Division for routing to the Police Department. (MC 9.08.080)

CITY OF MORENO VALLEY
CONDITIONS OF APPROVAL FOR PA09-0022
TENTATIVE PARCEL MAP NO. 36162
ASSESSOR'S PARCEL NUMBERS: 316-210-071, -073, -075 and -076

APPROVAL DATE:
EXPIRATION DATE:

_X_ **Planning (P), including Building (B), School District (S), Post Office (PO)**
_X_ **Fire Prevention Bureau (F)**
_X_ **Public Works – Land Development (LD)**
_X_ **Public Works – Special Districts (SD)**
_X_ **Public Works – Transportation Engineering (TE)**
_X_ **Public Works – Moreno Valley Utilities (MVU)**
___ **Parks & Community Services (PCS)**
_X_ **Police (PD)**

Note: All Special conditions are in bold lettering. All other conditions are standard to all or most development projects.

COMMUNITY & ECONOMIC DEVELOPMENT DEPARTMENT

Planning Division

P1. Tentative Parcel Map No. 36162 is approved for the purposes of re-configuring the existing four parcels located within the project site and creating a single 80 acre parcel.

P2. Development within Tentative Parcel Map No. 36162 shall be under separate review and approval of a plot plan or a conditional use permit application(s) and shall be subject to the requirements of the City's Municipal Code.

P3. This project shall comply with the project mitigation measures listed in the conditions of approval for PA09-0004 and the mitigation monitoring program for the VIP Moreno Valley Project.

P4. This approval shall comply with all applicable requirements of the City of Moreno Valley Municipal Code.

EXHIBIT B

Timing Mechanisms for Conditions (see abbreviation at beginning of affected condition):

R - Map Recordation	GP - Grading Permits	CO - Certificate of Occupancy or building final
WP - Water Improvement Plans	BP - Building Permits	P - Any permit

Governing Document (see abbreviation at the end of the affected condition):

GP - General Plan	MC - Municipal Code	CEQA - California Environmental Quality Act
Ord - Ordinance	DG - Design Guidelines	Ldscp - Landscape Development Guidelines and Specs
Res - Resolution	UFC - Uniform Fire Code	UBC - Uniform Building Code
	SBM - Subdivision M	

P5. This tentative map shall expire three years after the approval date of this tentative map unless extended as provided by the City of Moreno Valley Municipal Code; otherwise it shall become null and void and of no effect whatsoever in the event the applicant or any successor in interest fails to properly file a final map before the date of expiration. (MC 9.02.230, 9.14.050, 080)

P6. The site shall be developed in accordance with the approved tentative map on file in the Community & Economic Development Department -Planning Division, the Municipal Code regulations, General Plan, the Moreno Valley Industrial Area Plan and the conditions contained herein. (MC 9.14.020)

P7. All undeveloped portions of the site shall be maintained in a manner that provides for the control of weeds, erosion and dust. (MC 9.02.030)

P8. All landscaped areas shall be maintained in a healthy and thriving condition, free from weeds, trash and debris. (MC 9.02.030)

Prior to Issuance of Grading Permits

P9. (GP) Prior to issuance of grading permits, the developer shall pay the applicable Stephen's' Kangaroo Rat (SKR) Habitat Conservation Plan mitigation fee. (Ord)

P10. (GP) All site plans, grading plans, landscape and irrigation plans, fence/wall plans, lighting plans and street improvement plans shall be coordinated for consistency with this approval.

P11. (GP) If potential historic, archaeological, or paleontological resources are uncovered during excavation or construction activities at the project site, work in the affected area will cease immediately and a qualified person (meeting the Secretary of the Interior's standards (36CFR61)) shall be consulted by the applicant to evaluate the find, and as appropriate recommend alternative measures to avoid, minimize or mitigate negative effects on the historic, prehistoric, or paleontological resource. Determinations and recommendations by the consultant shall be implemented as deemed appropriate by the Community Development Director, in consultation with the State Historic Preservation Officer (SHPO) and any and all affected Native American Tribes before any further work commences in the affected area.

If human remains are discovered, work in the affected area shall cease immediately and the County Coroner shall be notified. If it is determined that the remains are potentially Native American, the California Native American Heritage Commission and any and all affected Native American Indians tribes such as the Morongo Band of Mission Indians or the Pechanga Band of Luiseno Indians shall be notified and appropriate measures provided by State law shall be implemented. (GP Objective 23.3, DG, CEQA).

P12. (GP) Prior to the issuance of grading permits, final erosion control landscape and irrigation plans for all cut or fill slopes over 3 feet in height shall be submitted to the Planning Division for review and approval for the phase in process. This shall include slopes associated with swales and basins. The plans shall be designed in accordance with the slope erosion plan as required by the City Engineer for that phase. Man-made slopes greater than 10 feet in height shall be "land formed" to conform to the natural terrain and shall be landscaped and stabilized to minimize visual scarring. Graded slopes shall have variations that do not exceed 2:1 (GP Objective 1.5, MC 9.08.080, DG)

P13. (GP) Prior to approval of any grading permits, any required final median enhancement/landscape/irrigation plans shall be submitted to the Community Development Department - Planning Division and Public Works Department – Special Districts for review and approval by each division. Timing of installation shall be determined by PW- Special Districts. (GP - Circulation Master Plan)

P14. (GP) Prior to the issuance of a precise grading permit, the plan shall show decorative treatments for all driveway ingress/egress locations of the project. Accessible pedestrian pathways interior to the site cannot be painted. If delineation is necessary, then an alternative material is required.

P15. (GP) Prior to the issuance of a precise grading permit, all required planter areas, curbs, including twelve-inch concrete step outs, and required parking space striping shall be shown on the precise grading plan.

P16. (GP) Prior to the issuance of any grading permits, the following burrowing owl survey requirements shall be incorporated into the grading plans in accordance with the Riverside County Multi-Species Habitat Conservation Plan: Within 30 days of and prior to disturbance, a burrowing owl pre-construction survey shall be conducted by a qualified biologist using accepted protocols. The survey shall be submitted to the Planning Division for review and approval.

Prior to Recordation of Final Map

P17. (R) Prior to final map recordation, subdivision phasing (including any proposed common open space or improvement phasing, if applicable), shall be subject to the Planning Division approval. Any proposed phasing shall provide for adequate vehicular access to all lots in each phase as determined by the City Transportation Engineer or designee and shall substantially conform to all intent and purpose of the subdivision approval. (MC 9.14.080)

Building and Safety Division

B1. The above project shall comply with the current California Codes (CBC, CEC, CMC and the CPC) as well as all other city ordinances. All new projects shall provide a soils report. Plans shall be submitted to the Building Department as a separate submittal.

COMMERCIAL, INDUSTRIAL, MULTI-FAMILY PROJECTS INCLUDING CONDOMINIUMS, TOWNHOMES, DUPLEXES AND TRIPLEX BUILDINGS REQUIRE THE FOLLOWING:

Prior to final inspection, all plans will be placed on a CD Rom for reference and verification. Plans will include "as built" plans, revisions and changes. The CD will also include Title 24 energy calculations, structural calculations and all other pertinent information. It will be the responsibility of the developer and or the building or property owner(s) to bear all costs required for this process. The CD will be presented to the Building Department for review prior to final inspection and building occupancy. The CD will become the property of the Moreno Valley Building Department at that time. In addition, a site plan showing the path of travel from public right of way and building to building access with elevations will be required.

B2. (BP) Prior to the issuance of a building permit, the applicant shall submit a properly completed "Waste Management Plan" (WMP), as required, to the Compliance Official (Building Official) as a portion of the building or demolition permit process.

FIRE PREVENTION BUREAU

1. **Please complete and return attached fire flow letter.**
2. The following Standard Conditions shall apply.

With respect to the conditions of approval, the following fire protection measures shall be provided in accordance with Moreno Valley City Ordinances and/or recognized fire protection standards:

F1. Final fire and life safety conditions will be addressed when the Fire Prevention Bureau reviews building plans. These conditions will be based on occupancy, use, California Building Code (CBC), California Fire Code (CFC), and related codes, which are in force at the time of building plan submittal.

F2. The Fire Prevention Bureau is required to set a minimum fire flow for the remodel or construction of all commercial buildings per CFC Appendix B and Table B105.1. The applicant/developer shall provide documentation to show there exists a water system capable of delivering 4000 GPM for 4 hour(s) duration at 20-PSI residual operating pressure. The required fire flow may be adjusted during the approval process to reflect changes in design, construction type, or automatic fire protection measures as approved by the Fire Prevention Bureau. Specific requirements for the project will be determined at time of submittal. (CFC 508.3, Appendix B and MVMC 8.36.100 Section D) **The 50% reduction in fire flow was granted for the use of fire sprinklers throughout the facility. The reduction shall only apply to fire flow, hydrant spacing shall be per the fire flow requirements listed in CFC Appendix B and C.**

F3. Industrial, Commercial, Multi-family, Apartment, Condominium, Townhouse or Mobile Home Parks. A combination of on-site and off-site super enhanced fire hydrants (6" x 4" x 4" x 2 ½") shall not be closer than 40 feet and more than 150 feet from any portion of the building as measured along approved emergency vehicular travel ways. The required fire flow shall be available from any adjacent fire hydrant(s) in the system. Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, super or enhanced fire hydrants as determined by the fire code official shall be provided at spacing not to exceed 500 feet of frontage for transportation hazards. (CFC 508.5.7 & MVMC 8.36.050 Section O and 8.36.100 Section E)

F4. During phased construction, dead end roadways and streets which have not been completed shall have a turn-around capable of accommodating fire apparatus. (CFC 503.1 and 503.2.5)

F5. Prior to issuance of Building Permits, the applicant/developer shall provide the Fire Prevention Bureau with an approved site plan for Fire Lanes and signage. (MVMC 8.36.050 and CFC 501.3)

F6. Prior to construction and issuance of building permits, all locations where structures are to be built shall have an approved Fire Department emergency vehicular access road (all weather surface) capable of sustaining an imposed load of 80,000 lbs. GVW, based on street standards approved by the Public Works Director and the Fire Prevention Bureau. (CFC 501.4 and MVMC 8.36.050 Section A)

F7. Prior to construction and issuance of Building Permits, fire lanes and fire apparatus access roads shall have an unobstructed width of not less than twenty–four (24) or thirty (30) feet as approved by the Fire Prevention Bureau and an unobstructed vertical clearance of not less the thirteen (13) feet six (6) inches. (CFC 503.2.1.1 and MVMC 8.36.050)

F8. Prior to construction, all roads, driveways and private roads shall not exceed 12 percent grade. (CFC 503.2.7 and MVMC 8.36.050)

F9. If construction is phased, each phase shall provide an approved emergency vehicular access way for fire protection prior to any building construction. (CFC 501.4 and MVMC 8.36.050 Section A)

F10. Prior to construction, all locations where structures are to be built shall have an approved Fire Department access based on street standards approved by the Public Works Director and the Fire Prevention Bureau. (CFC 501.3 and MVMC 8.36.050)

F11. Prior to building construction, dead end roadways and streets which have not been completed shall have a turnaround capable of accommodating fire apparatus. (CFC 503.2.5 and MVMC 8.36.050)

F12. Prior to issuance of Building Permits, the applicant/developer shall participate in the Fire Impact Mitigation Program. (Fee Resolution as adopted by City Council)

F13. Prior to issuance of Building Permits, the applicant/developer shall furnish one copy of the water system plans to the Fire Prevention Bureau for review. Plans shall:

a) Be signed by a registered civil engineer or a certified fire protection engineer;
b) Contain a Fire Prevention Bureau approval signature block; and
c) Conform to hydrant type, location, spacing of new and existing hydrants and minimum fire flow required as determined by the Fire Prevention Bureau.

After the local water company signs the plans, the originals shall be presented to the Fire Prevention Bureau for signatures. The required water system, including fire hydrants, shall be installed, made serviceable, and be accepted by the Moreno Valley Fire Department prior to beginning construction. They shall be maintained accessible.

Existing fire hydrants on public streets are allowed to be considered available. Existing fire hydrants on adjacent properties shall not be considered available unless fire apparatus access roads extend between properties and easements are established to prevent obstruction of such roads. (CFC 508.1 and MVMC 8.36.100)

F14. Prior to issuance of Certificate of Occupancy or Building Final, "Blue Reflective Markers" shall be installed to identify fire hydrant locations in accordance with City specifications. (CFC 510.1)

F15. Prior to issuance of Certificate of Occupancy or Building Final, all commercial buildings shall display street numbers in a prominent location on the street side and rear access locations. The numerals shall be a minimum of twelve (12) inches in height for buildings and six (6) inches in height for suite identification on a contrasting background. Unobstructed lighting of the address(s) shall be by means approved by the Fire Prevention Bureau and Police Department. In multiple suite centers (strip malls), businesses shall post the name of the business on the rear door(s). (CFC 505.1)

F16. Prior to issuance of Certificate of Occupancy or Building Final, the applicant/developer shall install a fire sprinkler system based on square footage and type of construction, occupancy or use. Fire sprinkler plans shall be submitted to the Fire Prevention Bureau for approval prior to installation. (CFC Chapter 9)

F17. Prior to issuance of Certificate of Occupancy or Building Final, the applicant/developer shall install a fire alarm system monitored by an approved Underwriters Laboratory listed central station based on a requirement for monitoring the sprinkler system, occupancy or use. Fire alarm panel shall be accessible from exterior of building in an approved location. Plans shall be submitted to the Fire Prevention Bureau for approval prior to installation. (CFC Chapter 9 and MVMC 8.36.070)

F18. Prior to issuance of a Certificate of Occupancy or Building Final, a "Knox Box Rapid Entry System" shall be provided. The Knox-Box shall be installed in an accessible location approved by the Fire Chief. The Knox-Box shall be supervised by the alarm system and all exterior security emergency access gates shall be electronically operated and be provided with Knox key switches for access by emergency personnel. (CFC 506.1)

F19. Prior to issuance of Certificate of Occupancy, approval shall be required from the County of Riverside Community Health Agency (Department of Environmental Health) and Moreno Valley Fire Prevention Bureau to maintain, store, use, handle materials, or conduct processes which produce conditions hazardous to life or property, and to install equipment used in connection with such activities. (CFC 2701.5)

F20. Prior to issuance of Certificate of Occupancy or Building Final, the applicant/developer must submit a simple plot plan, a simple floor plan, and other plans as requested, each as an electronic file in .dwg format, to the Fire Prevention Bureau. Alternate file formats may be acceptable with approval by the Fire Chief.

F21. The angle of approach and departure for any means of Fire Department access shall not exceed 1 ft drop in 20 ft (0.3 m drop in 6 m), and the design limitations of the fire apparatus of the Fire Department shall be subject to approval by the AHJ. (CFC 503.2.7 and MVMC 8.36.050 Section I)

F22. Prior to issuance of the building permit for development, independent paved access to the nearest paved road, maintained by the City shall be designed and constructed by the developer within the public right of way in accordance with City Standards. (MVMC 8.36.050)

F23. Prior to construction, “private” driveways over 150 feet in length shall have a turn-around as determined by the Fire Prevention Bureau capable of accommodating fire apparatus. Driveway grades shall not exceed 12 percent. (CFC 503 and MVMC 8.36.050)

F24. Complete plans and specifications for fire alarm systems, fire-extinguishing systems (including automatic sprinklers or standpipe systems), clean agent systems (or other special types of automatic fire-extinguishing systems), as well as other fire-protection systems and appurtenances thereto shall be submitted to the Moreno Valley Fire Prevention Bureau for review and approval prior to system installation. Submittals shall be in accordance with CFC Chapter 9 and associated accepted national standards.

F25. A permit is required to maintain, store, use or handle materials, or to conduct processes which produce conditions hazardous to life or property, or to install equipment used in connection with such activities. Such permits shall not be construed as authority to violate, cancel or set aside any of the provisions of this code. Such permit shall not take the place of any license required by law. Applications for permits shall be made to the Fire Prevention Bureau in such form and detail as prescribed by the Bureau. Applications for permits shall be accompanied by such plans as required by the Bureau. Permits shall be kept on the premises designated therein at all times and shall be posted in a conspicuous location on the premises or shall be kept on the premises in a location designated by

the Fire Chief. Permits shall be subject to inspection at all times by an officer of the fire department or other persons authorized by the Fire Chief in accordance with Appendix Chapter 1 and MVMC 8.36.100.

F26. Approval of the safety precautions required for buildings being constructed, altered or demolished shall be required by the Fire Chief in addition to other approvals required for specific operations or processes associated with such construction, alteration or demolition. (CFC Chapter 14 & CBC Chapter 33)

F27. Prior to issuance of Certificate of Occupancy, permits are required to store, dispense, use or handle hazardous material. Each application for a permit shall include a hazardous materials management plan (HMMP). The location of the HMMP shall be posted adjacent to (other) permits when an HMMP is provided. The HMMP shall include a facility site plan designating the following:

a) Storage and use areas;
b) Maximum amount of each material stored or used in each area;
c) Range of container sizes;
d) Locations of emergency isolation and mitigation valves and devises;
e) Product conveying piping containing liquids or gases, other than utility-owned fuel gas lines and low-pressure fuel gas lines;
f) On and off positions of valves for valves which are of the self-indicating type;
g) Storage plan showing the intended storage arrangement, including the location and dimensions of aisles. The plans shall be legible and approximately to scale. Separate distribution systems are allowed to be shown on separate pages; and
h) Site plan showing all adjacent/neighboring structures and use.

NOTE: Each application for a permit shall include a hazardous materials inventory statement (HMIS).

F28. Before a Hazardous Materials permit is issued, the Fire Chief shall inspect and approve the receptacles, vehicles, buildings, devices, premises, storage spaces or areas to be used. In instances where laws or regulations are enforceable by departments other than the Fire Prevention Bureau, joint approval shall be obtained from all departments concerned. (CFC Appendix H)

F29. Construction or work for which the Fire Prevention Bureau's approval is required shall be subject to inspection by the Fire Chief and such construction or work shall remain accessible and exposed for inspection purposes until approved. (CFC Section 106)

F30. The Fire Prevention Bureau shall maintain the authority to inspect, as often as necessary, buildings and premises, including such other hazards or appliances designated by the Fire Chief for the purpose of ascertaining and causing to be corrected any conditions which would reasonably tend to cause fire or contribute to its spread, or any violation of the purpose or provisions of this code and of any other law or standard affecting fire safety. (CFC Section 106)

F31. Permit requirements issued, which designate specific occupancy requirements for a particular dwelling, occupancy, or use, shall remain in effect until such time as amended by the Fire Chief. (CFC Section 104)

F32. In accordance with the California Fire Code Appendix Chapter 1, where no applicable standards or requirements are set forth in this code, or contained within other laws, codes, regulations, ordinances or bylaws adopted by the jurisdiction, compliance with applicable standards of the National Fire Protection Association or other nationally recognized fire safety standards as are approved shall be deemed as prima facie evidence of compliance with the intent of this code as approved by the Fire Chief. (CFC Section 102.7)

F33. Any alterations, demolitions, or change in design, occupancy and use of buildings or site will require plan submittal to the Fire Prevention Bureau with review and approval prior to installation. (CFC Appendix Chapter 1)

F34. Emergency and Fire Protection Plans shall be provided when required by the Fire Prevention Bureau. (CFC Section 105)

F35. Prior to construction, all traffic calming designs/devices must be approved by the Fire Marshal and City Engineer.

FIRE FLOW LETTER

Date:	02/24/2009	**Address:**	
Case Number:	PA09-0004	**A.P.N.:**	316-210-071, 073, 075, 076

This is certification the water system is capable of meeting the following required fire flows as determined by the California Fire Code Appendix B.

Based on the information provided on the above referenced case. The fire flow required for this project will be 4000 G.P.M. for duration of 4-HOURS measured at 20-psi residual pressure.

The required fire flow may be adjusted during the approval process to reflect changes in design, construction type or automatic fire protection measures as approved by the Fire Prevention Bureau.

Applicant/ Developer: _____

By: _____ **Date:** _____

Title: _____

WATER AGENCY APPROVAL

Name of Agency: _____

Address: _____

Telephone: _____ **Date:** _____

By: _____ **Title:** _____

NOTE: **THE COMPLETION AND SUBMITTAL OF THIS LETTER TO THE FIRE PREVENTION BUREAU SHALL NOT BE CONSTRUED AS APPROVAL FOR THE INSTALLATION OF THE REQUIRED FIRE HYDRANT (S) AND/OR WATER SYSTEM.**

COMMUNITY & ECONOMIC DEVELOPMENT DEPARTMENT – LAND DEVELOPMENT DIVISION

The following are the Land Development Division Conditions of Approval for this project and shall be completed at no cost to any government agency. All questions regarding the intent of the following conditions shall be referred to the Land Development Division.

General Conditions

LD1. (G) The developer shall comply with all applicable City ordinances and resolutions including the City's Municipal Code (MC) and if subdividing land, the Government Code (GC) of the State of California, specifically Sections 66410 through 66499.58, said sections also referred to as the Subdivision Map Act (SMA). (MC 9.14.010)

LD2. (G) It is understood that the tentative map correctly shows all existing easements, traveled ways, and drainage courses, and that their omission may require the map or plans associated with this application to be resubmitted for further consideration. (MC 9.14.040)

LD3. (G) In the event right-of-way or offsite easements are required to construct offsite improvements necessary for the orderly development of the surrounding area to meet the public health and safety needs, the developer shall make a good faith effort to acquire the needed right-of-way in accordance with the Land Development Division's administrative policy. In the event that the developer is unsuccessful, he shall enter into an agreement with the City to acquire the necessary right-of-way or offsite easements and complete the improvements at such time the City acquires the right-of-way or offsite easements which will permit the improvements to be made. The developer shall be responsible for all costs associated with the right-of-way or easement acquisition. (GC 66462.5)

LD4. (G) If improvements associated with this project are not initiated within two years of the date of approval of the Public Improvement Agreement, the City Engineer may require that the improvement cost estimate associated with the project be modified to reflect current City construction costs in effect at the time of request for an extension of time for the Public Improvement Agreement or issuance of a permit.

LD5. (G) The developer shall monitor, supervise and control all construction and construction supportive activities, so as to prevent these activities from causing a public nuisance, including but not limited to, insuring strict adherence to the following:

(a) Removal of dirt, debris, or other construction material deposited on any public street no later than the end of each working day.

(b) Observance of working hours as stipulated on permits issued by the Public Works Department.
(c) The construction site shall accommodate the parking of all motor vehicles used by persons working at or providing deliveries to the site.
(d) All dust control measures per South Coast Air Quality Management District (SCAQMD) requirements shall be adhered to during the grading operations.

Violation of any condition or restriction or prohibition set forth in these conditions shall subject the owner, applicant, developer or contractor(s) to remedies as noted in the City Municipal Code 8.14.090. In addition, the City Engineer or Building Official may suspend all construction related activities for violation of any condition, restriction or prohibition set forth in these conditions until such time as it has been determined that all operations and activities are in conformance with these conditions.

LD6. (G) The developer shall protect downstream properties from damage caused by alteration of drainage patterns, i.e., concentration or diversion of flow. Protection shall be provided by constructing adequate drainage facilities, including, but not limited to, modifying existing facilities or by securing a drainage easement. (MC 9.14.110)

LD7. (G) A detailed drainage study shall be submitted to the City Engineer for review and approval at the time of any improvement or grading plan submittal. The study shall be prepared by a registered civil engineer and shall include existing and proposed hydrologic conditions. Hydraulic calculations are required for all drainage control devices and storm drain lines. (MC 9.14.110). Prior to approval of the related improvement or grading plans, the developer shall submit the approved drainage study, on compact disk, in (.pdf) digital format to the Land Development Division of the Public Works Department.

LD8. (G) Prior to occupancy, the developer shall enter into a Development Impact Fee (DIF) Improvement Credit Agreement to secure credit and reimbursement for the construction of applicable **Indian Street** improvements. If the developer fails to complete this agreement prior to the timing as specified above, no credits or reimbursements will be given. The applicant shall pay Arterial Streets, Traffic Signals, and Interchange Improvements development impact fees adopted by the City Council by resolution. (Ord. 695 § 1.1 (part), 2005) (MC 3.38.030, .040, .050)

LD9. (G) Prior to occupancy, the developer shall enter into a Transportation Uniform Mitigation Fee (TUMF) Improvement Credit Agreement to secure credit and reimbursement for the construction of applicable **Perris Boulevard** improvements. If the developer fails to complete this agreement by the timing as specified above, no credits or reimbursements will be given for any work. Prior to approval of the

TUMF Improvement Credit Agreement, an approved engineer's cost estimate and street improvement plan are required.

LD10. (G) The final conditions of approval issued by the Planning Division subsequent to Planning Commission approval shall be photographically or electronically placed on mylar sheets and included in the Grading and Street Improvement plan sets on twenty-four (24) inch by thirty-six (36) inch mylar and submitted with the plans for plan check. These conditions of approval shall become part of these plan sets and the approved plans shall be available in the field during grading and construction.

Prior to Grading Plan Approval or Grading Permit

LD11. (GPA) Prior to approval of the grading plans, plans shall be drawn on twenty-four (24) inch by thirty-six (36) inch mylar and signed by a registered civil engineer and other registered/licensed professional as required.

LD12. (GPA) Prior to approval of grading plans, the developer shall ensure compliance with the City Grading ordinance, these Conditions of Approval and the following criteria:

a. The project street and lot grading shall be designed in a manner that perpetuates the existing natural drainage patterns with respect to tributary drainage area and outlet points. Unless otherwise approved by the City Engineer, lot lines shall be located at the top of slopes.

b. Any grading that creates cut or fill slopes adjacent to the street shall provide erosion control, sight distance control, and slope easements as approved by the City Engineer.

c. A grading permit shall be obtained from the Public Works Department Land Development Division prior to commencement of any grading outside of the City maintained road right-of-way.

d. All improvement plans are substantially complete and appropriate clearance and at-risk letters are provided to the City. (MC 9.14.030)

e. The developer shall submit a soils and geologic report to the Public Works Department – Land Development Division. The report shall address the soil's stability and geological conditions of the site.

LD13. (GPA) Prior to grading plan approval, the developer shall select and implement treatment control best management practices (BMPs) that are medium to highly effective for treating Pollutants of Concern (POC) for the project. Projects where National Pollution Discharge Elimination System (NPDES) mandates water quality

treatment control best management practices (BMPs) shall be designed per the City of Moreno Valley guidelines or as approved by the City Engineer.

LD14. (GPA) Prior to approval of the grading plans for projects that will result in discharges of storm water associated with construction with a soil disturbance of one or more acres of land, the developer shall submit a Notice of Intent (NOI) and obtain a Waste Discharger's Identification number (WDID#) from the State Water Quality Control Board (SWQCB). The WDID# shall be noted on the grading plans prior to issuance of the first grading permit.

LD15. (GPA) Prior to the grading plan approval, or issuance of a building permit, if a grading permit is not required, the Developer shall submit two (2) copies of the final project-specific Water Quality Management Plan (WQMP) for review by the City Engineer that:

a. Addresses Site Design Best Management Practices (BMPs) such as minimizing impervious areas, maximizing permeability, minimizes directly connected impervious areas to the City's street and storm drain systems, and conserves natural areas;
b. Incorporates Source Control BMPs and provides a detailed description of their implementation;
c. Incorporates Treatment Control BMPs and provides information regarding design considerations;
d. Describes the long-term operation and maintenance requirements for BMPs requiring maintenance; and
e. Describes the mechanism for funding the long-term operation and maintenance of the BMPs.

A copy of the final WQMP template can be obtained on the City's Website or by contacting the Land Development Division of the Public Works Department.

LD16. (GPA) Prior to the grading plan approval, or issuance of a building permit, if a grading permit is not required, the Developer shall record a "Stormwater Treatment Device and Control Measure Access and Maintenance Covenant," to provide public notice of the requirement to implement the approved final project-specific WQMP and the maintenance requirements associated with the WQMP.

A boilerplate copy of the "Stormwater Treatment Device and Control Measure Access and Maintenance Covenant," can be obtained by contacting the Land Development Division of the Public Works Department

LD17. (GPA) Prior to the grading plan approval, or issuance of a building permit, if a grading permit is not required, the Developer shall secure approval of the final project-specific WQMP from the City Engineer. The final project-specific WQMP

shall be submitted at the same time of grading plan submittal. The approved final WQMP shall be submitted to the Storm Water Program Manager on compact disk(s) in Microsoft Word format prior to grading plan approval.

LD18. (GPA) Prior to the grading plan approval, or issuance of a building permit as determined by the City Engineer, the approved final project-specific WQMP shall be incorporated by reference or attached to the project's Storm Water Pollution Prevention Plan as the Post-Construction Management Plan.

LD19. (GPA) Prior to grading plan approval, the developer shall prepare a Storm Water Pollution Prevention Plan (SWPPP) in conformance with the state's Construction Activities Storm Water General Permit. A copy of the current SWPPP shall be kept at the project site and be available for review upon request. The SWPPP shall be submitted to the Storm Water Program Manager on compact disk(s) in Microsoft Word format.

LD20. (GPA) Prior to the approval of the grading plans, the developer shall pay applicable remaining grading plan check fees.

LD21. (GP) Prior to issuance of a grading permit, or building permit when a grading permit is not required, for projects that require a project-specific Water Quality Management Plan (WQMP), a project-specific final WQMP (F-WQMP) shall be approved. Upon approval, a WQMP Identification Number is issued by the Storm Water Management Section and shall be noted on the rough grading plans as confirmation that a project-specific F-WQMP approval has been obtained.

LD22. (GP) Prior to issuance of a grading permit, if the fee has not already been paid prior to map approval or prior to issuance of a building permit if a grading permit is not required, the developer shall pay Area Drainage Plan (ADP) fees. The developer shall provide a receipt to the City showing that ADP fees have been paid to Riverside County Flood Control and Water Conservation District. (MC 9.14.100)

LD23. (GP) Prior to issuance of a grading permit, security, in the form of a cash deposit (preferable), letter of credit, or performance bond shall be required to be submitted as a guarantee of the completion of the grading required as a condition of approval of the project.

LD24. (GP) Prior to issuance of a grading permit, the developer shall pay the applicable grading inspection fees.

Prior to Map Approval or Recordation

LD25. (MA) Prior to approval of the map, the developer shall submit a copy of the Covenants, Conditions and Restrictions (CC&Rs) to the Land Development Division

for review and approval. The CC&Rs shall include, but not be limited to, access easements, reciprocal access, private and/or public utility easements as may be relevant to the project.

LD26. (MA) Prior to approval of the map, all street dedications shall be irrevocably offered to the public and shall continue in force until the City accepts or abandons such offers, unless otherwise approved by the City Engineer. All dedications shall be free of all encumbrances as approved by the City Engineer.

LD27. (MA) Prior to approval of the map, security shall be required to be submitted as a guarantee of the completion of the improvements required as a condition of approval of the project. A public improvement agreement will be required to be executed.

LD28. (MR) Prior to recordation of the map, the developer shall submit the map, on compact disks, in (.dxf) digital format to the Land Development Division of the Public Works Department.

Prior to Improvement Plan Approval or Construction Permit

LD29. (IPA) Prior to approval of the improvement plans, the improvement plans shall be drawn on twenty-four (24) inch by thirty-six (36) inch mylar and signed by a registered civil engineer and other registered/licensed professional as required.

LD30. (IPA) Prior to approval of the improvement plans, the developer shall submit clearances from all applicable agencies, and pay all outstanding plan check fees. (MC 9.14.210)

LD31. (IPA) All public improvement plans prepared and signed by a registered civil engineer in accordance with City standards, policies and requirements shall be approved by the City Engineer in order for the Public Improvement Agreement and accompanying security to be executed.

LD32. (IPA) Prior to approval of the improvement plans, securities and a public improvement agreement shall be required to be submitted and executed as a guarantee of the completion of the improvements required as a condition of approval of the project.

LD33. (IPA) The street improvement plans shall comply with all applicable City standards and the following design standards throughout this project:

a. Corner cutbacks in conformance with City Standard 208 shall be shown on the final map or, if no map is to be recorded, offered for dedication by separate instrument.

b. Lot access to major thoroughfares shall be restricted except at intersections and approved entrances and shall be so noted on the final map. (MC 9.14.100)

c. The minimum centerline and flow line grades shall be one percent unless otherwise approved by the City Engineer. (MC 9.14.020)

d. All street intersections shall be at ninety (90) degrees plus or minus five (5) degrees per City Standard No. 706A, or as approved by the City Engineer. (MC 9.14.020)

LD34. (IPA) Prior to approval of the improvement plans, the plans shall indicate any restrictions on trench repair pavement cuts to reflect the City's moratorium on disturbing newly-constructed pavement less than three years old and recently slurry sealed streets less than one year old. Pavement cuts for trench repairs may be allowed for emergency repairs or as specifically approved in writing by the City Engineer.

LD35. (IPA) Prior to approval of the improvement plans, the developer is required to bring any existing access ramps adjacent to and fronting the project to current ADA (Americans with Disabilities Act) requirements. However, when work is required in an intersection that involves or impacts existing access ramps, those access ramps in that intersection shall be retrofitted to comply with current ADA requirements, unless approved otherwise by the City Engineer.

LD36. (IPA) Prior to approval of the improvement plans, drainage facilities with sump conditions shall be designed to convey the tributary 100-year storm flows. Secondary emergency escape shall also be provided. (MC 9.14.110)

LD37. (IPA) Prior to the approval of the improvement plans, the hydrology study shall show that the 10-year storm flow will be contained within the curb and the 100-year storm flow shall be contained within the street right-of-way. In addition, one lane in each direction shall not be used to carry surface flows during any storm event for street sections equal to or larger than a minor arterial. When any of these criteria is exceeded, additional drainage facilities shall be installed. (MC 9.14.110 A.2)

LD38. (IPA) The project shall be designed to accept and properly convey all off-site drainage flowing onto or through the site. All storm drain design and improvements shall be subject to review and approval of the City Engineer. In the event that the City Engineer permits the use of streets for drainage purposes, the provisions of the Development Code will apply. Should the quantities exceed the street capacity or the use of streets be prohibited for drainage purposes, as in the case where one travel lane in each direction shall not be used for drainage conveyance for emergency vehicle access on streets classified as minor arterials and greater, the

developer shall provide adequate facilities as approved by the Public Works Department – Land Development Division. (MC 9.14.110)

LD39. (CP) All work performed within the City right-of-way requires a construction permit. As determined by the City Engineer, security may be required for work within the right-of-way. Security shall be in the form of a cash deposit or other approved means. The City Engineer may require the execution of a public improvement agreement as a condition of the issuance of the construction permit. All inspection fees shall be paid prior to issuance of construction permit. (MC 9.14.100)

LD40. (CP) Prior to issuance of a construction permit, all public improvement plans prepared and signed by a registered civil engineer in accordance with City standards, policies and requirements shall be approved by the City Engineer.

LD41. (CP) Prior to issuance of construction permits, the developer shall submit all improvement plans on compact disks, in (.dxf) digital format to the Land Development Division of the Public Works Department.

LD42. (CP) Prior to issuance of construction permits, the developer shall pay all applicable inspection fees.

Prior to Building Permit

LD43. (BP) Prior to issuance of a building permit, if the project involves a non-residential subdivision, the map shall be recorded.

LD44. (BP) Prior to issuance of a building permit (excluding model homes), an approval by the City Engineer is required of the water quality control basin(s). The developer shall provide certification to the line, grade, flow test and system invert elevations.

LD45. (BP) Prior to issuance of a building permit, all pads shall meet pad elevations per approved plans as noted by the setting of “Blue-top” markers installed by a registered land surveyor or licensed engineer.

LD46. (BP) Prior to issuance of a building permit, the developer shall submit for review and approval, a Waste Management Plan (WMP) that shows data of waste tonnage, supported by original or certified photocopies of receipts and weight tags or other records of measurement from recycling companies and/or landfill and disposal companies. The Waste Management Plan shall contain the following:

a. The estimated volume or weight of project waste to be generated by material type. Project waste or debris may consist of vegetative materials including trees, tree parts, shrubs, stumps, logs, brush, or any other type of plants that are cleared from a site. Project waste may also include roadwork removal,

rocks, soils, concrete and other material that normally results from land clearing.

b. The maximum volume or weight of such materials that can be feasibly diverted via reuse and recycling.
c. The vendor(s) that the applicant proposes to use to haul the materials.
d. Facility(s) the materials will be hauled to, and their expected diversion rates.
e. Estimated volume or weight of clearing, grubbing, and grading debris that will be landfilled.

Approval of the WMP requires that at least fifty (50) percent of all clearing, grubbing, and grading debris generated by the project shall be diverted, unless the developer is granted an exemption. Exemptions for diversions of less than fifty (50) percent will be reviewed on a case by case basis. (AB939, MC 8.80)

Prior to Certificate of Occupancy

LD47. (CO) Prior to issuance of the last certificate of occupancy or building final, the developer shall pay all outstanding fees.

LD48. (CO) Prior to issuance of a certificate of occupancy, this project is subject to requirements under the current permit for storm water activities required as part of the National Pollutant Discharge Elimination System **(NPDES)** as mandated by the Federal Clean Water Act. In compliance with Proposition 218, the developer shall agree to approve the City of Moreno Valley NPDES Regulatory Rate Schedule that is in place at the time of certificate of occupancy issuance. Following are the requirements:

a. Select one of the following options to meet the financial responsibility to provide storm water utilities services for the required continuous operation, maintenance, monitoring system evaluations and enhancements, remediation and/or replacement, all in accordance with Resolution No. 2002-46.
    i. Participate in the mail ballot proceeding in compliance with Proposition 218, for the Common Interest, Commercial, Industrial and Quasi-Public Use NPDES Regulatory Rate Schedule and pay all associated costs with the ballot process; or
    ii. Establish an endowment to cover future City costs as specified in the Common Interest, Commercial, Industrial and Quasi-Public Use NPDES Regulatory Rate Schedule.

b. Notify the Special Districts Division of the intent to request building permits 90 days prior to their issuance and the financial option selected. The financial option selected shall be in place prior to the issuance of certificate of occupancy. (California Government Code & Municipal Code)

LD49. (CO) The City of Moreno Valley has an adopted Development Impact Fee (DIF) nexus study. All projects unless otherwise exempted shall be subject to the payment of the DIF prior to issuance of occupancy. The fees are subject to the provisions of the enabling ordinance and the fee schedule in effect at the time of occupancy.

LD50. (CO) The City of Moreno Valley has an adopted area wide Transportation Uniform Mitigation Fee (TUMF). All projects unless otherwise exempted shall be subject to the payment of the TUMF prior to issuance of occupancy. The fees are subject to the provisions of the enabling ordinance and the fee schedule in effect at the time of occupancy.

LD51. (CO) Prior to issuance of a certificate of occupancy or building final, the developer shall construct all public improvements in conformance with applicable City standards, except as noted in the Special Conditions, including but not limited to the following applicable improvements:

a. Street improvements including, but not limited to: pavement, base, curb and/or gutter, cross gutters, spandrel, sidewalks, drive approaches, pedestrian ramps, street lights, signing, striping, under sidewalk drains, landscaping and irrigation, medians, redwood header boards, pavement tapers/transitions and traffic control devices as appropriate.

b. Storm drain facilities including, but not limited to: storm drain pipe, storm drain laterals, open channels, catch basins and local depressions.

c. City-owned utilities.

d. Sewer and water systems including, but not limited to: sanitary sewer, potable water and recycled water.

e. Under grounding of existing and proposed utility lines less than 115,000 volts.

f. Relocation of overhead electrical utility lines including, but not limited to: electrical, cable and telephone.

LD52. (CO) Prior to issuance of a certificate of occupancy or building final, all existing and new utilities adjacent to and on-site shall be placed underground in accordance with City of Moreno Valley ordinances. (MC 9.14.130)

LD53. (CO) Prior to issuance of a certificate of occupancy or building final for any Commercial/Industrial facility, whichever occurs first, the owner may have to secure coverage under the State's General Industrial Activities Storm Water Permit as issued by the State Water Resources Control Board.

SPECIAL CONDITIONS

LD54. Prior to parcel map approval, the map shall show the following:

a. A 4-foot minimum pedestrian right-of-way dedication behind any driveway approach per City Standard 118C, on Perris Boulevard, Indian Street, and Grove View Road.

b. A 2-foot public access easement for the portions of sidewalk which are outside of the public right-of-way, along Perris Boulevard and Indian Street.

c. The appropriate additional right-of-way required for a bus turn-out on Perris Boulevard as depicted on the approved project plans and as conditioned by the City's Transportation Department.

d. Corner cutback right-of-way dedications per City Standard 208 at the southeast corner of Indian Street and Grove View Road and the southwest corner of Perris Boulevard and Grove View Road.

LD55. Prior to parcel map approval, the Developer shall guarantee the construction of the following improvements by entering into a public improvement agreement and posting security. The improvements shall be completed prior to occupancy of the first building or as otherwise determined by the City Engineer.

a. Perris Boulevard, Divided Arterial, City Standard 103C (110-foot RW / 86-foot CC) shall be constructed to half-width plus an additional 18 feet east of the centerline, along the entire project's east frontage. Additional right-of-way dedications at driveway approaches as well as a 2-foot pedestrian access easement, along the project's west property line, shall be shown on the parcel map. Improvements shall consist of, but not be limited to, pavement, base, curb, gutter, sidewalk, driveway approaches, drainage structures, any necessary offsite improvement transition/joins to existing, streetlights, pedestrian ramps, removal/relocation and/or undergrounding of any power poles with overhead utility lines less than 115,000 volts, and dry and wet utilities.

b. Indian Street, Minor Arterial, Modified City Standard 105A (88-foot RW / 64-foot CC) shall be constructed to half-width plus an additional 18 feet west of the centerline, along the entire project's east frontage. Additional right-of-way dedications at driveway approaches as well as a 2-foot pedestrian access easement, along the project's west property line, shall be shown on the parcel map. Improvements shall consist of,

but not be limited to, pavement, base, curb, gutter, sidewalk, driveway approaches, drainage structures, streetlights, pedestrian ramps, removal/relocation and/or undergrounding of any power poles with overhead utility lines less than 115,000 volts, and dry and wet utilities.

c. Grove View Road, Industrial Collector, City Standard 106 (78-foot RW / 56-foot CC) shall be constructed to half-width plus an additional 18 feet north of the centerline, along the entire project's north frontage. Additional right-of-way dedications at driveway approaches along the project's north property line, shall be shown on the parcel map.. Improvements shall consist of, but not be limited to, pavement, base, curb, gutter, sidewalk, driveway approaches, drainage structures, any necessary offsite, streetlights, pedestrian ramps, dry and wet utilities.

d. Driveway approaches shall be constructed per City Standard No. 118C or as modified as shown on the project plans. The parcel map shall show an additional 4-foot minimum right-of-way dedication behind driveway approaches. No decorative pavers shall be placed within the public right-of-way. Certain project entrance(s) may be required to be constructed as a public street intersection.

e. Pavement core samples of existing pavement may be taken and findings submitted to the City for review and consideration of pavement improvements. The City will determine the adequacy of the existing pavement structural section. If the existing pavement structural section is found to be adequate, the developer may still be required to perform a one-tenth inch grind and overlay or slurry seal depending on the severity of existing pavement cracking, as required by the City Engineer. If the existing pavement section is found to be inadequate, the Developer shall replace the pavement to meet or exceed the City's pavement structural section standard.

LD56. Prior to precise grading plan or improvement plan approval, as applicable, the plans shall show all driveway approaches to be constructed per City Standard Plan 118C modified, as accepted by the City. There shall be 4-foot minimum wide pedestrian sidewalk area at 2% maximum behind the conventional right-of-way. A minimum 4-foot pedestrian right-of-way dedication shall be made on the final parcel map PM 35672.

LD57. Prior to precise grading plan approval, the grading plan shall show any proposed trash enclosure as dual bin; one bin for trash and one bin for recyclables. The trash enclosure shall be per City Standard Plan 627.

LD58. Prior to precise grading plan approval, the grading plan shall show that the lowest finished floor elevation is a minimum of one foot above the base flood elevation.

LD59. Prior to precise grading plan approval, the grading plans shall clearly show that the parking lot conforms to City standards. The parking lot shall be 5% maximum, 1% minimum, 2% maximum at or near any disabled parking stall and travel way. Ramps, curb openings and travel paths shall all conform to current ADA standards as outlined in Department of Justice's "ADA Standards for Accessible Design", Excerpt from 28 CFR Part 36. (www.usdoj.gov) and as approved by the City's Building and Safety Division.

LD60. Prior to occupancy, the developer shall obtain an encroachment permit from Riverside County Flood Control & Water Conservation District in order to connect proposed onsite storm drain to the Perris Valley Channel Lateral B.

LD61. Prior to occupancy, the developer shall make a good faith effort to cause Riverside County Flood Control & Water Conservation District to dedicate additional public street right-of-way on Indian Street and Perris Boulevard along their property frontage between the project's south property line and the bridges.

LD62. Prior to occupancy, all overhead utility lines less than 115,000 volts fronting or within the entire project site boundary shall be placed underground per Section 9.14.130C of the City Municipal Code.

LD63. The Applicant shall select and implement treatment control BMPs that are medium to highly effective for treating Pollutants of Concern (POC) for the project. POC include project pollutants associated with a 303(d) listing or a Total Maximum Daily Load (TMDL) for receiving waters. Project POC include sediment/turbidity, nutrients, oxygen demanding substances, and pathogens (bacteria and viruses). Exhibit C of the document, "Riverside County Water Quality Management Plan for Urban Runoff" dated July 24, 2006 shall be consulted for determining the effectiveness of proposed treatment BMPs.

LD64. Overall, the proposed treatment control concept is accepted as the conceptual treatment control BMP for the proposed site.

LD65. The Applicant has proposed to incorporate the use of vegetated swales, hydrodynamic separators, and sand filters. Final design details of the treatment control BMPs must be provided in the first submittal of the F-WQMP. The size of the treatment control BMPs is to be determined using the procedures set forth in Exhibit C of the Riverside County Guidance Document.

The Applicant acknowledges that more area than currently shown on the plans may be required to treat site runoff as required by the WQMP guidance.

LD66. The Applicant shall substantiate the applicable Hydrologic Condition of Concern (HCOC) (WQMP Section IV) in the F-WQMP. The HCOC designates that the project will comply with Condition A; therefore, the condition must be addressed in the F-WQMP.

LD67. The Applicant shall, prior to building or grading permit closeout or the issuance of a certificate of occupancy, demonstrate:

a. That all structural BMPs have been constructed and installed in conformance with the approved plans and specifications;

b. That all structural BMPs described in the F-WQMP have been implemented in accordance with approved plans and specifications;

c. That the Applicant is prepared to implement all non-structural BMPs included in the F-WQMP, conditions of approval, and building/grading permit conditions; and

d. That an adequate number of copies of the approved F-WQMP are available for the future owners/occupants of the project.

PUBLIC WORKS DEPARTMENT – SPECIAL DISTRICTS DIVISION

Note: All Special Conditions, Modified Conditions, or Clarification of Conditions are in bold lettering. All other conditions are standard to all or most development projects.

Acknowledgement of Conditions

The following items are Special Districts' Conditions of Approval for project **PA09-0004**; this project shall be completed at no cost to any Government Agency. All questions regarding Special Districts' Conditions including but not limited to, intent, requests for change/modification, variance and/or request for extension of time shall be sought from the Special Districts Division of the Public Works Department 951.413.3480. The applicant is fully responsible for communicating with each designated Special Districts staff member regarding their conditions.

General Conditions

SD1. The parcel(s) associated with this project have been incorporated into the Moreno Valley Community Services Districts Zones A (Parks & Community Services) and C (Arterial Street Lighting). All assessable parcels therein shall be subject to annual Zone A and Zone C charges for operations and capital improvements.

SD2. Plans for parkway, median, slope, and/or open space landscape areas designated on the tentative map or in these Conditions of Approval for incorporation into Moreno Valley Community Services District **Zone M**, shall be prepared and submitted in accordance with the *City of Moreno Valley Public Works Department Landscape Design Guidelines*. Contact the Special Districts Division of the Public Works Department to obtain copies of this document.

SD3. The developer, or the developer's successors or assignees shall be responsible for all parkway and/ or median landscaping maintenance until such time as the District accepts maintenance duties.

SD4. Any damage to existing landscape easement areas due to project construction shall be repaired/replaced by the developer, or developer's successors in interest, at no cost to the Moreno Valley Community Services District.

Prior to Building Permit Issuance

SD5. (BP) This project has been identified to be included in the formation of a Community Facilities District (Mello-Roos) for **Public Safety** services, including but not limited to Police, Fire Protection, Paramedic Services, Park Rangers, and Animal Control services. The property owner(s) shall not protest the formation; however, they retain the right to object to the rate and method of maximum special tax. In compliance

with Proposition 218, the developer shall agree to approve the mail ballot proceeding (special election) for either formation of the CFD or annexation into an existing district that may already be established. The Developer must notify Special Districts of intent to request building permits 90 days prior to their issuance. (California Government Code)

SD6. (BP) This project is conditioned to provide a funding source for the capital improvements and/or maintenance for the **Perris Blvd.** median landscape. In order for the Developer to meet the financial responsibility to maintain the defined service, one of the following options shall be selected:

a. Participate in the mail ballot proceeding in compliance with Proposition 218, for Moreno Valley Community Services District **Zone M** (Commercial, Industrial and Multifamily Improved Median Maintenance), and pay all associated costs with the ballot process; or

b. Establish an endowment to cover the future maintenance costs of the landscaped area.

The developer must notify Special Districts of intent to request building permits 90 days prior to their issuance and the financial option selected to fund the continued maintenance.

SD7. *Commercial* (BP) If Land Development, a Division of the Public Works Department, requires this project to supply a funding source necessary to provide, but not limited to, stormwater utilities services for the monitoring of on site facilities and performing annual inspections of the affected areas to ensure compliance with state mandated stormwater regulations, the developer must notify Special Districts 90 days prior to the City's issuance of a building permit and the financial option selected to fund the continued maintenance. (California Government Code)

SD8. (BP) Prior to release of building permit, the developer, or the developer's successors or assignees, shall record with the County Recorder's Office a **Declaration of Covenant and Acknowledgement of Assessments** for each assessable parcel therein, whereby the developer covenants and acknowledges the existence of the Moreno Valley Community Services District, its established benefit zones, and that said parcel(s) is (are) liable for payment of annual benefit zone charges and the appropriate National Pollutant Discharge Elimination System (NPDES) maximum regulatory rate schedule when due. A copy of the recorded Declaration of Covenant and Acknowledgement of Assessments shall be submitted to the Special Districts Division.

**For a copy of the Declaration of Covenant and Acknowledgement of the Assessments form, please contact Special Districts, phone 951.413.3480.

SD9. (BP) Final median, parkway, slope, and/or open space landscape/irrigation plans for those areas designated on the tentative map or in these Conditions of Approval for inclusion into Community Services District shall be reviewed and approved by the Community Development Department–Planning Division, and the Public Works Department–Special Districts and Transportation Divisions prior to the issuance of the first Building Permit.

Prior to Certificate of Occupancy

SD10. (CO) Prior to issuance of a Certificate of Occupancy or building final, the developer shall submit a letter to Special Districts from the Utility service responsible for providing final electrical energy connections and energization of the streetlights for the development project. The letter must identify, by pole number, each streetlight in the development and state the corresponding date of its electrical energization.

SD11. (CO) All parkway and/or median landscaping specified in the tentative map or in these Conditions of Approval shall be constructed prior to the issuance of the Certificate of Occupancy/Building Final for this project.

SD12. (CO) Prior to the issuance of the first Certificate of Occupancy or building final for this project, the developer shall pay Advanced Energy fees for all applicable Zone B (Residential Street Lighting) and/or Zone C (Arterial Street Lighting and Intersection Lighting) streetlights required for this development. The developer shall provide a receipt to the Special Districts Division showing that the Advanced Energy fees have been paid in full for the number of streetlights to be accepted into the CSD Zone B and/or Zone C program. Payment shall be made to the City of Moreno Valley, as collected by the Land Development Division, based upon the Advanced Energy fee rate at the time of payment and as set forth in the current Listing of City Fees, Charges and Rates, as adopted by City Council. Any change in the project which may increase the number of streetlights to be installed will require payment of additional Advanced Energy fees at the then current fee.

PUBLIC WORKS DEPARTMENT – TRANSPORTATION ENGINEERING DIVISION

Note: All Special conditions are in bold lettering. All other conditions are standard to all or most development projects.

Based on the information contained in our standard review process we recommend the following conditions of approval be placed on this project:

GENERAL CONDITIONS

TE1. Conditions of approval may be modified if project is phased or altered from any approved plans.

TE2. Perris Boulevard is classified as a Divided Arterial (110'RW/86'CC) per City Standard Plan No. 103C. The sidewalk shall be curb-separated. Any modifications or improvements undertaken by this project shall be consistent with the City's standards for this facility.

TE3. Indian Street is designated as a Minor Arterial (88'RW/64'CC) per City Standard Plan No. 105A. Any modifications or improvements undertaken by this project shall be consistent with the City's standards for this facility.

TE4. Grove View Road is designated as an Industrial Collector (78'RW/56'CC) per City Standard Plan No. 106. Any modifications or improvements undertaken by this project shall be consistent with the City's standards for this facility.

PRIOR TO GRADING PERMIT

TE5. (GP) Prior to issuance of a grading permit, the project applicant shall submit conceptual striping plans for improvements identified in condition TE11 as well as Indian Street for the City Traffic Engineer's approval.

PRIOR TO IMPROVEMENT PLAN APPROVAL OR CONSTRUCTION PERMIT

TE6. The driveways less than 40 feet in width shall conform to Section 9.16.250, and Table 9.16.250A of the City's Development Code - Design Guidelines, and City Standard Plan No. 118C. Driveways wider than 40' shall be designed as intersections with pedestrian access ramps per City standards.

TE7. Sight distance at driveways and on streets shall conform to City of Moreno Valley Standard No. 125A, B, C at the time of preparation of final grading, landscape, and street improvements.

TE8. Prior to the final approval of the street improvement plans, a signing and striping plan shall be prepared per City of Moreno Valley Standard Plans - Section 4 for all streets with a cross section of 66'/44' and wider.

TE9. Prior to issuance of a construction permit, construction traffic control plans prepared by a qualified, Registered Civil or Traffic engineer may be required.

TE10. Prior to the final approval of the street improvement plans, the project applicant shall design Perris Boulevard to include a bus bay per City Standard

Plan No. 121 in the southbound direction, south of Grove View Road. The bus bay may be designed to serve as a combination right turn lane/bus bay to the satisfaction of the City Engineer.

TE11. Prior to the final approval of the street improvement plans, the project applicant shall design the intersection/traffic signal at Perris Boulevard and the South Project Driveway to provide the following (at a minimum):

Northbound: One left turn lane, one shared through/right turn lane
Southbound: One left turn lane, one through lane, one right turn lane
Eastbound: One left turn lane, one shared through/right turn lane
Westbound: One left turn lane, one shared through/right turn lane

NOTE: The curb return radii on the northwest/southwest corners shall be 50 feet.

TE12. Prior to the final approval of the street improvement plans, the project applicant shall design and modify the intersection of Perris Boulevard at Grove View Road to include a 200' northbound left turn lane with raised median. This modification may include relocation of the traffic detector loops and other traffic signal modifications.

PRIOR TO BUILDING PERMIT

TE13. (BP) Prior to issuance of a building permit, traffic signal plans shall be prepared by a registered civil or electrical engineer and shall be submitted to the City Traffic Engineer for the following intersections:

- **Perris Boulevard at South Project Driveway (signal modifications).**
- **Perris Boulevard at Grove View Road (signal modifications).**

TE14. (BP) Prior to issuance of a building permit, the project applicant shall make a fair-share contribution in the amount of $45,150 to the City of Moreno Valley for the construction of a traffic signal at Perris Boulevard and Suburban Lane. As this traffic signal is not in any existing fee program, payment of DIF and/or TUMF are not considered satisfaction of this obligation.

PRIOR TO CERTIFICATE OF OCCUPANCY OR BUILDING FINAL

TE15. (CO) Prior to issuance of a certificate of occupancy, all approved signing and striping shall be installed per current City Standards and the approved plans.

TE16. (CO) Each gated entrance shall be provided with the following, or as approved by the City Traffic Engineer:

a) A storage lane with a minimum of 75 feet queuing length for entering traffic.
b) Appropriate signing and striping.

All of these features must be kept in working order.

TE17. (CO) Prior to the issuance of a certificate of occupancy, the project applicant shall construct the traffic signal modifications identified in TE13. Construction shall be completed per the approved plans and coordinated with the street improvements.

TE18. (CO) Prior to issuance of a certificate of occupancy, the project applicant shall construct the intersection/roadway improvements identified in TE10, TE11, and TE12 per the approved plans.

TE19. (CO) Prior to the issuance of a certificate of occupancy for the project, driveway access at the following locations will be installed as follows:

- **North Perris Boulevard Driveway: Right-in, right-out access by means of a raised median.**
- **South Perris Boulevard Driveway: Full access by means of a traffic signal.**
- **Grove View Road Driveways: Full access.**
- **Indian Street Driveways: Full access.**

NOTE: All truck driveways shall have curb return radii of 50 feet.

PRIOR TO ACCEPTANCE OF STREETS INTO THE CITY-MAINTAINED ROAD SYSTEM

TE20. Prior to the acceptance of streets into the City-maintained road system, all approved traffic control and signing and striping shall be installed per current City Standards and the approved plans.

PUBLIC WORKS DEPARTMENT – MORENO VALLEY UTILITY

Note: All Special Conditions, Modified Conditions, or Clarification of Conditions are in bold lettering. All other conditions are standard to all or most development projects.

Acknowledgement of Conditions

The following items are Moreno Valley Utility's Conditions of Approval for project(s) PA09-0004 & PA09-0012; this project shall be completed at no cost to any Government Agency. All questions regarding Moreno Valley Utility's Conditions including but not limited to, intent, requests for change/modification, variance and/or request for extension of time shall be sought from Moreno Valley Utility (the Electric Utility Division) of the Public Works Department 951.413.3512. The applicant is fully responsible for communicating with Moreno Valley Utility staff regarding their conditions.

PRIOR TO RECORDATION OF FINAL MAP

MVU1. (R) For single family subdivisions, a three foot easement along each side yard property line shall be shown on the final map and offered for dedication to the City of Moreno Valley for public utility purposes, unless otherwise approved by the City Engineer. If the project is a multi-family development, townhome, condominium, apartment, commercial or industrial project, and it requires the installation of electric distribution facilities within common areas, a non-exclusive easement shall be provided to Moreno Valley Utility to include all such common areas. All easements shall include the rights of ingress and egress for the purpose of operation, maintenance, facility repair, and meter reading.

PRIOR TO ISSUANCE OF BUILDING PERMIT

MVU2. (BP) **City of Moreno Valley Municipal Utility Service – Electrical Distribution**: Prior to issuance of building permit, the developer shall submit a detailed engineering plan showing design, location and schematics for the utility system to be approved by the City Engineer. In accordance with Government Code Section 66462, the Developer **shall** execute an agreement with the City providing for the installation, construction, improvement and dedication of the utility system following recordation of final map and concurrent with trenching operations and other subdivision improvements so long as said agreement incorporates the approved engineering plan and provides financial security to guarantee completion and dedication of the utility system.

The Developer **shall** coordinate and receive approval from the City Engineer to install, construct, improve, and dedicate to the City, or the City's designee, all utility infrastructure (including but not limited to conduit, equipment, vaults, ducts, wires, switches, conductors, transformers, resistors, amplifiers, and "bring-up"

facilities including electrical capacity to serve the identified development and other adjoining/abutting/ or benefiting projects as determined by Moreno Valley Utility) – collectively referred to as "utility system" (to and through the development), along with any appurtenant real property easements, as determined by the City Engineer to be necessary for the distribution and /or delivery of any and all "utility services" to each lot and unit within the Tentative Map. For purposes of this condition, "utility services" shall mean electric, cable television, telecommunication (including video, voice, and data) and other similar services designated by the City Engineer. "Utility services" shall not include sewer, water, and natural gas services, which are addressed by other conditions of approval. Properties within development will be subject to an electrical system capacity charge and that contribution will be collected prior to issuance of building permits.

The City, or the City's designee, shall utilize dedicated utility facilities to ensure safe, reliable, sustainable and cost effective delivery of utility services and maintain the integrity of streets and other public infrastructure. Developer shall, at developer's sole expense, install or cause the installation of such interconnection facilities as may be necessary to connect the electrical distribution infrastructure within the project to the Moreno Valley Utility owned and controlled electric distribution system. Alternatively, developer may cause the project to be included in or annexed to a community facilities district established or to be established by the City for the purpose of financing the installation of such interconnection and distribution facilities. The project shall be deemed to have been included in or annexed to such a community facilities district upon the expiration of the statute of limitations to any legal challenges to the levy of special taxes by such community facilities district within the property. The statute of limitations referred to above will expire 30 days after the date of the election by the qualified electors within the project to authorize the levy of special taxes and the issuance of bonds.

MVU3. This Project is **subject** to a Reimbursement Agreement. The Project is responsible for a proportionate share of costs associated with electrical distribution infrastructure previously installed that directly benefits the Project. The developer shall be responsible to pay to the City of Moreno Valley the sum of **$423,150.00** for this electrical distribution infrastructure prior to the issuance of building permits.

POLICE DEPARTMENT

Note: All Special conditions are in bold lettering. All other conditions are standard to all or most development projects

Standard Conditions

PD1. Prior to the start of any construction, temporary security fencing shall be erected. The fencing shall be a minimum of six (6) feet high with locking, gated access and shall remain through the duration of construction. Security fencing is required if there is: construction, unsecured structures, unenclosed storage of materials and/or equipment, and/or the condition of the site constitutes a public hazard as determined by the Public Works Department. If security fencing is required, it shall remain in place until the project is completed or the above conditions no longer exist. (MC 9.08.080)

PD2. (GP) Prior to the issuance of grading permits, a temporary project identification sign shall be erected on the site in a secure and visible manner. The sign shall be conspicuously posted at the site and remain in place until occupancy of the project. The sign shall include the following:

a. The name (if applicable) and address of the development.

b. The developer's name, address, and a 24-hour emergency telephone number. (MC 9.08.080)

PD3. (CO) Prior to the issuance of a Certificate of Occupancy, an Emergency Contact Information Form for the project shall be completed at the permit counter of the Community & Economic Development Department - Building Division for routing to the Police Department. (MC 9.08.080)

Final

ENVIRONMENTAL IMPACT REPORT

VIP MORENO VALLEY

STATE CLEARINGHOUSE NO. 2011081084

CITY OF MORENO VALLEY

RIVERSIDE COUNTY, CALIFORNIA

LSA

June 27, 2012

Final

ENVIRONMENTAL IMPACT REPORT

VIP MORENO VALLEY

STATE CLEARINGHOUSE NO. 2011081084

CITY OF MORENO VALLEY

RIVERSIDE COUNTY, CALIFORNIA

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LSA Project No. VOG1001

LSA

June 27, 2012

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APPENDICES

1. INTRODUCTION

The Final Environmental Impact Report (EIR) for the proposed VIP Moreno Valley project is composed of the Draft EIR State Clearinghouse No. 2011081084 and Appendices; the Response to Comments; and the Findings, Statement of Overriding Considerations, Staff Reports, and Resolutions. Specifically, this document portion of the EIR includes the Comments and Responses volume of the Final EIR, EIR modifications or errata, and the Mitigation Monitoring and Reporting Program (MMRP). The purpose of this document is to respond to all comments received by the City of Moreno Valley (City) regarding the environmental information and analyses contained in the Draft EIR. Additionally, any corrections to the text and figures of the Draft EIR, generated either from responses to comments or independently by the City, are stated in this volume of the Final EIR. The Draft EIR text has not been modified to reflect these clarifications.

1.1 CONTENT AND FORMAT

Subsequent to this introductory section, Section 2.0 contains copies of each comment letter received on the Draft EIR, along with annotated responses to each comment contained within the letters, Section 3.of this document contains corrections and errata to the Draft EIR. Section 4.0 contains the Mitigation Monitoring and Reporting Plan, which includes additional measures developed as a part of this Final EIR.

1.2 PUBLIC REVIEW OF THE DRAFT EIR

As required by the California Environmental Quality Act (CEQA) Guidelines Section 15087, a Notice of Completion (NOC) of the Draft EIR State Clearinghouse No. 2011081084 for the VIP Moreno Valley project was filed with the State Clearinghouse on April 20, 2012 and the Notice of Availability (NOA) of the Draft EIR was filed with the Riverside County Clerk on April 20, 2012

The Draft EIR was circulated for public review for a period of 45 days, from April 20, 2012 to June 4, 2012. Copies of the Draft EIR were distributed to all Responsible Agencies and to the State Clearinghouse in addition to various public agencies, citizen groups, and interested individuals. Copies of the Draft EIR were also made available for public review at the City Planning Department, at one area library, and on the internet.

A total of ten comment letters was received. Seven of the comment letters received were from Federal, State, regional, or local agencies. One comment letter was received from a citizen group and two letters from individuals. All ten letters have been responded to within this document. Comments that address environmental issues are thoroughly responded to in Section 2.0.

1.3 POINT OF CONTACT

The Lead Agency for this Project is the City of Moreno Valley. Any questions or comments regarding the preparation of this document, its assumptions, or its conclusions, should be referred to:

Jeff Bradshaw, Associate Planner
City of Moreno Valley, Planning Division
14177 Frederick Street
Post Office Box 88005
Moreno Valley, California 92553
Phone: (951) 413-3224
e-mail: jeffreyb@moval.com

1.4 PROJECT SUMMARY

The following information is summarized from the Project Description in the Draft EIR. For additional detail in regard to Project characteristics and Project-related improvements, along with analyses of the Project's potential environmental impacts, please refer to Draft EIR Sections 3.0 and 4.0, respectively.

1.4.1 Project Location

The project site is located in the City of Moreno Valley, Riverside County. The approximately 71-acre site is generally located on the southwest corner of Perris Boulevard and Grove View Road. The Perris Valley Storm Drain Lateral B channel forms the southern boundary of the site while Indian Street forms the western boundary.

1.4.2 Proposed Project

The proposed development would result in the construction and operation of approximately 1,616,133 square feet of distribution warehouse uses on an approximately 71-acre site. The single building will be constructed with 264 vertical-lift dock-high roll up doors on the long (north and south) sides of the building to allow access for the loading and unloading of products from diesel truck/trailers. The building will include a total of approximately 44,000 square feet of business office space for the management of the warehouse. Parking at the warehouse will be provided for 368 trucks and trailers as well as 589 parking stalls for passenger vehicles in accordance with City standards for light industrial uses.

1.4.3 Project Objectives

The purpose of the proposed project is to provide a new facility specializing in warehouse distribution services. Upon development, the proposed project will achieve the following:

Create employment-generating opportunities for the citizens of Moreno Valley and surrounding communities;

Encourage industrial development as attractive and productive uses while minimizing conflicts with the surrounding existing uses;

Encourage warehouse distribution services that take advantage of the area's close proximity to various freeways and transportation corridors;

Provide the infrastructure improvements required to meet project needs in an efficient and cost-effective manner;

Encourage new development consistent with the capacity and municipal service capabilities;

Provide a high density, high-quality large-scale industrial development to provide jobs for residents at a variety of income levels;

Facilitate the efficient and cost-effective movement of goods in and through the City, which, in turn, allows the City to compete economically on a domestic and international scale;

Provide an industrial warehouse facility that meets the substantial and unmet demands of businesses located in the City and County;

Cluster industrial warehouse uses near efficient access points to the state highway system to reduce traffic congestion on surface streets and to reduce associated air pollutant emissions from vehicle sources;

Implement the City's General Plan Industrial/Business Park Land Use designations that are applicable to the site;

Accommodate new development that channels land uses in a phased, orderly manner and is coordinated with the provision of necessary infrastructure and public improvements;

Provide new development that will assist the City in obtaining fiscal balance in the years and decades ahead; and

Address community circulation, both vehicular and pedestrian, utilizing available capacity within the existing circulation system, and provide fair share improvements to various future-year deficient intersections or road segments.

1.4.4 Required Permits and Discretionary Actions

The following discretionary actions are anticipated to be taken by the City of Moreno Valley as part of the proposed project:

Tentative Parcel Map approval (TPM 36162);

Certification of Environmental Impact Report; and

Site Plan approval.

Other non-discretionary actions anticipated to be taken by the City at the Staff level as part of the proposed project include the following:

Approval of a Storm Water Pollution Prevention Plan (SWPPP) to accommodate site runoff during construction. Approval of a Water Quality Management Plan (WQMP) to mitigate for post-construction runoff flows.

Issuance of a Grading permit that requires approval of a grading plan, approval of the final drainage study, approval of the Final WQMP, obtaining an NOI and WDID number, and satisfying those conditions of approval required prior to grading.

Issuance of an Encroachment permit for any construction work done in any City-controlled right-of-way. Encroachment permit issuance requires approval of improvement plans, public improvement agreement execution with securities posted, and satisfying those conditions of approval required prior to grading.

Issuance of a Building permit. The comprehensive building permit includes building, plumbing, mechanical, and electrical permits.

Approvals and permits required by other agencies include:

A National Pollutant Discharge Elimination System (NPDES) permit from the Regional Water Quality Control Board (RWQCB) to ensure that downstream water quality is not worsened.

Approval of water and sewer improvement plans by the Eastern Municipal Water District.

Approval from the City and Riverside County Flood Control and Water Conservation District to ensure that construction site drainage velocities are equal to or less than the pre-construction conditions.

2. RESPONSE TO COMMENTS

A total of ten comment letters was received. Seven of the comment letters received were from Federal, State, regional, or local agencies. One comment letter was received from a citizen group and two letters from individuals. All ten letters have been responded to within this document. Comments that address environmental concerns have been thoroughly addressed. Comments that (1) do not address the adequacy or completeness of the Draft EIR; (2) do not raise environmental issues; or (3) do request the incorporation of additional information not relevant to environmental issues do not require a response, pursuant to Section 15088(a) of the State CEQA Guidelines.

Section 15088 of the State CEQA Guidelines, Evaluation of and Response to Comments, states:

a) The lead agency shall evaluate comments on environmental issues received from persons who reviewed the draft EIR and shall prepare a written response. The lead agency shall respond to comments received during the noticed comment period and any extensions and may respond to late comments.

b) The written response shall describe the disposition of significant environmental issues raised (e.g., revisions to the proposed project to mitigate anticipated impacts or objections). In particular, major environmental issues raised when the lead agency's position is at variance with recommendations and objections raised in the comments must be addressed in detail, giving the reasons that specific comments and suggestions were not accepted. There must be good faith, reasoned analysis in response. Conclusory statements unsupported by factual information will not suffice.

c) The response to comments may take the form of a revision to the draft EIR or may be a separate section in the final EIR. Where the response to comments makes important changes in the information contained in the text of the draft EIR, the lead agency should either:

    1. Revise the text in the body of the EIR; or

    2. Include marginal notes showing that the information is revised in the responses to comments.

Information provided in this volume of the Final EIR clarifies, amplifies, or makes minor modifications to the Draft EIR. No significant changes have been made to the information contained in the Draft EIR as a result of the responses to comments, and no significant new information has been added that would require recirculation of the document.

An Errata to the EIR (Section 3.0) has been prepared to make minor corrections and clarifications to the Draft EIR as a result of City review and comments received during the public review period. Therefore, this Response to Comments document, along with the Errata is included as part of the Final EIR for consideration by the Planning Commission prior to a vote to certify the Final EIR.

2.1 LIST OF PERSONS, ORGANIZATIONS, AND PUBLIC AGENCIES COMMENTING ON THE DRAFT EIR

The persons, organizations, and public agencies that submitted comments regarding the Draft EIR through June 4, 2012, are listed below. A total of ten comment letters was received. Seven of the comment letters received were from Federal, State, regional, or local agencies. One comment letter

was received from a citizen group and two letters from individuals. Each comment letter received is indexed with a number below.

Comment Letters Received Regarding the Draft EIR

A **California Native American Heritage Commission (May 14, 2012)**
Dave Singleton, Program Analyst

B **California Department of Fish and Game (May 21, 2012)**
Jeff Brandt, Senior Environmental Specialist

C **Gerald M. Budlong (May 31, 2012)**

D **Johnson & Sedlack (June 1, 2012)**
Ray Johnson, AICP, Esq.

E **Sierra Club, San Gorgonio Chapter (June 3, 2012)**
George Hague, Conservation Chair
Moreno Valley Chapter

F **California Department of Transportation, District 8 (June 4, 2012)**
Daniel Kopulsky, Office Chief
Community Planning/IGR-CEQA

G **Eastern Municipal Water District (June 4, 2012)**
Joseph B. Lewis
Director of Engineering Services

H **United States Fish and Wildfire Service (e-mail June 4, 2012)**
Nicole Ronan, Fish and Wildfire Service

I **Riverside County Flood Control and Water Conservation District**
Mekbib Degaga, Engineering Project Manager

J **California Governor's Office of Planning and Research, State Clearinghouse**
Scott Morgan, Director State Clearinghouse

2.2 FORMAT OF RESPONSES TO COMMENTS

Aside from the courtesy statements, introductions, and closings, individual comments within the body of each letter have been identified and numbered. A copy of each comment letter and the City's responses are included in this section. Brackets delineating the individual comments and an alphanumeric identifier have been added to the right margin of the letter. Responses to each comment identified are included on the page(s) following each comment letter. Responses to comments were sent to the agencies that provided comments.

In the process of responding to the comments, there were minor revisions to the Environmental Impact Report. None of the comments or responses constitutes "significant new information" (*CEQA Guidelines* Section 15073.5) that would require recirculation of the Environmental Impact Report.

Letter A

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
ds_nahc@pacbell.net

May 11, 2012

RECEIVED
MAY 14 2012
CITY OF MORENO VALLEY
Planning Division

Mr. Jeff Bradshaw, Associate Planner
City of Moreno Valley Community & Economic Development Department
14177 Frederick Street
Moreno Valley, CA 92552

Re: SCH#2011081084; CEQA Notice of Completion; draft Environmental Impact Report (DEIR) for the **"VIP Moreno Valley Project – PA09-0004 (plot Plan) PA09-0012 (TPM 36162) P11-020 (EIR);"** located in the City of Moreno Valley; Riverside, California.

Dear Mr. Bradshaw:

The Native American Heritage Commission (NAHC), the State of California 'Trustee Agency' for the protection and preservation of Native American cultural resources pursuant to California Public Resources Code §21070 and affirmed by the Third Appellate Court in the case of EPIC v. Johnson (1985: 170 Cal App. 3rd 604). 1

This letter includes state and federal statutes relating to Native American historic properties of religious and cultural significance to American Indian tribes and interested Native American individuals as 'consulting parties' under both state and federal law. State law also addresses the freedom of Native American Religious Expression in Public Resources Code §5097.9. 1

The California Environmental Quality Act (CEQA – CA Public Resources Code 21000-21177, amendments effective 3/18/2010) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per the CEQA Guidelines defines a significant impact on the environment as 'a substantial, or potentially substantial, adverse change in any of physical conditions within an area affected by the proposed project, including ...objects of historic or aesthetic significance." In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE), and if so, to mitigate that effect. The NAHC did conduct a Sacred Lands File (SLF) search within the 'area of potential effect (APE) with the following results: Native American cultural resources were not found within the APE. However, the absence of archaeological resources does not preclude their existence at the subsurface level and may be exposed during construction activity. 2 3

The NAHC "Sacred Sites,' as defined by the Native American Heritage Commission and the California Legislature in California Public Resources Code §§5097.94(a) and 5097.96. Items in the NAHC Sacred Lands Inventory are confidential and exempt from the Public Records Act pursuant to California Government Code §6254 (r). 4

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries of cultural resources or burial sites once a project is underway. 5

Culturally affiliated tribes and individuals may have knowledge of the religious and cultural significance of the historic properties in the project area (e.g. APE). We strongly urge that you make contact with the list of Native American Contacts on the attached list of Native American contacts, to see if your proposed project might impact Native American cultural resources and to obtain their recommendations concerning the proposed project. Pursuant to CA Public Resources Code § 5097.95, the NAHC requests cooperation from other public agencies in order that the Native American consulting parties be provided pertinent project information. Consultation with Native American communities is also a matter of environmental justice as defined by California Government Code §65040.12(e). Pursuant to CA Public Resources Code §5097.95, the NAHC requests that pertinent project information be provided consulting tribal parties. The NAHC recommends *avoidance* as defined by CEQA Guidelines §15370(a) to pursuing a project that would damage or destroy Native American cultural resources and Section 2183.2 that requires documentation, data recovery of cultural resources. 5

Furthermore, the NAHC if the proposed project is under the jurisdiction of the statutes and regulations of the National Environmental Policy Act (e.g. NEPA; 42 U.S.C. 4321-43351). Consultation with tribes and interested Native American consulting parties, on the NAHC list, should be conducted in compliance with the requirements of federal NEPA and Section 106 and 4(f) of federal NHPA (16 U.S.C. 470 *et seq*), 36 CFR Part 800.3 (f) (2) & .5, the President's Council on Environmental Quality (CSQ, 42 U.S.C 4371 *et seq.* and NAGPRA (25 U.S.C. 3001-3013) as appropriate. The 1992 *Secretary of the Interiors Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including cultural landscapes. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful, supportive guides for Section 106 consultation. The aforementioned Secretary of the Interior's *Standards* include recommendations for all 'lead agencies' to consider the historic context of proposed projects and to "research" the cultural landscape that might include the 'area of potential effect.' 6

Confidentiality of "historic properties of religious and cultural significance" should also be considered as protected by California Government Code §6254(r) and may also be protected under Section 304 of he NHPA or at the Secretary of the Interior discretion if not eligible for listing on the National Register of Historic Places. The Secretary may also be advised by the federal Indian Religious Freedom Act (cf. 42 U.S.C., 1996) in issuing a decision on whether or not to disclose items of religious and/or cultural significance identified in or near the APEs and possibility threatened by proposed project activity. 7

Furthermore, Public Resources Code Section 5097.98, California Government Code §27491 and Health & Safety Code Section 7050.5 provide for provisions for inadvertent discovery of human remains mandate the processes to be followed in the event of a discovery of human remains in a project location other than a 'dedicated cemetery'. 8

To be effective, consultation on specific projects must be the result of an ongoing relationship between Native American tribes and lead agencies, project proponents and their contractors, in the opinion of the NAHC. Regarding tribal consultation, a relationship built around regular meetings and informal involvement with local tribes will lead to more qualitative consultation tribal input on specific projects. 9

Finally, when Native American cultural sites and/or Native American burial sites are prevalent within the project site, the NAHC recommends 'avoidance' of the site as referenced by CEQA Guidelines Section 15370(a). 10

2

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton
Program Analyst

Cc: State Clearinghouse

Attachment: Native American Contact List

Letter A

Native American Contacts
Riverside County
May 11, 2012

Los Coyotes Band of Mission Indians
Shane Chapparosa, Chairman
P.O. Box 189 Cahuilla
Warner , CA 92086
(760) 782-0711
(760) 782-2701 - FAX

Pechanga Band of Mission Indians
Paul Macarro, Cultural Resources Manager
P.O. Box 1477 Luiseno
Temecula , CA 92593
(951) 770-8100
pmacarro@pechanga-nsn.gov
(951) 506-9491 Fax

Ramona Band of Cahuilla Mission Indians
Joseph Hamilton, Chairman
P.O. Box 391670 Cahuilla
Anza , CA 92539
admin@ramonatribe.com
(951) 763-4105
(951) 763-4325 Fax

San Manuel Band of Mission Indians
James Ramos, Chairperson
26569 Community Center Drive Serrano
Highland , CA 92346
(909) 864-8933
(909) 864-3724 - FAX
(909) 864-3370 Fax

Soboba Band of Mission Indians
Scott Cozaet, Chairperson; Attn: Carrie Garcia
P.O. Box 487 Luiseno
San Jacinto , CA 92581
carrieg@soboba-nsn.gov
(951) 654-2765
(951) 654-4198 - Fax

Santa Rosa Band of Mission Indians
John Marcus, Chairman
P.O. Box 391820 Cahuilla
Anza , CA 92539
(951) 659-2700
(951) 659-2228 Fax

Juaneno Band of Mission Indians Acjachemen Nation
Anthony Rivera, Chairman
31411-A La Matanza Street Juaneno
San Juan Capistrano CA 92675-2674
arivera@juaneno.com
(949) 488-3484
(949) 488-3294 - FAX
(530) 354-5876 - cell

Morongo Band of Mission Indians
Michael Contreras, Cultural Heritage Prog.
12700 Pumarra Road Cahuilla
Banning , CA 92220 Serrano
(951) 201-1866 - cell
mcontreras@morongo-nsn.gov
(951) 922-0105 Fax

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2011081084; CEQA Notice of Completion; draft Environmental Impact Report (DEIR) for the VIP Moreno Valley Project; located in the City of Moreno Valley; Riverside County, California.

Letter A

Native American Contacts
Riverside County
May 11, 2012

San Manuel Band of Mission Indians
Ann Brierty, Policy/Cultural Resources Departmen
26569 Community Center. Drive Serrano
Highland , CA 92346
(909) 864-8933, Ext 3250
abrierty@sanmanuel-nsn.gov
(909) 862-5152 Fax

Ernest H. Siva
Morongo Band of Mission Indians Tribal Elder
9570 Mias Canyon Road Serrano
Banning , CA 92220 Cahuilla
siva@dishmail.net
(951) 849-4676

Pechanga Band of Mission Indians
Mark Macarro, Chairperson
P.O. Box 1477 Luiseno
Temecula , CA 92593
tbrown@pechanga-nsn.gov
(951) 770-6100
(951) 695-1778 Fax

SOBOBA BAND OF LUISENO INDIANS
Joseph Ontiveros, Cultural Resource Department
P.O. BOX 487 Luiseno
San Jacinto , CA 92581
jontiveros@soboba-nsn.gov
(951) 663-5279
(951) 654-5544, ext 4137

William J. Pink
48310 Pechanga Road Luiseno
Temecula , CA 92592
wjpink@hotmail.com
(909) 936-1216
Prefers e-mail contact

Pechanga Cultural Resources Department
Anna Hoover, Cultural Analyst
P.O. Box 2183 Luiseño
Temecula , CA 92593
ahoover@pechanga-nsn.gov
951-770-8104
(951) 694-0446 - FAX

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2011081084; CEQA Notice of Completion; draft Environmental Impact Report (DEIR) for the VIP Moreno Valley Project; located in the City of Moreno Valley; Riverside County, California.

2.4 RESPONSE TO LETTER A

California Native American Heritage Commission

Response to Comment A-1. The comment is introductory and states that the Native American Heritage Commission (NAHC) is the State "trustee agency" pursuant to Public Resources Code Section 21070 for the protection and preservation of the State's Native American resources. The comment also states that the letter contains state and federal statutes relating to Native American historic properties of religious and cultural significance.

The comment is introductory in nature and outlines the NAHC's authority and role as a commenting agency. The NAHC's introduction in this comment is noted, and no further response is required.

Response to Comment A-2. The comment states that CEQA requires that any project that causes a substantial adverse change in the significance of a historical resource, which includes archaeological resources, is a "significant effect" requiring the preparation of an EIR. A Draft EIR was prepared for the proposed project and circulated for public review on April 20, 2012. Based on the *Phase I Cultural Resources Assessment and Paleontological Records Review* prepared for the proposed project, the site contains a historic site and a historic isolate, which were recorded and evaluated for significance in accordance with CEQA. Based on the study, it was determined that the historic resource and historic isolate were not considered to be significant. Consequently, construction and grading of the proposed project site will not affect significant historic resources, resulting in a less than significant impact.

Response to Comment A-3. The comment states that the NAHC Sacred Lands File (SLF) search found that no Native American cultural resources were identified within the project area. Similarly, the Draft EIR determined that there were no cultural resources (historic or prehistoric) identified on the project site as a result of records searches or during on site reconnaissance. The comment does not contain any substantive statements or questions about the Draft EIR or the analysis therein. Therefore, no further response is necessary.

Response to Comment A-4. The comment states that NAHC Sacred Sites are confidential and exempt from the Public Records Act pursuant to California Government Code Section 6254. The City acknowledges the sensitivity and confidentiality of the information contained in the cultural resources report. No records maps have been made public nor will they be made public in association with the City's consideration of the proposed project.

Response to Comment A-5. The comment states that pursuant to California Public Resources Code Section 5097.95, the NAHC requests that pertinent project information be provided to Native American consulting parties, and that Native American consultation is a matter of environmental justice. The comment letter states that early consultation with Native American Tribes in the area of the project site is the best way to avoid unanticipated discoveries once a project is underway. The letter includes a list of Native American contacts and recommends obtaining their recommendations concerning the proposed project.

Appendix B-5 of the Draft EIR contains the Phase I Cultural Resource Assessment and Paleontological Records Review, (Michael Brandman Associate., March 27, 2012) prepared for the proposed project in which Native American consultation was conducted. On February 15, 2007, Michael Brandman Associates sent a letter to the NAHC in an effort to determine whether any sacred sites were listed on the Scared Lands Files for this area of Moreno Valley containing the project site.

In response to the Sacred Land Record Search request, the NAHC identified fourteen Native American contacts that may have knowledge of cultural resources in the project area.

Letters dated February 28, 2007, were sent by MBA to the fourteen Native American contacts provided by the NAHC. The letters notified the parties of the proposed project and requested that the tribes respond with information concerning cultural resources that might be affected.

Response to Comment A-6. The comment states that consultation with Tribes and interested Native American consulting parties on the NAHC list should be conducted in compliance with the requirements of federal National Environmental Policy Act (NEPA), Sections 106 and 4(f) of the National Historic Preservation Act, and the Native American Grave Protection and Repatriation Act (NAGPRA), as appropriate.

The project is not a federal undertaking as defined under Section 106 of the National Historic Preservation Act (NHPA) or 36 Code of Federal Regulations (CFR) Part 800 regulations implementing Section 106. The project does not use federal funds and will not require any federal permits. Therefore, the project does not fall under the regulatory oversight of Section 106. The project is not a federal transportation project, so it also does not fall under the jurisdiction of Section 4(f) of the Department of Transportation Act of 1966. Finally, since there is no federal involvement in the project, the requirements of NAGPRA do not apply.

As described in Response to Comment A-5, above, the City conducted consultation with fourteen local tribes and interested Native American individuals for the project. Consultation included providing those parties with pertinent project and location information.

Response to Comment A-7. The comment states that historic properties of religious and cultural significance are confidential and protected by California Government Code Section 6254. The comment further states that the confidentiality of such resources may also be protected by section 304 of the NHPA. The City acknowledges the sensitivity and confidentiality of any identified resources. The SLF and any associated records maps are not for public distribution. In addition, because the project is not a federal undertaking, it is not regulated under Section 304 of the NHPA.

Response to Comment A-8. The comment identifies State laws regarding the accidental discovery of human remains. In in the unlikely event that human remains are encountered during project grading, the County Coroner and the City Planning Division would be notified immediately, and no further disturbance would occur until the County Coroner makes a determination of origin and disposition. If the remains are determined to be Native American, the County Coroner would notify the NAHC, which will determine and notify the most likely descendant (MLD). Implementation of state law reduces potential impacts related to the discovery of human remains on the proposed project site to a less than significant level, and no additional mitigation is required.

Response to Comment A-9. The comment states that effective consultation, in the opinion of the NAHC, is the result of an ongoing relationship between Native American tribes and lead agencies, project proponents and their contractors. The City agrees that effective consultation is desired. The City has reached out to Native American tribes through the consultation process (as detailed in the Draft EIR in Appendix B-5).The comment does not contain any substantive statements or questions about the Draft EIR or the analysis therein. Therefore, no further response is necessary.

Response to Comment A-10. The comment states that the NAHC recommends avoidance when a project would damage or destroy Native American cultural resources. The comment further states that documentation and data recovery of such resources is required pursuant to the CEQA

Guidelines. Based on the *Phase I Cultural Resources Assessment and Paleontological Records Review* prepared for the proposed project, the site has a low potential for containing archeological resources due to the lack of such resources previously discovered in the surrounding area and the disturbed nature of the project site. Consequently, construction and grading of the proposed project site will have a low probability of damaging archeological resources. Impacts to archeological resources are considered to be less than significant.

Letter B

State of California -The Natural Resources Agency
DEPARTMENT OF FISH AND GAME
1416 9th Street
Sacramento, CA 95814
http://www.dfg.ca.gov

EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

May 16, 2012

RECEIVED
MAY 21 2012
CITY OF MORENO VALLEY
Planning Division

Mr. Jeff Bradshaw
City of Moreno Valley
14177 Frederick Street
Moreno Valley, CA 92551

Subject: Draft Environmental Impact Report for the VIP Moreno Valley Project
City of Moreno Valley, Riverside County -- SCH #2011081084

Dear Mr. Bradshaw:

The Department of Fish and Game (Department) appreciates this opportunity to comment on the Draft Environmental Impact Report for the VIP Moreno Valley Project. The Department is responding as a Trustee Agency for fish and wildlife resources [Fish and Game Code sections §711.7 and 1802 and the California Environmental Quality Act Guidelines (CEQA) section §15386] and as a Responsible Agency regarding any discretionary actions (CEQA Guidelines section §15381), such as a Lake and Streambed Alteration Agreement (California Fish and Game Code Sections §1600 *et seq.*) and/or a Permit for Incidental Take of Endangered, Threatened, and/or Candidate species (Fish and Game Code Sections 2080 and 2080.1).

The proposed Project consists of the construction and operation of approximately 1,616,133 square feet of distribution warehouse uses on a 71-acre site. The Project is located in the City of Moreno Valley and is bounded on the west by Indian Street, on the east by Perris Boulevard, on the north by Grove View Road and on the south by the Perris Valley Storm Drain. The March Air Reserve Base and the Interstate-215 (I-215) are located in the vicinity to the west. The site has been used for dryland farming and is disked. There is vegetation (mostly non-native) on the periphery of the site but the major part of the site is disked.

Western Riverside Multiple Species Habitat Conservation Plan (MSHCP)

The Department is responsible for ensuring appropriate conservation of fish and wildlife resources including rare, threatened, and endangered plant and animal species, pursuant to the California Endangered Species Act (CESA), and administers the Natural Community Conservation Plan Program (NCCP Program). On June 22, 2004, the Department issued Natural Community Conservation Plan Approval and Take Authorization for the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) per Section §2800, et seq., of the California Fish and Game Code. The MSHCP establishes a multiple species conservation program to minimize and mitigate habitat loss and the incidental take of covered species in association with activities covered under the permit.

The proposed Project occurs within the MSHCP area and is subject to the provisions and policies of the MSHCP. The City of Moreno Valley is the Lead Agency and is signatory to the

1

Implementing agreement of the MSHCP. Compliance with approved habitat plans, such as the MSHCP, is discussed in CEQA. Specifically, Section 15125(d) of the CEQA Guidelines requires that the DEIR discuss any inconsistencies between a proposed Project and applicable general plans and regional plans, including habitat conservation plans and natural community conservation plans. An assessment of the impacts to the MSHCP as a result of this Project is necessary to address CEQA requirements.

The Project is located in the Reche Canyon/Badlands Area Plan but does not contain any Criteria Cells and the site is not necessary for reserve assembly. MSHCP policies and procedures that apply to the proposed Project include Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools policy (MSHCP section 6.1.2 pp 6-20; "Riparian/Riverine and Vernal Pool Policy"), Protection of Narrow Endemic Plant Species (MSHCP section 6.1.3 pp 6-28; "NEPPSA"), and Additional Survey Needs and Procedures (MSHCP section 6.3.2, Additional Survey Needs and Procedures). 1

A) Special Survey Areas

The Project is located within the survey area for the western burrowing owl (WBO). WBO is a State Species of Special Concern and is a species subject to the Migratory Bird Treaty Act (MBTA). Focused surveys for the WBO were conducted in 2009. The results of the focused surveys indicate that there were no direct observations or sign of the WBO. 2

B) Protection of Narrow Endemic Plant Species

Plant species requiring habitat assessments include: San Diego ambrosia, many-stemmed dudleya, spreading navarretia, California Orcutt grass, Wrights trichocoronis, Coulter's goldfields, Davidson's saltscale, little mousetail, mud nama, Parish's brittlescale, round-leaved filaree, San Jacinto Valley crownscale, smooth tarplant, and threat-leaved brodiaea. Focused NEPS and Criteria Area surveys were conducted in 2009. The 2009 surveys determined that the NEPS and Criteria Area Plants have a low potential for occurrence because of the absence of suitable habitat and the disking of the site. The DEIR conclusions are supported by the surveys for the Perris Boulevard Widening Project. 3

C) Riparian/Riverine Areas, Vernal Pools, and Fairy Shrimp

A narrow, north-south trending agricultural drainage ditch bisects the center of the site and terminates at a culvert entering the Perris Valley Storm Drain. The document states that the "drainage ditch" does not meet the requirements of this MSHCP policy. The Department reserves the right to determine whether the on-site channel is jurisdictional. 4

<u>Impacts to the species</u>

The biological report states that the only vegetation on the site is located on the periphery because of ongoing disking and consists primarily of non-native plants. Wildlife on the site includes: red-tailed hawk, American kestrel, common raven, American crow, Brewer's blackbird, Say's phoebe, western kingbird, western meadowlark, mourning dove, side-blotched lizard, western fence lizard, California ground squirrel, desert cottontail and pocket gopher. 5

Proposed mitigation

Impacts to wildlife are covered by the MSHCP and the mitigation requirements in the MSHCP. The DEIR states that preconstruction surveys will be conducted for WBO and nesting birds. If WBO are found on the site the Resource Conservation Agency and the Department should be notified to determine whether additional mitigation measures are required. 6

Department Concerns

The Department reserves the right to determine whether the channel on site is subject to Section 1600 *et seq.* in the Fish and Game Code. A Determination of Biologically Equivalent or Superior Preservation (DBESP) alternative is not required, according to the DEIR. The Department needs to be notified prior to commencement of grading if bird nests or burrowing owl are identified in pre-construction surveys. In addition, a Lake and Streambed Alteration Agreement (Section 1600 *et seq.*) may be required. No mitigation has been provided for the loss of this channel. 7

Lake and Streambed Alteration Agreement

Although the proposed Project is within the Western Riverside Multiple Species Habitat Conservation Plan (MSHCP) and is not subject to Section 6.1.2, Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools, a Lake and Streambed Alteration Agreement Notification may still be required by the Department should the site contain jurisdictional waters. Additionally, the Department's criteria for determining the presence of jurisdictional waters are more comprehensive than the MSHCP criteria in Section 6.1.2.

A routine delineation was conducted in 2009 and the consultants determined that there were no jurisdictional wetlands or streams on the site. However, the Department retains the right to determine whether the resources on site are jurisdictional waters and subject to the Lake and Streambed Alteration Agreement program. A new streambed jurisdictional delineation needs to be conducted to determine whether the channel (i.e., "drainage ditch") conveys water across the site, particularly during the rainy season, and how many linear feet or acres comprise the channel. 8

The Department recommends submitting a notification early on, since modification of the proposed Project may be required to avoid or reduce impacts to fish and wildlife resources. To obtain a Streambed Alteration Agreement notification package, please call (562) 430-7924 or go to http://www.dfg.ca.gov/habcon/1600/forms.html. 9

If the CEQA documents do not fully identify potential impacts to lakes, streams, and associated resources and provide adequate avoidance, mitigation, monitoring, funding sources, a habitat management plan and reporting commitments, additional CEQA documentation will be required prior to execution (signing) of the Agreement. In order to avoid delays or repetition of the CEQA process, potential impacts to a stream or lake, as well as avoidance and mitigation measures need to be discussed within this CEQA document. Permit negotiations conducted after and outside of the CEQA process are not CEQA-compliant because they deprive the public and agencies of their right to know what project impacts are and how they are being mitigated (CEQA Section 15002). 10

Letter B

The Department opposes the elimination of ephemeral, intermittent and perennial stream channels, lakes and their associated habitats. The Department recommends avoiding the stream and riparian habitat to the greatest extent possible. Any unavoidable impacts need to be compensated with the creation and/or restoration of in-kind habitat either on-site or off-site at a minimum 3:1 replacement-to-impact ratio, depending on the impacts and proposed mitigation. Additional mitigation requirements through the Department's Streambed Alteration Agreement process may be required depending on the quality of habitat impacted, proposed mitigation, project design, and other factors.

The following information will be required for the processing of a Streambed Alteration Agreement and the Department recommends incorporating this information to avoid subsequent CEQA documentation and project delays:

11

1) Delineation of lakes, streams, and associated habitat that will be temporarily and/or permanently impacted by the proposed project (include an estimate of impact to each habitat type);
2) Discussion of avoidance measures to reduce project impacts; and,
3) Discussion of potential mitigation measures required to reduce the project impacts to a level of insignificance.

Please refer to section 15370 of the CEQA guidelines for the definition of mitigation. If the project does not include the criteria listed above, the Department believes that it cannot fulfill its obligations as a Trustee and Responsible Agency for fish and wildlife resources.

We recommend that the Department's concerns be addressed in the Final Environmental Impact Report.

Sincerely,

Jeff Brandt
Senior Environmental Scientist

cc: State Clearinghouse

2.6 RESPONSE TO LETTER B

California Department of Fish and Game

Response to Comment B-1. The commentor accurately summarizes both the CEQA requirement for an analysis of the proposed project's consistency with the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) and the MSHCP policies and procedures applicable to the proposed project.

Response to Comment B-2. The commentor accurately summarizes both the MSHCP requirement for a burrowing owl survey and that the surveys conducted for the project showed no burrowing owl sign or observations.

Response to Comment B-3. The commentor accurately summarizes both the MSHCP requirement for survey of narrow endemic plant species and that the surveys conducted for the project determined there is a low potential for occurrence of the species due to lack of suitable habitat and disking of the site. The commentor also notes these conclusions are consistent with the surveys conducted for the Perris Boulevard Widening Project (which is a City of Moreno Valley capital improvement project) and not related to the VIP Moreno Valley Project.

Response to Comment B-4. The commentor notes the Draft EIR statement that the agricultural ditch running north-south across the center of the site is not jurisdictional and indicates CDFG reserves the right to determine whether the on-site ditch is jurisdictional. As stated in the Draft EIR (pages 2-10 and 2-11), the ditch no longer contains the characteristics of jurisdictional waters. This is due to the construction of Grove View Road and storm drains on the north side of the site, resulting in the elimination of an abundant supply of off-site water flow from the north onto the site. Because the ditch no longer carries the abundant supply off-site water flow, it no longer supports the one riparian species (willow) that exists in the ditch. This condition has become even more evident over the past several years, resulting in no jurisdictional waters on the site.

Response to Comment B-5. The commentor accurately summarizes the vegetation and wildlife observed on the site.

Response to Comment B-6. The commentor accurately summarizes the Draft EIR mitigation measure prescribing preconstruction surveys for burrowing owl and nesting birds, and requests that the Regional Conservation Authority and CDFG be contacted should burrowing owl be found on the site in order to determine the need for additional mitigation. This is standard operating procedure, and the project proponent's biological consultant will comply.

Response to Comment B-7. The commentor identifies CDFG's concerns which are summarized as follows: 1) Regarding the on-site ditch that runs north-south through the center of the project site, CDFG states that they reserve the right to determine whether the site is jurisdictional, and if so, a Section 1600 permit would be required for the loss of the on-site ditch; and 2) CDFG requests that they be notified prior to grading activities if bird nests or burrowing owls or observed during the pre-construction surveys required as part of Mitigation Measures BIO-1 through BIO-4.

Response to Comment B-8. The commentor notes that CDFG's criteria for determining jurisdictional waters are more comprehensive than the MSHCP criteria and requests that a new jurisdictional delineation be conducted.. As stated in the Response to Comment B-4, the Draft EIR has already identified that the on-site ditch no longer accepts off-site water flows during storm events because off-site flows now are conveyed to a storm drain located in Grove View Road. The eastern section of Grove View Road between Perris Boulevard and Indian Street was constructed in 2007 while the

western section was constructed in 2009 as part of the two warehouse projects located across the street and north of the proposed project. The conditions observed in the 2009 jurisdictional delineation prepared by Ecological Sciences are still valid, and in fact, the lack of jurisdictional waters has become more obvious due to the lack of off-site water conveyance.

Response to Comment B-9. The commentor provides contact information regarding submittals for Section 1600 permit. Refer to Responses to Comments B-4 and B-9. The project contains no jurisdictional waters, a Section 1600 Streambed Alteration Agreement is not required, and this information is therefore not applicable.

Response to Comment B-10. Refer to Responses to Comments B-4, B-9, and B-10.

Response to Comment B-11. Refer to Responses to Comments B-4, B-9, and B-10.

RECEIVED
MAY 3 1 2012
CITY OF MORENO VALLEY
Planning Division

Gerald M. Budlong
24821 Metric Drive
Moreno Valley, CA 92557
May 31, 2012

Subject: Proposed VIP Moreno Valley Distribution Center DEIR

Jeff Bradshaw, Associate Planner
Moreno Valley Planning Division
14177 Frederick Street, Moreno Valley City Hall
Moreno Valley, CA 92553

Dear Mr. Bradshaw:

The proposed VIP Moreno Valley Distribution Center project is consistent with the present specific plan as well as the superseded Oleander Specific Plan of the Moreno Valley General Plan and the zoning ordinance. My opinion of this industrial site concerning prime farmland, remains the same since 1989. The land has been designated as industrial in the specific plans and the zoning ordinance. The land has not met the state definition of prime farmland for the last 20 years or more due to the lack of acreage remaining of the land designated prime farmland on the state map. Viable crops grown on prime farmland have not been commercially possible for quite some time. Much of the site is already developed into industrial uses. 1

My only concern of the subject DEIR is the omission of groundwater levels and associated adverse impacts such as liquefaction. Why are high groundwater levels and liquefaction issues missing from this EIR?

The environmental cleanup program, called the Installation Restoration Program (IRP),at March Field, incorporating the former March AFB and present March ARB, has monitored the groundwater levels on and off base since the start of this program in the late 1980s. The groundwater levels have been rising an average of one to two feet annually. To date local groundwater levels are as high as 10 feet or less from the ground surface. Projects such as the new MWD water pipeline parallel to I-215 and near the March Field Museum has undergone high groundwater conditions which has prevented completion of approximately 400 linear yards of the project. A new bidding process inviting contractors with expertise in high groundwater conditions was initiated. The Air Force is concerned that the high groundwater conditions may adversely impact foundations at the base. The Air Force is concerned about potential adverse impacts from liquefaction in the event of a future earthquake. It was reported at the April 2012 March Field IRP Board meeting, that underground cement utility vaults at the former DHL airfreight building was experiencing flooding. I inquired whether the flooding was caused by high groundwater conditions. Staff promised they will make inquiries and report back at the October IRP meeting. 2

Are the building foundations for the proposed project engineered for high groundwater level conditions and potential liquefaction events from major earthquakes? 3

Sincerely,

Gerald M. Budlong.

2.8 RESPONSE TO LETTER C

Gerald M. Budlong

Response to Comment C-1. The City appreciates the comments provided on the proposed project regarding the project being consistent with the City's General Plan and zoning code as well as comments on prime farmland and the area not being viable for farming since 1989. The comments are part of the public record and will be forwarded to the City's decision makers for their consideration prior to approving the project and certifying the EIR.

Response to Comment C-2. Appendix B-6 of the Draft EIR contains the *Geotechnical Engineering Investigation Proposed Industrial Development Southwest Corner of Perris Boulevard and Grove View Road Moreno Valley, California (*NorCal Engineering*,* May 7, 2007) prepared for the proposed project. The geotechnical investigation consisted of forty (40) subsurface exploratory trenches by a backhoe to depths ranging 5-15 feet below current elevations. The report stated "no ground water was encountered in any of the trenches (page 2). This study indicated that the groundwater levels are greater than 100 feet below the surface and the site has a low potential for liquefaction (page 5). The Draft EIR also provided this information in Section 2.5.4 Geology and Soils, page 2-14 which states *"Liquefaction typically occurs in areas where groundwater is shallower than approximately 30 feet, and where there is the presence of loose, sandy soils. According to the City's General Plan, liquefaction is not considered to be a local hazard since groundwater levels in Moreno Valley are far below the surface.*[1] *The project's geotechnical analysis*[2] *indicates that the depth of groundwater within the project vicinity is in excess of 100 feet. The proposed project site is not located in an area identified as being prone to liquefaction. The potential for earthquake-induced liquefaction within the proposed project is considered very low.*[3] *Because liquefaction at the project site is considered to be very low, a less than significant impact related to liquefaction would occur."*

Response to Comment C-3. The proposed project will be built per the City's and State's building code requirements and those contained in the geotechnical study prepared for the proposed project. The building code includes provisions for seismic safety.

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1 *Chapter 6 Safety*, City of Moreno Valley General Plan, July 11, 2006.
2 *Geotechnical Engineering Investigation Proposed Industrial Development Southwest Corner of Perris Boulevard and Grove View Road Moreno Valley, California*, NorCal Engineering, March 7, 2007.
3 *Figure 5.6-2 Seismic Hazards*, Moreno Valley General Plan Final Program EIR, July 2006.

Letter D

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June 1, 2012

VIA EMAIL

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RE: Moreno Valley Vogel Industrial Park (VIP) Draft Environmental Impact Report Comments

Greetings:

On behalf of the Sierra Club, Moreno Valley Group, and Residents for a Livable Moreno Valley, I hereby submit these comments on the Moreno Valley VIP Draft Environmental Impact Report (DEIR). (PA09-0004, PA09-0012, TPM No. 36162)

Project Summary:

The proposed development would result in the construction and operation of approximately 1,616,133 square feet of distribution warehouse uses on an approximately 71-acre site. The single building will be constructed with 264 vertical-lift dock-high roll up doors on the long (north and south) sides of the building to allow access for the loading and unloading of products from diesel truck/trailers. The building will include a total of approximately 44,000 square feet of business office space for the management of the warehouse. Parking at the warehouse will be provided for 368 trucks and trailers as well as 589 parking stalls for passenger vehicles in accordance with City standards for light industrial uses. See Figure 1.2. 1

The project is located approximately 1.3 miles east of I-215, 4.5 miles south of SR-60, and 1.75 miles west of Lake Perris. March Air Reserve Base is located approximately one half mile west of the project site. Residences are located to the west of the site.

Letter D

General Comments:

The California Environmental Quality Act (CEQA) was adopted as a disclosure and transparency document. The theory is that by providing a document that adequately describes the environmental consequences of a project to decision makers and the public, the decision makers will make a rational decision based upon the true environmental consequences of the project and if they do not, the electorate can hold them accountable for their decisions. The core of this statutory structure is the adequacy of the document as an informational document. 2

Unfortunately, the Draft EIR for this Project fails as an informational document. The EIR misleads decision makers and the public as to the extent and severity of the Project's environmental impacts. On top of these inadequacies, the Draft EIR is almost constantly conclusory, and does not provide the analysis or examination required by CEQA to inform the public and decision makers of the analytical pathway taken from facts to conclusions. Moreover, the EIR evaluates only impacts to Agricultural and Forest Resources, Air Quality, Greenhouse Gas Emissions and Global Climate Change, Noise, and Traffic. The EIR determines, without basis in CEQA, to *not* evaluate in detail impacts which *are potentially significant* but which will be mitigated below a level of significance, including impacts to Biological Resources, Cultural Resources, Geology and Soils, and Hydrology and Water Quality. While effects determined not be significant need not be discussed in detail in the EIR, effects which may be significant must be evaluated, and then the mitigation measures or alternatives which would reduce or avoid that effect must be described. (Public Res. C. § 21002.1(a), (e); State CEQA Guidelines § 15128, 15126, 15123) The EIR fails as an informational document by failing to analyze and evaluate **all potentially significant environmental effects of the project,** relying instead on the cursory evaluation performed for the environmental assessment. By failing to provide information on the potentially significant effects of the project that can be mitigated below a level of significance, the EIR fails as an informational document. The findings are also not supported by substantial evidence in the record, but rather only by the baseless conclusions cited in the EIR. 3 4

CEQA also requires that where feasible mitigation exists which can substantially lessen the environmental impacts of a project, **all feasible mitigation** must be adopted. In this way CEQA goes beyond its informational role to require that projects substantively lessen their negative effects on the environment. It is critical to proper drafting of an EIR that all feasible mitigation measures be required of a project. This has not been done with this Project. For instance, the EIR fails to require *any* mitigation for the project's significant impacts to agricultural resources. Moreover, all mitigation measures required in the EIR must be fully enforceable and certain to occur. This Project fails to ensure that all feasible mitigation will occur with this Project and instead provides vague, uncertain, and unenforceable approximations of mitigation measures. 5 6

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For instance, several "alternatives" listed in the EIR will not satisfy the actual mitigation required, while other mitigation measures merely require the incorporation of writings, not actions. 7

The Moreno Valley VIP project purports to be a "green project" that is environmentally forward thinking; this is simply not the case, and in fact, the Moreno Valley VIP industrial building will be the *least* green building constructed in Moreno Valley in the past 3 years. The EIR provides examples of typical green building features, but fails to require each of those features for this project. The project only requires LEED certification and does not explain why requiring a gold or platinum LEED certification is infeasible, despite having significant air quality and greenhouse gas impacts. 8

Correspondingly, while most of the project's environmental effects will be a result of its use as a distribution center and corresponding traffic and air quality impacts, not the effects of the warehouse building itself, little if any mitigation is required to reduce these impacts. 9 Regarding traffic effects, the EIR relies heavily on TUMF and DIF programs and concludes that significant effects will be either immediately or promptly reduced by these programs. To the contrary, a significant amount of the streets impacted are not currently planned or funded for improvements, and given the underfunding of these programs are unlikely to see any improvement in the near term. The EIR accordingly understates the traffic and air quality impacts of the project and fails to require all feasible mitigation. 10

The EIR also fails to make adequate findings, based on substantial evidence, that the environmentally superior alternative is infeasible. In fact, the environmentally superior alternative satisfies most, if not all project objectives and significant reduces project impacts, particularly with regards to air quality in an area known to have some of the worst air quality in the nation. At the least, the environmentally superior alternative must be implemented in lieu of the project. 11

Further shortcomings of the EIR are detailed below.

Aesthetics

The finding of less than significant impact is not supported regarding lighting. The EIR acknowledges that the project will create a new source of substantial light, but fails to discuss this impact on nighttime views. 12

Agricultural Resources

The project will result in a significant and unmitigated individual and cumulative impact to agricultural resources by converting ***Prime Farmland, Unique Farmland, and Farmland of Statewide Importance***, to non-agricultural use; and would involve other changes in the existing environment which would result in the conversion of Farmland to non-agricultural use. 13

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Specifically, the project site is entirely identified as Prime Farmland, Farmland of Statewide Importance, and Farmland of Local Importance. Loss of State Designated Farmland as a result of this project is a significant impact, and accounts for a substantial percent of farmland conversion for Riverside County. The project site's Land Evaluation and Site Assessment score further demonstrates a significant impact from the conversion of quality land and agricultural resources. 14

The EIR plays down the effect of development and operation of industrial uses in increasing development pressure on adjacent agricultural properties. The EIR does not disclose the predicted impacts on properties adjacent to the project site or along the truck routes used to access the project site, as well as city wide impacts. 15

No mitigation is required to reduce the significant adverse impacts of this project to agriculture. While the EIR identifies many mitigation measures that may be implemented, it fails to require any mitigation. The fact that the General Plan EIR found mitigation to be infeasible on a citywide scale does not mean that project level mitigation here is infeasible.

Mitigation measures identified by the CDC to reduce agricultural impacts include: 16

- The purchase of agricultural conservation easements;
- Transfer of development rights;
- Acquisition of farmland by the city or county;
- mitigation banking;
- the establishment of "urban limits," greenbelts, and buffers;
- the payment of in-lieu fees sufficient to a purchase and maintain farmland conservation easements;
- and planning tools such as clustering development, use of density bonuses, and limiting "leapfrog" development.

While the measures regarding planning have been determined to be infeasible by the City, ***the EIR does not provide evidence to support the finding of infeasibility with regard to the purchase or transfer of development rights, conservation easements, or donation of funds to assist in the preservation of agricultural lands.*** The conclusion of the EIR that these measures for mitigation of agricultural land are contrary to the City's vision and therefore not feasible is unsupported. The purchase of conservation easements must be required as mitigation barring evidence of infeasibility. The purchase of a permanent agricultural conservation easement of land of at least 2:1 of equal quality must be required to mitigate for impacts from the direct and growth inducing/cumulative loss of agricultural land by either the outright purchase of easements or donation of mitigation fees to a local, regional, or statewide organization that provides for acquisition and stewardship of agricultural conservation easements. Such mitigation is not found to be infeasible. 17

Air Quality

The project will result in significant and unavoidable impacts to air quality during construction and operation. 18

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Several of the construction air quality impact "mitigation measures" are required by law, and therefore do not qualify as "mitigation." 19

Existing air quality in the project vicinity generally exceeds state and federal air quality standards for Ozone, Coarse Particulate Matter (PM10), Fine Particulate Matter (PM2.5) for the year. The nearest sensitive receptors to the project are rural residences located approximately 1,000ft north of the project site and 0.5 miles southwest of the project site. 20

The EIR fails to disclose all Moreno Valley General Plan Policies relevant to air pollutant emissions. Such omitted policies and objectives include: 21

- Ultimate Goal VII: achieve a community which "Emphasizes public health and safety…"
- Goal 6.1: "To achieve acceptable levels of protection from natural and man-made hazards to life, health, and property."
- Objective 7.5 "Encourage efficient use of energy resources."
- Policies 7.5.1; 7.5.2; 7.5.5 regarding energy efficiency.

The EIR finds that the project would, "add jobs resulting from the development of the industrial uses to the City, with the potential to minimize the VMT traveled within the project site and community." This potential may not be recognized and is unsupported by evidence in the record and are countered by recent projects within Moreno Valley. For instance, the Sketchers project nearby likewise promised job opportunities for local Moreno Valley workers. However, when all was said and done the facility resulted in a net job loss, and most employees were transferred from Ontario, increasing vehicle miles travelled. (*See, "Moreno Valley: Sketchers' warehouse has caused net job loss,"* The Press Enterprise, Jack Katzanek, February 1, 2012. < http://www.pe.com/business/business-headlines/20120201-moreno-valley-skechers-warehouse-has-caused-net-job-loss.ece>) 22

The project use will also be truck distribution; hence despite any local employment at the warehouse, the project will not minimize VMT and will not minimize air pollutant emissions consistent with the AQMP, but will instead drastically increase mobile source emissions. In fact, the focus of the AQMP is to attain PM 2.5 standards, which this project will specifically add to through the use of diesel trucks. (See AQMP 4-1.)The finding that the project is consistent with the AQMP is entirely unsupported. 23

Health Risks

The EIR finds that the project will have less than significant operational-acute health risk impacts on the basis that, "studies …have not provided sufficient information to establish a short-term non-cancer health risk guidance value for respiratory impacts." This ignores entirely the threshold of significance which asks "Would the proposed project expose sensitive receptors to substantial pollutant concentrations?" and does not necessarily require a health risk guidance value. 24

Operational-Chronic Health Risk Impacts are determined to be less than significant. It is unclear 25

Letter D

from the EIR that levels at the sensitive receptors of Table 4.2.H were measured, as the EIR states, "Sensitive receptors were placed in a general grid extending in all directions to characterize the risk level surrounding the project site." In the immediate vicinity of the project site are residences, the Rancho Verde High School (one mile to the east of the project site), and El Potrero Elementary School (one mile to the northeast of the project). The EIR does not demonstrate that impacts at these and other locations were evaluated, particularly given the increased susceptibility of infants, children, and the elderly to health impacts from diesel PM. 25

Moreover, the HRA accounts only for the cancer risk and temporary respiratory impacts caused by this project. In addition to the risk of cancer, diesel PM is known to cause immune system effects; reproductive, developmental, and endocrine effects; nervous system effects; and lung health problems, as recognized by the County in the General Plan. Immune system effects include increased allergic inflammatory responses and suppression of infection fighting ability. Diesel PM has also been associated with reproductive effects such as decreased sperm production, changes in fetal development, low birth weight and other impacts. Diesel PM exposure may also cause impairment to the central nervous system. (*The Health Effects of Air Pollution on Children*, Michael T. Kleinman, Ph.D, Fall 2000, <http://aqmd.gov/forstudents/health_effects_on_children.html#WhyChildren>; *See also, Diesel and Health in America: the Lingering Threat*, Clean Air Task Force, February 2005, <http://www.catf.us/resources/publications/files/Diesel_Health_in_America.pdf>) 26

SCAQMD has stated with regards to the health effects from diesel PM:

> "Diesel particles consist mainly of elemental carbon and other carbon-containing compounds… Diesel particles are microscopic…Due to their minute size, diesel particles can penetrate deeply into the lung. There is evidence that once in the lung, diesel particles may stay there for a long time.
>
> In addition to particles, diesel exhaust contains several gaseous compounds including carbon monoxide, nitrogen oxides, sulfur dioxide and organic vapors, for example formaldehyde and 1,3-butadiene. Formaldehyde and 1,3-butadiene have been classified as toxic and hazardous air pollutants. Both have been shown to cause tumors in animal studies and there is evidence that exposure to high levels of 1,3-butadiene can cause cancer in humans… 27
>
> Diesel emissions may also be a problem for asthmatics. Some studies suggest that children with asthma who live near roadways with high amounts of diesel truck traffic have more asthma attacks and use more asthma medication.
>
> Some human volunteers, exposed to diesel exhaust in carefully controlled laboratory studies, reported symptoms such as eye and throat irritation, coughing, phlegm production, difficulty breathing, headache, lightheadedness, nausea and perception of unpleasant odors. Another laboratory study, in which volunteers were exposed to relatively high levels of diesel particles for about an hour, showed that such exposures could cause lung inflammation." (*The Health Effects of Air Pollution on Children, supra*; *See also, Mira Loma Commerce Center EIR No. 450, Air Quality, Section 4.*)

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Furthermore, infants, children, and the elderly are more susceptible to diesel PM and its associated health impacts. Given this project's close proximity to two schools, the Rancho Verde High school (1 mile east) and El Potrero Elementary School (1 mile northeast) this increased susceptibility is extremely relevant. With regards to infants and children, increased susceptibility to TACs and diesel PM exists for a variety of reasons. Children are generally more active than adults, have higher respiration rates, and inhale more pollutants deeper into the lung. Children also have more lung surface area in proportion to their body size and inhale more air pound for pound when compared to adults, taking in 20 to 50 percent more air and associated air pollutants than adults. When compared to adults, children spend more active time outdoors in polluted air environments and exert themselves harder than adults when playing outside. Importantly, this exposure to high pollutant levels in children occurs while their lungs are still developing, and therefore has more severe impacts on this sensitive group. (*The Health Effects of Air Pollution on Children, supra*.) 28

This increased susceptibility to air pollutant emissions for children has resulted in the California EPA Office of Environmental Health Hazard Assessment ("OEHHA") weighting cancer risk by a factor of 10 for exposures to carcinogens from birth to two years old, and by a factor of 3 for exposures from 2 years old to 15 years old. (*Technical Support Document for Cancer Potency Factors: Methodologies for derivation, listing of available values, and adjustments to allow for early life stage exposures*, California EPA OEHHA Air Toxicology and Epidemiology Branch, April 2009, p. 3. <http://www.oehha.ca.gov/air/hot_spots/pdf/TSDCPFApril_09.pdf.>) It is unclear that these increased risks were accounted for in the EIR. Additionally, recent studies conducted by SCAQMD's Brain and Lung Tumor and Air Pollution Foundation have found a specific connection between exposure to diesel PM and brain cancer in children. (Annual Meeting of the Brain & Lung Tumor and Air Pollution Foundation, April 2, 2010, <http://www.aqmd.gov/hb/2010/April/100425a.htm>) 29

In addition to an increased risk of cancer, the effects of diesel PM on children include slowed lung function and growth, increased emergency room visits, increased incidences of asthma and bronchitis, crib death, asthma respiratory infections, allergic symptoms, and asthma hospitalizations. (*Diesel and Health in America: the Lingering Threat*, *supra*.)

This project will contribute to an already dire TAC situation in Riverside County. The Riverside County Planning Commission recently considered GPA 1096, an amendment to the General Plan to add a Healthy Communities Element which seeks to reduce hazardous air quality impacts to environmental and human health. The Healthy Communities Element of the General Plan was approved in view of the following significant health impacts resulting from already poor air quality in Riverside County: 30

- ***Asthma-Related Hospitalizations***: In 2005, the greatest percentage of asthma-related hospitalizations were among those under age 18 (38%) followed by those over 65 (19%). Blacks experienced the greatest rate of hospitalizations in 2005 at 225.7 per 100,000 population, versus 99.5 and 81.2 for Hispanics and whites, respectively. 31
- ***Risk of Cancer from Diesel Soot and Other Toxic Air Pollutants: Whereas the regional risk of cancer from diesel soot and other toxic air pollutants dropped by 8 percent between 1998 and 2005, the cancer risk in Riverside County increased by 2 percent.*** 32

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- Poor air quality costs Riverside and San Bernardino around ***$6.3 billion annually*** in health care expenses.
- 19% of private schools, 11% of public schools, an 21% of licensed child care centers in Riverside County are located within a quarter (1/4) mile of a major highway.
- Around 350,000 Riverside County residents live within a half (1/2) mile of a major highway, including about 40,000 children under age 5.
- Five schools in Riverside County rank in the 10th percentile for air quality, meaning that 90 percent of the schools in the country had better air. Twenty-five schools ranked in the 50th percentile or below.

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Recognizing these present and unacceptable consequences of air pollution to the health of Riverside's residents, particularly children and the elderly, the County General Plan and recently approved Healthy Communities Element have adopted General Plan policies pertinent to this project.

Construction Impacts

The EIR erroneously categorizes construction impacts as "Construction Equipment Exhaust Emissions." While some construction air quality impacts arise from construction equipment exhaust, other emissions exceed the threshold of significance from architectural coatings (ROG), paving, and fugitive dust during site preparation and grading, including the importations of 220,000cy of soil (NOx and PM10).

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Table 4.2.1 relies on construction phasing not required of the project. For example, paving will result in 3434lbs/day of NOX emissions, 34 times the SCAQMD threshold. However, the EIR finds that, on a "Peak Day," NOX emissions will be only 390 lbs/day. This reduction is unsupported. Also, paving emissions for ROG are unclear (5.95.9?), but divide into 90 lbs/day on a peak day. Hence, while the EIR correctly finds that construction air quality impacts are significant and require mitigation, it fails to disclose the severity of that impact. Additional mitigation measures are also feasible to further reduce construction air quality emissions including the following:

1. Gravel pads must be installed at all access points to prevent tracking of mud onto public roads.
2. Install and maintain trackout control devices in effective condition at all access points where paved and unpaved access or travel routes intersect (eg. Install wheel shakers, wheel washers, and limit site access.)
3. All roadways, driveways, sidewalks, etc., should be completed as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.
4. Pave all construction roads.
5. Pave all construction access roads at least 100 feet on to the site from the main road.
6. Limit fugitive dust sources to 20 percent opacity.
7. Require a dust control plan for earthmoving operations.
8. When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of

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the container shall be maintained.

9. All streets shall be swept at least once a day using SCAQMD Rule 1186 certified street sweepers utilizing reclaimed water trucks if visible soil materials are carried to adjacent streets.
10. The contractor or builder shall designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite.
11. Post a publicly visible sign with the telephone number and person to contact regarding dust complaints. This person shall respond and take corrective action within 24 hours.
12. Extend grading period sufficiently to reduce air quality impacts below a level of significance.
13. The simultaneous disturbance of the site shall be limited to five acres per day.
14. Any vegetative cover to be utilized onsite shall be planted as soon as possible to reduce the disturbed area subject to wind erosion. Irrigation systems required for these plants shall be installed as soon as possible to maintain good ground cover and to minimize wind erosion of the soil.
15. Any on-site stockpiles of debris, dirt or other dusty material shall be covered or watered three times daily.
16. Any site access points within 30 minutes of any visible dirt deposition on any public roadway shall be swept or washed.
17. A high wind response plan shall be formulated for enhanced dust control if winds are forecast to exceed 25 mph in any upcoming 24-hour period.
18. Implement activity management techniques including a) development of a comprehensive construction management plan designed to minimize the number of large construction equipment operating during any given time period; b) scheduling of construction truck trips during non-peak hours to reduce peak hour emissions; c) limitation of the length of construction work-day period; and d) phasing of construction activities.*
19. Develop a trip reduction plan to achieve a 1.5 AVR for construction employees
20. Require high pressure injectors on diesel construction equipment.*
21. Restrict truck operation to "clean" trucks, such as a 2007 or newer model year or 2010 compliant vehicles.*
22. Require the use of CARB certified particulate traps that meet level 3 requirements on all construction equipment.*
23. Utilize only CARB certified equipment for construction activities.*
24. The developer shall require all contractors to turn off all construction equipment and delivery vehicles when not in use and/or idling in excess of 3 minutes.*
25. Restrict engine size of construction equipment to the minimum practical size.*
26. Use electric construction equipment where technically feasible.*
27. Substitute gasoline-powered for diesel-powered construction equipment.*
28. Require use of alternatively fueled construction equipment, using, e.g., compressed natural gas, liquefied natural gas, propane, or biodiesel.*
29. Use methanol-fueled pile drivers.*
30. Install catalytic converters on gasoline-powered equipment.*
31. Require the use of Alternative Diesel Fuels on diesel equipment used. Alternative diesel fuels exist that achieve PM10 and NOx reductions. PuriNOx is an alternative diesel

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formulation that was verified by CARB on January 31, 2001 as achieving a 14% reduction in NOx and a 63% reduction in PM10 compared to CARB diesel. It can be used in any direct-injection, heavy-duty compression ignition engine and is compatible with existing engines and existing storage, distribution, and vehicle fueling facilities. Operational experience indicates little or no difference in performance and startup time, no discernable operational differences, no increased engine noise, and significantly reduced visible smoke.

32. Electrical powered equipment shall be utilized in-lieu of gasoline-powered engines where technically feasible.*
33. All forklifts shall be electric or natural gas powered.*
34. Suspend use of all construction equipment operations during second stage smog alerts.*
35. Provide temporary traffic controls such as a flag person, during all phases of construction to maintain smooth traffic flow.*
36. Provide dedicated turn lanes for movement of construction trucks and equipment on- and off-site.*
37. Reroute construction trucks away from congested streets and sensitive receptor areas.*
38. Configure construction parking to minimize traffic interference.*
39. Prior to the issuance of a grading and building permit, the applicant shall submit verification that a ridesharing program for the construction crew has been encouraged and will be supported by the contractor via incentives or other inducements.*
40. Minimize construction worker trips by requiring carpooling and providing for lunch onsite. *
41. Provide shuttle service to food service establishments/commercial areas for the construction crew.*
42. Provide shuttle service to transit stations/multimodal centers for the construction crew.*
43. Require the use of Zero-VOC paints, coatings, and solvents.

(* Would reduce impacts to GHGs as well)

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Mitigation measure (MM) 4.2.6.1B is uncertain and vague, requiring that contractors "utilize power sources…" This should be amended to read that contractors shall utilize electricity from power poles rather than temporary diesel or gasoline power generators. It is further unclear what is considered to be a "clean-fuel."

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MM 4.2.6.1C requires that, during construction, contractors utilize Tier II equipment. This measure does not go far enough. At least Tier III equipment is feasible and must be required where such equipment is available.

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MM 4.2.6.1K does not require any mitigation, only that "construction specifications and bid documents" include "notations." This language must specify that: "the following mitigation shall be required to be implanted and, to ensure implementation, included in grading plans, construction specifications, and bid documents…" Several of the mitigation measures recommended above are included in this section but are not required of the project due to this language.

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MM 4.2.6.3A does not go far enough. The EIR does not demonstrate that implementation of all of the design features mentioned would be infeasible. Each of these measures must be required.

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Furthermore, it is misleading. Title 24 deals with building energy efficiency, so SmartWay partnerships and other mitigation measures concerning mobile emissions and vehicle standards will not be required to be implemented. ***As most of this project's operational emissions will be derived from mobile sources, and no mitigation measures pertain to reducing these emissions, the mitigation required of this project does not incorporate all feasible mitigation***. The measures under the bullet "Lease purchase documents shall identify that tenants are encouraged to promote the following" should simply be *required* mitigation for the project unless shown to be infeasible. 39

Operational Emissions 40

Impact 4.2.6.3 is unclear.

The Operational Emissions generated by this project are substantial. For instance, the project's NOX emissions will be 990 lbs/day, 18 times the threshold of significance of a 55lb/day increase; CO emissions will well exceed the threshold of significance at 830 lbs/day, one and a half times the threshold of significance of 550; ROG emissions of 143 lbs/day are 2.6 times the 55 lb threshold, and PM10 well exceeds the 150lbs/day threshold at 170lbs/day. (Note: the rounding of emissions downward where such totals are, for instance, 990.93 for NOx, but this number is rounded down to 990, fails to disseminate the *maximum* daily emissions caused by this project.) 41

The mitigation measures adopted to reduce operational emissions fail to reduce mobile emissions, by far the main source of this project's operational emission. (*See,* Table 4.2.K) The project's non-mobile source operational emissions are essentially limited to ROG emissions, yet the mitigation measures focus on the energy efficiency of the building. (e.g. MM 4.2.6.3A) 42

MM 4.2.6.3A does not go far enough and is misleading. All this mitigation measure requires is that the project's building energy efficiency exceed Title 24 by 20 percent. This mitigation does not in any way require the implementation of each of the alternatives listed below. Moreover, as Title 24 deals with building energy efficiency, SmartWay partnerships and other mitigation measures concerning mobile emissions and vehicle standards **will not be required to be implemented in order to satisfy the actual requirement of this mitigation**. The listing of alternatives to satisfy this mitigation measure is misleading and causes the EIR to fail as an informational document. 43

The EIR does not demonstrate that requiring that the project implement each of the alternatives listed at MM 4.2.6.3A is infeasible. Each of these alternatives must be required of the project. 44

With regards to operational mobile source emissions, most of this project's operational emissions will be derived from mobile sources, and no mitigation measures directly pertain to reducing these emissions. ***The mitigation required of this project to reduce operational air quality impacts does not incorporate all feasible mitigation*** as it fails to require the mitigation listed at MM 4.2.6.3A under the bullet "Lease purchase documents shall identify that tenants are encouraged to promote the following" yet does not find such mitigation to be infeasible. These measures must simply be *required* mitigation for the project as these measures will actually 45

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reduce the project's mobile source operational emissions. Likewise, as discussed above, each of the other alternatives listed at MM4.2.6.3 is feasible and must be required of this project.

The following mitigation measures are feasible and must be required of this project:

1. The operator of the primary facilities shall become SmartWay Partner.*
2. The Project shall meet SmartWay 1.25 ratings.*
3. The project shall use only freight companies that meet SmartWay 1.25 ratings.*
4. (ALTERNATIVELY from 2,3 above) The operator of the primary facilities shall incorporate requirements or incentives sufficient to achieve at least 20% per year (as a percentage of previous percentage, not total trips) increase in percentage of long haul trips carried by SmartWay carriers until it reaches a minimum of 90% of all long haul trips carried by SmartWay 1.0 or greater carriers. Results, including backup data shall be reported to the Planning Department semi-annually.*
5. The operator of the primary facilities shall incorporate requirements or incentives sufficient to achieve a 15% per year (as a percentage of previous percentage, not total trips) increase in percentage of consolidator trips carried by SmartWay carriers until it reaches a minimum of 85% of all consolidator trips carried by SmartWay 1.0 or greater carriers. Results, including backup data shall be reported to the Planning Department semi-annually.*
6. All fleet vehicles shall conform to 2010 air quality standards or better. Results, including backup data shall be reported to the Planning Department semi-annually.*
7. All spaces utilizing refrigerated storage, including restaurants and food or beverage stores, shall provide an electrical hookup for refrigeration units on delivery trucks. Trucks incapable of utilizing the electrical hookup for powering refrigeration units shall be prohibited from accessing the site. All leasing documents shall include these requirements and provide that violation of those provisions will constitute a material breach of the lease that will result in the termination of the lease. Because of the fact that these terms of the lease are designed to benefit the public, the public shall be considered to be a third party beneficiary with standing to enforce the requirements of the lease.*
8. Install catalytic converters on gasoline-powered equipment.*
9. Where diesel powered vehicles are necessary, require the use of alternative diesel fuels. Alternative diesel fuels exist that achieve PM10 and NOx reductions. PuriNOx is an alternative diesel formulation that was verified by CARB on January 31, 2001 as achieving a 14% reduction in NOx and a 63% reduction in PM10 compared to CARB diesel. It can be used in any direct-injection, heavy-duty compression ignition engine and is compatible with existing engines and existing storage, distribution, and vehicle fueling facilities. Operational experience indicates little or no difference in performance and startup time, no discernable operational differences, no increased engine noise, and significantly reduced visible smoke.
10. Electrical powered equipment should be utilized in-lieu of gasoline-powered engines where technically feasible.*
11. Utilize electrical equipment for landscape maintenance.*
12. All forklifts shall be electric or natural gas powered.*
13. Utilize electric yard trucks.*
14. Prohibit idling of trucks for periods exceeding three minutes.*

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15. Provide electrical vehicle ("EV") and compressed natural gas ("CNG") vehicles in vehicle fleets.*
16. Charge reduced or no parking fee for EVs and CNG vehicles.*
17. Install EV charging facilities for a minimum of 10% of all parking spaces.*
18. Install a CNG fueling facility.*
19. Provide preferential parking locations for EVs and CNG vehicles.*
20. Implement parking fee for single-occupancy vehicle commuters.*
21. Plant shade trees in parking lots to provide minimum 50% cover to reduce evaporative emissions from parked vehicles.*
22. Plant at least 50 percent low-ozone forming potential (Low-OFP) trees and shrubs, preferably native, drought-resistant species, to meet city/county landscaping requirements.*
23. Plant Low-OFP, native, drought-resistant, tree and shrub species, 20% in excess of that already required by city or county ordinance. Consider roadside, sidewalk, and driveway shading.*
24. Orient 75 percent or more of homes and buildings to face either north or south (within 30 degrees of N/S) and plant trees and shrubs that shed their leaves in winter nearer to these structures to maximize shade to the building during the summer and allow sunlight to strike the building during the winter months.*
25. Provide grass paving, tree shading, or reflective surface for unshaded parking lot areas, driveways, or fire lanes that reduce standard black asphalt paving by 10% or more.*
26. Electrical outlets shall be installed on the exterior walls of all residential and commercial buildings (and perhaps parking lots) to promote the use of electric landscape maintenance equipment.* — 45
27. Prohibit gas powered landscape maintenance equipment within residential, commercial, and mixed-use developments. Require landscape maintenance companies to use battery powered or electric equipment **or** contract only with commercial landscapers who operate with equipment that complies with the most recent California Air Resources Board certification standards, or standards adopted no more than three years prior to date of use or any combination of these two themes.*
28. Provide a complimentary cordless electric lawnmower to each residential buyer.
29. Implement parking cash-out program for non-driving employees.*
30. Require each user to establish a carpool/vanpool program.*
31. Create a car sharing program within the planned community.*
32. Create a light vehicle network, such as a neighborhood electric vehicle (NEV) system.*
33. Provide preferential parking for carpool/vanpool vehicles.*
34. Provide subsidies or incentives to employees who use public transit or carpooling, including preferential parking.*
35. Provide secure, weather-protected bicycle parking for employees.*
36. Provide direct, safe, attractive pedestrian access from project to transit stops and adjacent development.*
37. Provide direct safe, direct bicycle access to adjacent bicycle routes.*
38. Provide showers and lockers for employees bicycling or walking to work.*
39. Short-term bicycle parking for retail customers and other non-commute trips.*
40. Connect bicycle lanes/paths to city-wide network.*
41. Design and locate buildings to facilitate transit access, e.g., locate building entrances near

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transit stops, eliminate building setbacks, etc.*
42. Construct transit facilities such as bus turnouts/bus bulbs, benches, shelters, etc.*
43. Provide a display case or kiosk displaying transportation information in a prominent area accessible to employees or residents.
44. Provide shuttle service to food service establishments/commercial areas.*
45. Provide shuttle service to transit stations/multimodal centers.*
46. Provide on-site child care or contribute to off-site child care within walking distance.*
47. Implement a compressed workweek schedule.*
48. Implement home-based telecommunicating program, alternate work schedules, and satellite work centers.*
49. All buildings shall be constructed to LEED Platinum standards.*
50. Design buildings for passive heating and cooling and natural light, including building orientation, proper orientation and placement of windows, overhangs, skylights, etc.*
51. Construct photovoltaic solar or alternative renewable energy sources sufficient to provide 100% of all electrical usage for the entire Project.*
52. Install an ozone destruction catalyst on all air conditioning systems.*
53. Construct renewable energy sources sufficient to offset the equivalent of 100% of all greenhouse gas emissions from mobile sources (internal combustion engines) for the entire Project. *
54. Purchase only green/ renewable power from the electric company.*
55. Install solar water heating systems to generate all hot water requirements.*

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Cumulative Impacts

The finding of less than significant short-term cumulative impacts is unsupported by evidence in the record. The EIR finds that project individual construction emissions will be significant, and that other projects construction simultaneously will result in short term pollutant impacts. However, the EIR then states that because each project will have to comply with SCAQMD measures such cumulative impact is less than significant. This conclusion is unsupported by the EIR or any reasoning. In fact, here compliance with SCAQMD measures did not reduce short-term air quality impacts below a level of significance, and the presumption that it would for other area projects and the cumulative impact is completely unsupported by any evidence.

The project will result in significant and unmitigated cumulative operational impacts, yet not all feasible mitigation was adopted to reduce this impact. As discussed above, additional mitigation measures must be implemented to reduce operational impacts.

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Biological Resources

The EIR finds that impacts to biological resources will be less than significant with mitigation based on outdated and limited surveys. The EIR therefore fails as an informational document.

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Cultural Resources

The EIR finds that impacts to cultural resources would be less than significant with mitigation with regards to paleontological resource or unique geologic feature. The project site has a "high

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potential to contain significant fossil resources due to the presence of early to middle Pleistocene alluvial fan deposits." The finding of less than significant impacts with mitigation is unsupported as the mitigation required for this potentially significant impact is deficient and fails to incorporate all feasible mitigation. 48

First, MM Cul-1 provides for discontinuing monitoring if "the paleontologist(s) do not find evidence for Pleistocene-era deposits once the maximum excavation depth is reached." This mitigation measure is impermissibly vague as it fails to state what portion of the site must be excavated to maximum depth before this determination of "no evidence" is made. 49

Second, a qualified paleontological monitor may only "salvage fossils" or temporarily halt or divert equipment to remove large specimens while avoiding construction delays. This salvage of fossils fails to account for the potential importance associated with the placement of those fossils across the site or any study or documentation of the specimens at the site. The salvaging will also likely result in the loss of many paleontological resources as the purpose of the mitigation is demonstrated by this method to be, primarily, to "avoid construction delays" and not to avoid damaging paleontological resources. 50

MM Cul-1 also uses the qualification: "If too few fossil remains are found…"; this is impermissibly vague. There is no quantification of "too few" or objective way to determine whether this has occurred. 51

Overall, the mitigation required for archaeological resources fails to reduce impacts below a level of significance through vagueness and inherent deficiencies. Salvaging fossils also fails to further Objective 7.6 of the General Plan to "Identify and preserve Moreno Valley's unique historical and archaeological resources for future generations." The mitigation and potential impacts conflict with Policy 7.6.1 and 7.6.2 will not ensure that the archaeological resources are preserved or mitigated. It is also unclear from the EIR whether Conservation Element Programs, General Plan 9.7.3, program 7-6 has been incorporated where such program requires: "In areas where archaeological or paleontological resources are known or reasonably expected to exist, based upon the citywide survey conducted by the UCR Archaeological Research Unit, incorporate the recommendations and determinations of that report to reduce potential impacts to levels of insignificance." The EIR therefore fails to require all feasible mitigation, ensure enforceable mitigation, and fails as an informational document. 52

Geology and Soils

The project will require excavation, fill, and recompaction. The project description states that approximately 220,000 cubic yards of additional fill will be required. It is unclear whether the EIR considered impacts from the import of fill, such as traffic and air quality impacts from truck trips to and from the project site to the fill import site, an unknown location at this time. Some 80,000 cy of fill has already been imported to the site, yet the impacts from this fill dirt have 53

been segregated from the remainder for the project. Again, project impacts have been underestimated and improperly segmented. 53

The project is also located on a geologic unit or soil that is unstable as soil shrinkage and expansion may occur. The mitigation for expansive soils, MM Geo-2 is deferred and vague. Specifically, such mitigation requires that the project proponent "inform" engineers, architects, owner, maintenance personnel, and other interested parties of the Expansive Soil Guidelines provided in the geotechnical analysis and that such guidelines "shall be reviewed and considered." The guidelines must be required of the project in order for such mitigation to certain and enforceable. 54

GHGs

The EIR finds that the project is consistent with GHG plans, policies, and regulations. The reasoning behind several of these findings is unsupported. For instance with regards to transportation, as discussed above, the project is unlikely does not reduce VMT. 55

Compliance with GHG reduction strategies is also unsupported. For instance, the EIR fails to delineate how an energy efficient building features support achieving a 33 percent renewable energy mix statewide, unless the building will be reliant on renewable energy. Similarly, the EIR fails to show how the project is compliant with engine efficiency measures where the project does not require the use of fuel efficient trucks. 56

There is no GHG reduction plan as part of the City of Moreno Valley's General Plan, hence Tier 2 SCAQMD criteria are improperly applied. Tier 2 criteria is intended for a plan that may be part of a local general plan, for example. Comparing the impacts from this project to statewide emissions in order to find such emissions to be less than significant is improper.

Tier 3 is more properly applied to the industrial project at hand. The screening level for Tier 3 per the December 5, 2008 the SCAQMD Governing Board adoption of interim GHG significance thresholds is less than 10,000 MTCO2eq/yr. CARB's threshold for the same is less than 7,000MTCO2eq/yr and meets construction and transportation performance standards. Applying these interim thresholds to this project, the project is far in exceedence with emissions in the range of 44,000 MTCO2eq/yr. The finding that the project will have a less than significant individual impact on GHGs and climate change is unsupported in light of the interim numerical thresholds established for industrial projects by SCAQMD and ARB, and these omissions cause the EIR to fail as an informational document. Notably, the GHG appendix E delineates these standards at page 22 (from 2010), but they are neither applied nor mentioned in the EIR. 57

The mitigation measure requiring the devising of a comprehensive water conservation strategy is vague and defers mitigation. There is no requirement that the alternatives listed be incorporated 58

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or that the conservation strategy meet any performance standards. 58

Mitigation measure 4.3.6.1A is not mitigation, but a requirement of the California Code of Regulations. 59

Notwithstanding the above deficiencies, the EIR finds cumulative GHG impacts of the project to be significant and unavoidable. 60

Hazards and HazMat

The EIR finds, based on no substantial evidence, that this impact is less than significant. The EIR explains that "potentially hazardous materials…may be used and/or stored on site during the construction and/or occupancy of the proposed industrial facilities." As the tenant of the proposed industrial building is unknown, this impact should be considered potentially significant. Compliance with applicable laws does not necessarily reduce this impact below a level of significance. 61

Hydrology and Water Quality

The project will have a significant impact to water quality which will be mitigated below a level of significance, yet the EIR fails to undertake an evaluation of this impact beyond the cursory review done for the Environmental Assessment. 62

The project will alter the existing drainage onsite. Mitigation Measure Hyd-05 improperly defers mitigation as the EIR fails to provide any reason why the grading plan and/or drainage report cannot be presently prepared but, instead, must be deferred. Deferred mitigation is only permissible where, for practical reasons, it is not feasible to prescribe specific mitigation measures in the EIR. (*Communities for a Better Environment v. City of Richmond* (2010) 184 Cal.App.4th 70, 94.) This caveat is not demonstrated here, and a grading plan and drainage report must be contemporaneously prepared for the EIR. 63

Land Use

The project will conflict with an applicable habitat conservation plan or natural community conservation plan. It is unclear how MM Bio-1 through MM Bio-4 will reduce this impact below a level of significance. The EIR thereby fails as an informational document and impacts to land use should be considered significant and unmitigated. 64

Noise

The EIR arbitrarily creates a threshold for significance for noise of a 3dbA increase, stating that only this level of increase is considered potentially significant and that a 3 dbA change is used as a threshold of significance. This 3dbA change is ***not*** a threshold of significance adopted by the City of Moreno Valley. (Guidelines § 15064.7) Furthermore, the statement that only audible 65

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changes in existing ambient or background noise levels are considered potentially significant is unsupported except by further conclusory statements. 65

The EIR also relies on the City's Municipal Code with regards to prohibited acts and noise disturbances. These figures too are not a threshold of significance and are not noise standards adopted by the City. Rather, they represent punishable acts and violations of the law. Exemptions from sound regulations likewise refer to punishable sound violations and not noise standards adopted by the City. 66

The noise standards adopted by the City are described in the General Plan, Section 6.4, which states that acceptable residential exterior noise standards are within 60-65 CNEL, and interior at 45 dbA CNEL. The City's municipal code sets limits for a noise disturbance as well at the limits of Table 4.4.F, at Residential 60 dBA daytime, 55 dBA nighttime; Commercial 65 dBA daytime, 60dBA nighttime. 67

The EIR states that the noise analysis was done using "the soft site propagation for noise" on the basis that the ground is not pavement in the project vicinity. However, the site itself will be paved, in addition to the roads that vehicles will travel to and from the site. Other uses surrounding the site are also paved and include industrial/warehouse uses to the north, industrial/warehouse and undeveloped property to the south, industrial/warehouse and a self-storage facility to the east, and warehouses, vehicle storage, residences, and undeveloped property to the west. While these uses are interspersed with vacant uses, agricultural and undeveloped land in the project vicinity is zoned for development and will be hastened towards that end through the development of this project and surrounding areas. Overall, the use of soft site analysis is unsupported by the EIR, and noise levels are likely to be much higher than those predicted by the EIR. 68

The noise study relies on a standard vehicle mix to determine traffic noise. This is unsupported given the locale and proposed project use as a distribution facility. 69

The EIR find that the project will increase traffic noise at 5 study roadway segments where four of these segments already exceed the level of significance for noise. This must be considered a significant impact as the project will result in an increase in ambient noise and such noise levels are and will be unacceptable at off-site land uses. 70

The project will also cause exposure and generation of noise levels in excess of General Plan and Municipal Code standards for construction and operation noise. The EIR wrongly looks at noise impacts at the nearest residence, where the proper measure is to look at noise generation at the property line. 71

The EIR concludes that loading and unloading will be "intermittent" and therefore less than significant. However, the warehouse will be a distribution warehouse, with trucks coming and 72

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going, loading and unloading throughout the day. Accordingly, as noise levels will be 75 dBA at 50 feet, the noise impact is significant. 72

The EIR finds long-term traffic and operational noise impacts to be less than significant. However, the entire discussion in the EIR regarding noise is very conclusory and fails to provide any sources for the figures relied upon. 73

The Construction noise analysis is fatally flawed, as the source for typical construction equipment noise is quite outdated, from 1987. It is impossible that construction noise sources from 1987 have not been altered in 25 years. The EIR fails as an informational document by failing to rely on contemporary studies and data. The noise exposure during construction will be much greater than predicted by the EIR. (*See,* attached "Construction Noise Handbook," Chapters 3, 4, and 9, Federal Highway Administration, August 2006, <http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/index.cfm>; and" Construction Noise: Exposure, Effects, and the Potential for Remediation; A Review and Analysis," Electronic Library of Construction Occupational Safety and Health, November/December 2002.) Nonetheless, the EIR concludes that noise levels during construction will be up to 91 dBA at 50 feet. 74

The project will have a significant impact from construction noise that is said to be mitigated below a level of significance. However, as discussed above, such mitigation may not be sufficient after analysis based on contemporary studies. Furthermore, the EIR relies on noise occurring between the hours required by the City. This is not mitigation but the law. 75

As it is uncertain that mitigation will reduce project impacts below a level of significance, the following additional mitigation must be required of the project: 76

1. Temporary noise barriers must be installed during project construction.
2. Where technically feasible, utilize only electrical construction equipment
3. During construction, the developer shall require that all contractors turn off all construction equipment and delivery vehicles when not in use and prohibit idling in excess of 3 minutes.
4. Provide a "windows closed" condition requiring a means of mechanical ventilation (e.g. air conditioning) for all buildings.
5. Provide upgraded windows with a minimum Sound Transmission Class (STC) rating of 34 for all buildings, and/or require the installation of double-paned windows.
6. Keep new transportation facilities away from vibration sensitive areas.
7. When dealing with existing transportation facilities, obvious vibration causes, such as pot holes, pavement cracks, differential settlement in bridge approaches or individual pavement slabs, etc., may be eliminated by resurfacing.
8. Require the use of rubberized asphalt for construction of all roadways and parking areas.
9. Maintain quality pavement conditions that are free of bumps, pot holes, pavement cracks, differential settlement in bridge approaches or individual pavement slabs, etc.
10. Require resurfacing of roads.

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11. Ban heavy trucks near vibration sensitive uses.
12. Use alternate construction methods and tools to reduce construction vibrations. Examples are predrilling of pile holes, avoiding cracking and seating methods for resurfacing concrete pavements near vibration sensitive areas, using rubber tired as opposed to tracked vehicles, placing haul roads away from vibration sensitive areas.
13. Scheduling construction activities (particularly pile driving) for times when it does not interfere with vibration sensitive operations (e.g. night time).

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Mitigation Measure 4.9.6.1D does not mitigate for noise impacts during construction hours.

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Cumulative noise impacts were found to be "No Impact." This conclusion is unsupported. The discussion of cumulative traffic noise impacts is unsupported.

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Transportation

Traffic counts from the project are low given the project's 264 dock doors, parking for 368 trucks and trailers, and parking for 589 passenger vehicles.

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The EIR fails to study many intersections that will be impacted by the project, particularly along Harley Knox Boulevard en route to I-215. Also, no freeway connection to the north was evaluated at Cactus, and no evaluation of impacts to the south to the Ramona Expressway was conducted. The EIR fails as an informational document by failing to study impacts to these intersections. The EIR also fails to look at future traffic impacts.

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The EIR attempts to minimize the project's significant and unmitigated traffic impacts by segregating impacts to existing versus 2013 and local intersections and roadways versus freeway segments.

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The project will result in significant and unmitigated cumulative traffic impacts, resulting in less 10 intersections and 4 roadway segments operating as below the City's LOS standard. Additionally, 3 freeway segments and ramp merge/diverge areas would operate at unsatisfactory levels of service. Despite these impacts, the project does not require any additional mitigation at these intersections or roadways beyond contribution to the DIF and TUMF.

82

The EIR finds that impacts to intersections and roadway segments within the DIF and TUMF programs will be reduced below a level of significance despite the fact that many of these improvements are not yet funded and will likely not be funded for some time. Mitigation is therefore uncertain and deferred. It appears that the only improvement currently planned is widening of Perris Boulevard, to be completed in May 2013. Nonetheless, the EIR finds that impacts based on Opening year 2013 plus project will be mitigated to less than significant at all significantly impacted roadway segments and intersections other than the I-215 segments and ramps. The fact that an improvement is part of the DIF or TUMF program does not ensure that it will soon be planned or funded, and surely does not ensure that it will be planned, funded, and

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built by 2013 to reduce impacts to less than significant. 83

In fact, the roadways reliant on TUMF funds are not presently scheduled for improvement nor are the improvements funded. (*See, e.g., 2011 Annual Report, Transportation Uniform Mitigation Fee Program,* Western Riverside Council of Governments, "Five Year Transportation Improvement Program," <http://www.wrcog.cog.ca.us/downloads/AnnualReport_for_web.pdf>, p.39, *See, also,* <http://www.wrcog.cog.ca.us/downloads/2012CentralZoneTIP020612.pdf> [detailing funded expenditures in the Central Zone]) Furthermore, TUMF improvements can take up to 9 years to become a reality from a local jurisdiction developing a project to completion of construction. (*2011 Annual Report, Transportation Uniform Mitigation Fee Program, supra,* p.7) Project prioritization, programming, and allocation of funds may also be a barrier to improvements on the roadways impacted by this project. (*2011 Annual Report, Transportation Uniform Mitigation Fee Program, supra,* p.10) The EIR's conclusion that project transportation impacts on local roadways and intersections is less than significant after mitigation is simply not supported by evidence and the realities of these fair share programs. 84

With regards to DIF funding, the EIR even states that, "As part of its Capital Improvement program, the City determines the timing of necessary roadway improvements based on periodic review of citywide traffic counts, traffic trends, and a review of traffic accidents." The finding of less than significant impact after mitigation at these impacted intersections and roadway segments is therefore unsupported as such reduction to a level below significance may not occur in the short-term, long-term, or ever if these roadways are not given priority. 85

Mitigation requiring direct funding and completion of improvements at impacted roadways and intersections must be required of the project unless demonstrated to be infeasible. As the project currently stands, not all feasible mitigation has been required of this project to reduce traffic related impacts below a level of significance, and mitigation is uncertain and deferred. 86

Consistency with Local and Regional Plans

The EIR finds that the project is consistent with the SCAQMD AQMP, however the EIR previously found that the project failed to meet SCAQMD's requirements with regard to air quality control for mobile sources and construction emissions. 87

Consistency with the Transportation chapter of the 2008 RCP is unsupported. The statement that the proposed project will "limit[] the need for vehicle travel" and therefore satisfy the goal of "A more efficient transportation system that reduces and better manages vehicle activity" is erroneous. As discussed above, the project will have significant and unmitigated traffic impacts, and reliance on the TUMF and DIF programs provides for uncertain mitigation for traffic impacts. 88

Consistency with the Economy Chapter is likewise unsupported by the EIR. The Goal of 89

"diversifying the region's economy" is not satisfied by "add[ing] to the City's portfolio of industrial services." Said another way, the project will add more industrial services to already existing/proposed industrial services, the opposite of diversifying the region's economy. 89

The EIR finds that the project is consistent with the Compass Growth Vision Principles, yet fails to evaluate how the project is consistent with these principles. The evaluation provides is generalized and fails to discuss how the project is, in fact, consistent with principles 1, 2, and 4 re: improving mobility, fostering livability, and promoting sustainability for future generations. The finding of inconsistency is unsupported by the EIR and, again, the EIR fails as an informational document. 90

Segmentation

The project site has already received 80,000 cubic yards of fill of the total 300,000 cubic yards required onsite. The impact from this fill importation was segmented from the project as a whole. Such importation, upon evaluation in the EIR, would likely push the project construction impacts further above several threshold of significance and would likely lead to the exceedance of PM2.5, among perhaps others. 91

Alternatives

Where there is an environmentally superior alternative that significantly decreases the significant impacts of the Project then that alternative must be approved rather than the Project if that alternative is feasible, even if the alternative would impede to some degree the attainment of the project objectives, or would be more costly. [(PRC§ 21002; *Uphold Our Heritage v. Town of Woodside* (2007) 147 Cal.App.4th 587, 597, State CEQA Guidelines § 15126.6(b)]

In this case, both the no project alternative and the reduced intensity alternative would reduce impacts when compared with the project. The reduced intensity alternative would reduce several impacts below a threshold of significance when compared to the proposed project. The reduced intensity alternative would also satisfy most of the project objectives. Accordingly the reduced intensity alternative must be approved over the project. 92

The EIR undermines the reduced intensity alternative by claiming that impacts would be similar; this claim is entirely unsupported by the facts and figures provided in comparison. For instance, with regards to traffic impacts, the EIR finds that impacts to roadways and intersections would be reduces. The EIR then, however, finds that the impact "would be similar." The EIR also finds that the reduced intensity alternative fails to satisfy several project objectives; these findings are likewise unsupported by the evidence. For instance, the EIR states that the reduced intensity alternative fails to meet the objective of clustering industrial warehouses near efficient access points. However, the reduced intensity alternative does not move the project. Nonetheless, the reduced intensity alternative substantially reduces impacts and meets most 93 94 95

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project objectives. Accordingly, it must be approved rather than the project. 95

Lastly, the final line of the environmentally superior alternative pertains to an alternative site. There is no discussion of an alternative site with regards to the reduced intensity alternative. The EIR is misleading and fails as an informational document by claiming that the reduced intensity alternative fails to meet objectives related to location because of an alternative site. 96

Conclusion

Thank you for your consideration of these comments and the attached and/or referenced material.

Sincerely,

Raymond W. Johnson
JOHNSON & SEDLACK

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Attachments and Electronic Citations

(1) Western Riverside Council of Governments, *2011 Annual Report, Transportation Uniform Mitigation Fee Program,* <http://www.wrcog.cog.ca.us/downloads/AnnualReport_for_web.pdf>

(2) Western Riverside Council of Governments, *Funded Expenditures in the Central Zone,* <http://www.wrcog.cog.ca.us/downloads/2012CentralZoneTIP020612.pdf.>

(3) The Press Enterprise, Jack Katzanek (February 1, 2012)*"Moreno Valley: Sketchers' warehouse has caused net job loss,"* <http://www.pe.com/business/business-headlines/20120201-moreno-valley-skechers-warehouse-has-caused-net-job-loss.ece>

(4) *The Health Effects of Air Pollution on Children*, Michael T. Kleinman, Ph.D, Fall 2000, <http://aqmd.gov/forstudents/health_effects_on_children.html#WhyChildren>

(5) *Diesel and Health in America: the Lingering Threat*, Clean Air Task Force, February 2005, <http://www.catf.us/resources/publications/files/Diesel_Health_in_America.pdf>

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(6) Annual Meeting of the Brain & Lung Tumor and Air Pollution Foundation, April 2, 2010, <http://www.aqmd.gov/hb/2010/April/100425a.htm>

(7) *Technical Support Document for Cancer Potency Factors: Methodologies for derivation, listing of available values, and adjustments to allow for early life stage exposures*, California EPA OEHHA Air Toxicology and Epidemiology Branch, April 2009, p. 3. <http://www.oehha.ca.gov/air/hot_spots/pdf/TSDCPFApril_09.pdf.>

(8) California Air Pollution Control Officers Association. (January 2008) *CEQA & Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act*.

(9) U.S. Department of Transportation, Federal Highway Administration. (August 2006) *Construction Noise Handbook, Chapters 3, 4, and 9* <http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/index.cfm>

(10) Electronic Library of Construction Occupational Safety and Health (November/December 2002) *Construction Noise: Exposure, Effects, and the Potential for Remediation; A Review and Analysis.*

(11) U.S. Department of Housing and Urban Development. (March 1985) *The Noise Guidebook.*

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(12) Suter, Dr. Alice H., Administrative Conference of the United States. (November 1991) *Noise and Its Effects*.

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Johnson & Sedlack, an Environmental Law firm representing plaintiff environmental groups in environmental law litigation, primarily CEQA.

City Planning:

Current Planning

- Two years principal planner, Lenexa, Kansas (consulting)
- Two and one half years principal planner, Lee's Summit, Missouri
- One year North Desert Regional Team, San Bernardino County
- Thirty years subdivision design: residential, commercial and industrial
- Thirty years as applicants representative in various jurisdictions in: Missouri, Texas, Florida, Georgia, Illinois, Wisconsin, Kansas and California
- Twelve years as applicants representative in the telecommunications field

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General Plan

- Developed a policy oriented Comprehensive Plan for the City of Lenexa, Kansas.
- Updated Comprehensive Plan for the City of Lee's Summit, Missouri.
- Created innovative zoning ordinance for Lenexa, Kansas.
- Developed Draft Hillside Development Standards, San Bernardino County, CA.
- Developed Draft Grading Standards, San Bernardino County.
- Developed Draft Fiscal Impact Analysis, San Bernardino County

Environmental Analysis

- Two years, Environmental Team, San Bernardino County
  - Review and supervision of preparation of EIR's and joint EIR/EIS's
  - Preparation of Negative Declarations
  - Environmental review of proposed projects
- Eighteen years as an environmental consultant reviewing environmental documentation for plaintiffs in CEQA and NEPA litigation

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Representation:

- Represented various clients in litigation primarily in the fields of Environmental and Election law. Clients include:
  - Sierra Club
  - San Bernardino Valley Audubon Society
  - Sea & Sage Audubon Society
  - San Bernardino County Audubon Society
  - Center for Community Action and Environmental Justice
  - Endangered Habitats League
  - Rural Canyons Conservation Fund
  - California Native Plant Society
  - California Oak Foundation
  - Citizens for Responsible Growth in San Marcos
  - Union for a River Greenbelt Environment
  - Citizens to Enforce CEQA
  - Friends of Riverside's Hills
  - De Luz 2000
  - Save Walker Basin
  - Elsinore Murrieta Anza Resource Conservation District

Education:

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- B. A. Economics and Political Science, Kansas State University 1970
- Masters of Community and Regional Planning, Kansas State University, 1974
- Additional graduate studies in Economics at the University of Missouri at Kansas City
- J.D. University of La Verne. 1997 Member, Law Review, Deans List, Class Valedictorian, Member Law Review, Published, Journal of Juvenile Law

Professional Associations:

- Member, American Planning Association
- Member, American Institute of Certified Planners
- Member, Association of Environmental Professionals
- Member, U.S. Green Building Council, LEED GA

Johnson & Sedlack, Attorneys at Law
26785 Camino Seco 12/97- Present
Temecula, CA 92590
(951) 506-9925

Principal in the environmental law firm of Johnson & Sedlack. Primary areas of practice are environmental and election law. Have provided representation to the Sierra Club, Audubon Society, AT&T Wireless, Endangered Habitats League, Center for Community Action and Environmental Justice, California Native Plant Society and numerous local environmental groups. Primary practice is writ of mandate under the California Environmental Quality Act.

Planning-Environmental Solutions
26785 Camino Seco 8/94- Present
Temecula, CA 92590
(909) 506-9825

Served as applicant's representative for planning issues to the telecommunications industry. Secured government entitlements for cell sites. Provided applicant's representative services to private developers of residential projects. Provided design services for private residential development projects. Provided project management of all technical consultants on private developments including traffic, geotechnical, survey, engineering, environmental, hydrogeological, hydrologic, landscape architectural, golf course design and fire consultants. 97

San Bernardino County Planning Department
Environmental Team 6/91-8/94
385 N. Arrowhead
San Bernardino, CA 92415
(909) 387-4099

Responsible for coordination of production of EIR's and joint EIR/EIS's for numerous projects in the county. Prepared environmental documents for numerous projects within the county. Prepared environmental determinations and environmental review for projects within the county.

San Bernardino County Planning Department
General Plan Team 6/91-6/92
385 N. Arrowhead
San Bernardino, CA 92415
(909) 387-4099

Created draft grading ordinance, hillside development standards, water efficient landscaping ordinance, multi-family development standards, revised planned development section and fiscal impact analysis. Completed land use plans and general plan amendment for approximately 250 square miles. Prepared proposal for specific plan for the Oak Hills community.

San Bernardino County Planning Department
North Desert Regional Planning Team
15505 Civic 6/90-6/91
Victorville, CA
(619) 243-8245

Worked on regional team. Reviewed general plan amendments, tentative tracts, parcel maps and conditional use permits. Prepared CEQA documents for projects.

Broadmoor Associates/Johnson Consulting
229 NW Blue Parkway
Lee's Summit, MO 64063
(816) 525-6640 2/86-6/90

Sold and leased commercial and industrial properties. Designed and developed an executive office park and an industrial park in Lee's Summit, Mo. Designed two additional industrial parks and residential subdivisions. Prepared study to determine target industries for the industrial parks. Prepared applications for tax increment financing district and grants under Economic Development Action Grant program. Prepared input/output analysis of proposed race track Provided conceptual design of 800 acre mixed use development.

Shepherd Realty Co.
Lee's Summit, MO 6/84-2-86

Sold and leased commercial and industrial properties. Performed investment analysis on properties. Provided planning consulting in subdivision design and rezoning.

Contemporary Concepts Inc.
Lee's Summit, MO 9/78-5/84
Owner

Designed and developed residential subdivision in Lee's Summit, Mo. Supervised all construction trades involved in the development process and the building of homes.

Environmental Design Association
Lee's Summit, Mo.
Project Coordinator 6/77-9/78

Was responsible for site design and preliminary building design for retirement villages in Missouri, Texas and Florida. Was responsible for preparing feasibility studies of possible conversion projects. Was in charge of working with local governments on zoning issues and any problems that might arise with projects. Coordinated work of local architects on projects. Worked with marketing staff regarding design changes needed or contemplated.

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City of Lee's Summit, MO
220 SW Main
Lee's Summit, MO 64063
Community Development Director 4/75-6/77

Supervised Community Development Dept. staff. Responsible for preparation of departmental budget and C.D.B.G. budget. Administered Community Development Block Grant program. Developed initial Downtown redevelopment plan with funding from block grant funds. Served as a member of the Lee's Summit Economic Development Committee and provided staff support to them. Prepared study of available industrial sites within the City of Lee's Summit. In charge of all planning and zoning matters for the city including comprehensive plan.

Howard Needles Tammen & Bergendoff
9200 Ward Parkway
Kansas City, MO 64114
(816) 333-4800 5/73-4/75
Economist/Planner

97

Responsible for conducting economic and planning studies for Public and private sector clients. Consulting City Planner for Lenexa, KS.

Conducted environmental impact study on maintaining varying channel depth of the Columbia River including an input/output analysis. Environmental impact studies of dredging the Mississippi River. Worked on the Johnson County Industrial Airport industrial park master plan including a study on the demand for industrial land and the development of target industries based upon location analysis. Worked on various airport master plans. Developed policy oriented comprehensive plan for the City of Lenexa, KS. Developed innovative zoning ordinance heavily dependent upon performance standards for the City of Lenexa, KS.

2.10 RESPONSE TO LETTER D

Johnson & Sedlack

Response to Comment D-1. The commentor has accurately summarized the general aspects of the proposed project. No further response is necessary.

Response to Comment D-2. The City agrees that the major tenent of CEQA is that it is a disclosure process; therefore, your letter along with all the other comments and responses will be forwarded to the City decision makers for their consideration in the review of the EIR. No further response is necessary.

Response to Comment D-3. The commentor's opinions on the quality of the environmental assessment that was done will be forwarded to the decision-makers for their consideration. The City disagrees with the commentor's generalized assertions regarding the adequacy of the VIP Moreno Valley Draft EIR. The comment that the conclusions in the EIR are not based in fact is erroneous. The Draft EIR is based on the findings of technical studies that were prepared for the project that were included in their entirety in the appendices to the Draft EIR. Those studies are:

- General Habitat Assessment, 71± Site (APNs: 316-210-071, -073, -075, -076), Moreno Valley, Riverside County California, Ecological Sciences, Inc., August 1, 2010.
- Jurisdictional Survey and MSHCP Riparian/Riverine/Vernal Pools Evaluation, 71± Site (APNs: 316-210-071, -073, -075, -076), Moreno Valley, Riverside County California, Ecological Sciences, Inc., November 1, 2009.
- Focused Surveys for Selected Criteria Area and Narrow Endemic Plant Species, 71± Site (APNs: 316-210-071, -073, -075, -076), Moreno Valley, Riverside County California, Ecological Sciences, Inc., November 9, 2009.
- Focused Western Burrowing Owl Survey, 71± Site (APNs: 316-210-071, -073, -075, -076), Moreno Valley, Riverside County California, Ecological Sciences, Inc., November 11, 2009.
- Phase I Cultural Resources Assessment and Paleontological Records Review Perris Boulevard Project, Moreno Valley, Riverside County, California, Michael Brandman Associates, March 22, 2007.
- Geotechnical Engineering Investigation Proposed Industrial Development Southwest Corner of Perris Boulevard and Grove View Road Moreno Valley, California, NorCal Engineering, March 7, 2007.
- Phase I Environmental for the Evaluation of Potentially Hazardous Materials, Centec Engineering, February 23, 2007.
- Preliminary Hydrology Report and Hydraulic Analysis for PA09-004, VIP Moreno Valley, SWC Perris Boulevard and Grove View Road, Robert A. Bebensee, R.C.E., March 27, 2009.
- Preliminary Water Quality Management Plan, for PA09-0004 VIP Moreno Valley, SWC Perris Boulevard and Grove View Road, Robert A. Bebensee, R.C.E., July 24, 2009.
- Water Supply Assessment for City of Moreno Valley Plot Plan Application PA09-004, Eastern Municipal Water District, January 20, 2010.
- LESA Modeling Worksheets, LSA Associates, Inc., August 2011.
- Air Quality Analysis VIP Moreno Valley, LSA Associates, Inc., March 2012.
- Health Risk Assessment VIP Moreno Valley, LSA Associates, Inc., March 2012.

- Greenhouse Gas Emissions and Global Climate Change Study, LSA Associates, Inc., December 2011.
- Noise Impact Analysis VIP Moreno Valley, LSA Associates, Inc., March 2012.
- Traffic Study VIP Moreno Valley, LSA Associates, Inc., April 9, 2012.

The Initial Study that was prepared for the proposed project determined that impacts on biological resources, cultural resources, geology, and hydrology and water quality would be less than significant with the implementation of mitigation not potentially significant requiring further analysis in an EIR. Those specific mitigation measures are identified in the Initial Study, Section 2.0 of the EIR and are also included in the Mitigation Monitoring and Reporting Plan (MMRP) attached to the Final EIR. The City formally initiated the environmental process with circulation of an NOP along with the Initial Study , which it sent to responsible agencies and interested individuals for a 30-day review period from August 26 to September 26, 2011. At the close of the public review period, the City had received 12 letters on the NOP. The NOP disclosed that an EIR would be prepared and the issues that would be addressed are agricultural and forest resources, air quality, greenhouse gases and global climate change, noise and transportation. None of the responses to the NOP asked that biological resources, cultural resources, geology, and hydrology and water quality be evaluated in the EIR. As a result the City is not concealing information from the public on the significance of impacts.

Response to Comment D-4. The City respectfully disagrees with the commentor's opinion that the findings in the EIR are not supported by substantial evidence. (also refer to Response to Comment D-3).

Response to Comment D-5. As appropriate, a portion of the mitigation measures suggested by the commentor (refer to Response to Comment D-45) have been incorporated in the Final EIR to further reduce impacts but these mitigation measures do not change the conclusions or analysis in the Draft EIR. All mitigation measures that are in the Draft EIR and mitigation added as a result of responses to D-45, D-34 and E-51 through D– 53 have been included in the MMRP (Section 4.0 of the Final EIR) to ensure that they are being implemented.

Response to Comment D-6. It is the commentor's opinion that the mitigation measures in the EIR are vague, uncertain, and unenforceable and are not based in fact nor does the commentor provide any examples. As detailed in the following responses, appropriate and enforceable mitigation of the project's significant individual and cumulative impacts have been identified in the Draft EIR.

Response to Comment D-7. It is not clear as to what the commentor is referring to in stating "several "alternatives" listed in the EIR will not satisfy the actual mitigation required, while other mitigation measures merely require the incorporation of writings, not actions."

The alternatives (Section 6.0 of the Draft EIR) are in compliance with *CEQA Guidelines* Section 15126.6(a), where the Draft EIR describes "a range of reasonable alternatives to the project, or to the location of the project which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project." The EIR need not consider every conceivable alternative; rather it must consider a reasonable range of potentially feasible alternatives to the project, or to the location of the project, which would avoid or substantially lessen significant effects of the project, even if "these alternatives would impede to some degree the attainment of the project objectives, or would be more costly" (*CEQA Guidelines* Section 15126.6(b)). The discussion of project alternatives must "include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project." The alternatives are to "substantially lessen the significant effects of the project", not to satisfy the actual mitigation required.

It is not clear by what the commentor means as to the mitigation measures "merely require incorporation of writings" and no examples were provided by the commentor to clarify the meaning of the statement.

Response to Comment D-8. The commentor inaccurately suggests that the project should be required to obtain a LEED gold or platinum rating as a form of mitigation of significant impacts associated with air pollution and greenhouse gas emissions impacts. The process of obtaining a LEED rating of any level (LEED ratings levels are Certified, Silver, Gold, and Platinum, with Platinum being the highest) is not mitigation. However, the specific green building features that are part of the LEED rating equation can reduce air pollution and greenhouse gas emissions impacts by minimizing and reducing the quantity of emissions. Mitigation Measure 4.2.6.3.A in the Draft EIR prescribes a performance standard requiring a 20% improvement in energy efficiency (over and above the 2008 CBC) for the building and lists suggested measures that can be included in the building's design to obtain this improvement in energy efficiency. As stated in Mitigation Measure 4.2.6.3.A (Draft EIR page 4.2-26): *"Any combination of design features, including but not limited to the following list, may be used to fulfill this requirement provided that the total increase in energy efficiency meets or exceeds 20 percent:"* With implementation of this measure, the building will meet the 20% performance standard which will render greenhouse gas emissions impacts to a less than significant level on a project-specific basis.

Regarding air quality impacts, many of the suggested mitigation measures have been added in the Final EIR, are incorporated in the Draft EIR already, or were determined to be infeasible. For a list of those mitigation measures please refer to the Tables contained in Response to Comments D-34 regarding construction mitigation measures and D-45 regarding operational mitigation measures.

For clarification purposes, the Level of Significance After Mitigation conclusion regarding the project-specific impact associated with climate change and greenhouse gas emissions that appears on page 4.3-26 has been modified as shown below and as indicated in Section 3.0 Errata in the Final EIR:

Draft EIR, Section 4.3.6.1 Greenhouse Gas Emissions, Page 4.3-26

> **Level of Significance After Mitigation.** The mitigation measures identified above would contribute to a reduction in GHG emissions from energy, mobile, and water usage sources. With implementation of the identified mitigation measures, the proposed project's GHG emissions are reduced. As described above, project-related GHG emissions are not confined to a particular air basin but are dispersed worldwide. Consequently, it is speculative to determine how project-related GHG emissions would contribute to global climate change and how global climate change may impact the State. Therefore, project-related GHG emissions are not project-specific impacts to global warming but are instead the project's contribution to this cumulative impact. As stated previously, project-related GHG emissions and their contribution to global climate change impacts in the State are less than significant ~~and less than cumulatively considerable~~ on a project specific basis because: (1) the project's impacts alone would not cause or significantly contribute to global climate change, and (2) the project has no substantial effect on consumption of fuels or other energy resources, especially fossil fuels that contribute to GHG emissions when consumed. However, project-related GHG emissions and their contribution to global climate change impacts are considered to be cumulatively considerable.

Response to Comment D-9. Please see Response to Comment D-8. In addition, a portion of the air quality mitigation measures suggested by the commentor have been incorporated to further reduce air quality and impacts. Please refer to the Table contained in Response to Comment D-45. However, these mitigation measures do not change the conclusions or analysis in the Draft EIR.

Response to Comment D-10. The commentor incorrectly asserts that the project's traffic impacts are not fully mitigated through contribution to TUMF and DIF. As elaborated in Responses to Comments D-82 through D-85, the project's payment of these fees will result in full and complete mitigation.

Response to Comment D-11. The commentor incorrectly asserts that the environmentally superior alternative meets most project objectives and must be approved instead of the proposed project. Although the environmentally superior alternative (reduced density) will result in reduced air pollution and GHG emissions, impacts associated with these issues would remain significant and unavoidable for air quality, greenhouse gas emissions, and traffic in the same manner as the proposed project (see Draft EIR Section 6.4 Comparison of Project Alternatives, Table 6.K, page 6-31). Also refer to Responses to Comments D-92 through D-95 for further elaboration on this subject.

Response to Comment D-12. While the Draft EIR does acknowledge that "*Development of the project site would introduce a new source of light and glare into the area in the form of street lighting, parking lot lighting, and security lighting for the buildings*" the Draft EIR does not state that the project would result in the introduction of a substantial new source of light as asserted by the commentor. The Draft EIR includes an analysis of potential light and glare impacts that may occur as a result of project implementation.

As noted in the Draft EIR, "*project-related lighting impacts were determined to be less than significant because all development in the City, which includes light generated from warehouse buildings and parking lots, is required to adhere to lighting requirements contained in the City's Municipal Code (Section 9.08.100 Lighting), which states that any outdoor lighting associated with nonresidential uses shall be shielded and directed away from the surrounding residential uses. Such lighting shall not exceed one-half foot-candle at all property lines and shall not blink, flash, oscillate, or be of unusually high intensity or brightness. Lighting in parking areas and drive aisles must be at least 1.0 foot-candle and cannot exceed a maximum of 8 foot-candles. Adherence to the City's Zoning Code would ensure that any building or parking lighting would not significantly impact adjacent uses. Therefore, impacts associated with this issue are less than significant and no mitigation is required."*

Response to Comment D-13. The commentor misidentifies the existing farmland designations on-site. As detailed in the Draft EIR (Section 4.1 Agriculture and Forestry Resources, page 4.1-5), "*Approximately 16.89 acres (23%) of the project site is designated as Prime Farmland,*[1] *16.23 acres (23%), is designated Farmland of Statewide Importance, and 38.69 acres (54%) is designed Farmland of Local Importance.*" No Unique Farmland exists on-site. Additionally, the Draft EIR accurately identifies that the project would result in the significant and unavoidable conversion of farmland to a non-agricultural use (Draft EIR Section 4.1.6.1 Conversion of State Designated Farmland, page 4.1-14).

Response to Comment D-14. The comment is noted. As described in Section 4.1.6.1 Conversion of State Designated Farmland, page 4.1-10 of the Draft EIR, "*The conversion of the 16.89 acres of on-site Prime Farmland would be equivalent to 0.03 percent of the total loss of Prime Farmland in the County during this period. Similarly, the conversion of the 16.23 acres of on-site Farmland of Statewide Importance would be equivalent to 0.07 percent of the total loss of Farmland of Statewide Importance in the County during this period. The conversion of the 38.69 acres of on-site Farmland of Local Importance would be equivalent to 1.89 percent of the total loss of Farmland of Local Importance in the County during this period*." This level of conversion expressed in percentages that would occur with project implementation over the course of a two-year reporting period for the County

[1] Important Farmland Map Riverside County, Farmland Mapping and Monitoring Program, 2004.

does not represent a substantial conversion of farmland within the County. Furthermore, the Draft EIR accurately identifies that the project would result in the significant and unavoidable conversion of on-site farmland to a non-agricultural use (Draft EIR, Section 4.1.6.1 Conversion of State Designated Farmland, page 4.1-14).

Response to Comment D-15. There are no agricultural land uses designated or zoned adjacent to the proposed project site. As described in the Draft EIR (Section 4.1 Agriculture and Forestry Resources, page 4.1-1), "*Developed properties in the vicinity include a waste transfer station and an industrial/warehouse to the north; industrial/warehouse and undeveloped property to the south; industrial/warehouses and a self-storage facility to the east; and warehouses, vehicle storage, residences, and undeveloped property to the west. Active agricultural operations (alfalfa) take place on properties located to the southwest of the project site, west of Indian Street and south of Harley Knox Boulevard"*. The active agricultural uses identified in the Draft EIR are approximately 1,000 feet away.

The Draft EIR does not play down the effect of on-site development on adjacent agricultural uses or on properties along truck routes or citywide. As identified in the Draft EIR (Section, 4.1.6.1 Conversion of State Designated Farmland, page 4.1-12), "*the City has specifically recognized that the conversion of agricultural land under its jurisdiction is an eventual and expected outcome of current and future growth. The current General Plan does not include any agricultural designations. The City allows agricultural uses in all land use designations as an interim use until such time as the land is developed per the vision identified in the General Plan. One of the goals stated in the City's recent General Plan is the '…orderly conversion of agricultural lands.' The proposed project is a continued extension of development in the surrounding area (industrial/business park). The proposed project does not interfere with the ability of other adjacent properties to be used for agricultural production should the property owner wish to do so, nor does it create any gaps of vacant or agricultural land between the proposed project and the existing adjacent development."* As described in the Draft EIR, the City's General Plan and General Plan EIR have considered and evaluated the eventual and expected conversion of agricultural activity within the City. The City has already anticipated the eventual conversion of all agricultural activity within the City.

Furthermore, to predict potential impacts of the conversion of active agricultural operations that are occurring citywide as a result of the implementation of the proposed project is speculative and outside the scope of the Draft EIR and CEQA. Agricultural activity within the City is an interim use until such time a development proposal is submitted for a particular project, which cannot be predicted.

Response to Comment D-16. The potential mitigation measures identified in this comment are not considered to be feasible by the City of Moreno Valley as determined in the City's General Plan EIR. As identified in the Draft EIR (Section 4.1.6.1 Conversion of State Designated Farmland, page 4.1-13), "*Williamson Act contracts are entered into voluntarily by property owners and the City cannot force owners to participate in this program. The City does have the ability to encourage property owners to participate in Williamson Act programs; however, this is expected to result only in temporary preservation of agricultural land since property owners have the option of non-renewal of these contracts at any time after the ten-year contract period ends. The land would then be available to be developed with urban uses.*

Providing protection for ongoing agricultural activities from new developments, such as requiring buffers between agricultural operation and new development or requiring the notification and disclosure of agricultural activities to the purchasers adjacent properties will not permanently protect agricultural land.

The purchase or transfer of development rights, purchase of conservation easements, or donation of funds to assist in the conservation of agricultural land would need to be implemented to ensure the preservation of agricultural land. As stated previously, the City anticipates the conversion of agricultural land within the City and does not set aside land for permanent preservation. The City expects that the majority of the land within the City will be converted to urban uses, although some agriculture will continue as interim uses, as allowed by the City's Development Code for all zoning categories. Moreno Valley has determined that these measures are economically infeasible based on the higher costs associated with land, water and labor, increased environmental regulation, and competition from neighboring regions where agricultural operations are less costly; thus, resulting in an inability to make farming profitable. Furthermore, these measures are contrary to the City's vision (as stated in its General Plan) for the project site; therefore, they are not feasible and alternative mitigation has not been identified."

The Table below contains the suggested mitigation measures by the commentor. The responses determine whether the Draft EIR contains the mitigation measure, if the mitigation will be added mitigation as part of the Final EIR, or if it will not be included and why.

Suggested Mitigation Measure	Response
1. The purchase of agricultural conservation easements;	**Economically infeasible.** Based on the higher costs associated with land, water and labor, increased environmental regulation, and competition from neighboring regions where agricultural operations are less costly; thus, resulting in an inability to make farming profitable. The site has been planned for industrial uses since 1987, the City has recognized that the conversion of agricultural land under its jurisdiction is an eventual and expected outcome of current and future growth and the current General Plan does not include any agricultural designations; therefore mitigation for the loss of is not required. An easement does not compensate for the impact by replacing or providing substitute resources or environments (i.e., the easement would not create any new farmland where no farmland presently exists). See Fourth District Court of Appeal, *Cherry Valley Pass Acres and Neighbors v. City of Beaumont* (2010) 190 Cal.App.4th 316 (*Cherry Valley*)
2. Transfer of development rights;	**Economically infeasible.** Based on the higher costs associated with land, water and labor, increased environmental regulation, and competition from neighboring regions where agricultural operations are less costly; thus, resulting in an inability to make farming profitable.
3. Acquisition of farmland by the city or county;	**Economically infeasible**. Based on the higher costs associated with land, water and labor, increased environmental regulation, and competition from neighboring regions where agricultural operations are less costly; thus, resulting in an inability to make farming profitable No mechanism for the mitigation of impacts to State-designated Farmland and/or existing agricultural operations has been enacted by either the City of Moreno Valley or the County of Riverside. Rather, the City has specifically recognized that the conversion of agricultural land under its jurisdiction is an eventual and expected outcome of current and future growth. The current General Plan does not include any agricultural designations.
4. Mitigation banking;	**Economically infeasible**. Neither the City of Moreno Valley or the County have a mechanism in place for mitigation banking. The site has been planned for industrial uses since 1987, the City has recognized that the conversion of agricultural land under its jurisdiction is an eventual and expected outcome of current and future growth and the current General Plan does not include any agricultural designations; therefore mitigation for the loss of is not required. In addition, there is not any agricultural zoned land in the City for the City or County to purchase.

Suggested Mitigation Measure	Response
5. The establishment of "urban limits," greenbelts, and buffers;	**Not sufficient.** Will not result in permanent protection of agricultural lands. There is no mechanism for the mitigation of impacts to State-designated Farmland and/or existing agricultural operations has been enacted by either the City of Moreno Valley or the County of Riverside. Rather, the City has specifically recognized that the conversion of agricultural land under its jurisdiction is an eventual and expected outcome of current and future growth. The current General Plan does not include any agricultural designations.
6. The payment of in-lieu fees sufficient to a purchase and maintain farmland conservation easements;	**Economically infeasible**. Based on the higher costs associated with land, water and labor, increased environmental regulation, and competition from neighboring regions where agricultural operations are less costly; thus, resulting in an inability to make farming profitable. An easement does not compensate for the impact by replacing or providing substitute resources or environments (i.e., the easement would not create any new farmland where no farmland presently exists). See (Fourth District Court of Appeal, *Cherry Valley Pass Acres and Neighbors v. City of Beaumont* (2010) 190 Cal.App.4th 316 (*Cherry Valley*) In addition, there is not any agricultural zoned land in the City for the City or County to purchase and there is no existing fee program for farm land in the City.
7. Planning tools such as clustering development, use of density bonuses, and limiting "leapfrog" development.	**Economically infeasible.** Based on the higher costs associated with land, water and labor, increased environmental regulation, and competition from neighboring regions where agricultural operations are less costly; thus, resulting in an inability to make farming profitable. In addition the project is an industrial project which the site is planned for in the City's General Plan since 1987. In addition, this is not a residential project. The proposed mitigation is not applicable. The project won't promote "leapfrog" development since the area surrounding the project site is developed.

Response to Comment D-17. Please refer to Response to Comment D-16.

Response to Comment D-18. This comment is noted. The commentor has correctly identified potential air quality impacts of the proposed project. The Draft EIR also identifies the same significant and unavoidable air quality impacts as occurring during construction and operation of the project (Draft EIR Section 4.2 Air Quality, pages 4.3-23, 4.2-25 and 4.3-28 through 4.3-29).

Response to Comment D-19. The Draft EIR Section 4.2 Air Quality includes a discussion of the applicable SCAQMD regional rules that are required of all development within the South Coast Air Basin as well as project-specific mitigation measures. The Draft EIR distinguishes between measures that are required by rules enforced by the SCAQMD and proposed mitigation measures identified to reduce potential impacts. The Draft EIR then presents data reflecting the anticipated reduction of emissions achieved as a result of both rules enforced by the SCAQMD and project-specific mitigation measures. The Draft EIR includes text on page 4.2-21 stating, "*To facilitate monitoring and compliance, applicable SCAQMD regulatory requirements are restated in the following mitigation. These measures shall be incorporated in all project plans, specifications, and contract documents.*" No further discussion is required.

Response to Comment D-20. This comment is noted. The commentor has correctly identified existing ambient air quality conditions in the project vicinity and the location of the nearest sensitive receptors. The Draft EIR Section 4.2 Air Quality, Table 4.2.D page 4.2-5 and page 4.2-6 (Section 4.2.1.5 Sensitive Land Uses in the Project Vicinity) also identifies the same ambient air quality conditions and locations of the nearest sensitive receptors.

Response to Comment D-21. The Draft EIR Section 4.2.3.4 Local Policies, page 4.2-9, includes a discussion of the City's General Plan and the policies relevant to air quality. The goals, objectives, and policies cited by the commentor are in portions of the General Plan that deal with public safety and energy conservation, but are included here to address the comment:

Ultimate Goal VII: Emphasizes public health and safety, including, but not limited to, police, fire, emergency and animal services and protection from floods and other hazards.

Response: Section 2.5.10 of the Draft EIR addressed public health and safety relative to the cited public services, and Section 2.5.12 of the Draft EIR addressed utilities including energy use (i.e., the wise use of energy is considered energy conservation). The Draft EIR evaluated these issues and determined that the proposed project would not have significant impacts related to public health and safety (public services) and energy use/conservation with implementation of the project as proposed with the recommended mitigation. Therefore, the proposed project is consistent with this goal.

Goal 6.1: To achieve acceptable levels of protection from natural and man-made hazards to life, health, and property.

Response: Section 4.2 of the Draft EIR addresses health impacts related to air quality (i.e., health risk assessment), Section 2.5.5 of the Draft EIR addresses hazards and hazardous materials, Section 2.5.4 of the Draft EIR addresses geotechnical hazards, and Section 2.5.6 addresses water-related hazards. The EIR concluded that these impacts would be less than significant based on the design of the project and implementation of recommended mitigation measures except for specific daily thresholds for construction and operational air pollutants.

NOTE: The project's consistency with Objective 7.5 and Policies 7.5.1, 7.5.2, and 7.5.5 regarding energy efficiency is included in Chapter 4.3 Climate Change and Greenhouse Gases, which begins on Draft EIR page 4.3-1. However, the following information is provided for the reader's convenience.

OBJECTIVE 7.5: ENCOURAGE EFFICIENT USE OF ENERGY RESOURCES.

Response: Section 2.5.12 of the Draft EIR examines the project's use of energy resources such as electricity and natural gas and concludes that the potential impacts will be less than significant after compliance with the State's new "Green Building Code" (Title 24) including strict energy conservation requirements. In addition, Mitigation Measure 4.2.6.3A (under Air Quality) also addresses energy conservation.

Policy 7.5.1: Encourage building, site design, and landscaping techniques that provide passive heating and cooling to reduce energy demand.

Response: Sections 2.5.12 (Utilities) and 4.2 (Air Quality) of the Draft EIR addresses the design of the project relative to wise energy use (i.e., energy conservation) and determined that impacts in this regard would be less than significant with implementation of the state Green Building Code as well as implementation of Mitigation Measures 4.2.6.3A.

Policy 7.5.2: Encourage energy efficient modes of transportation and fixed facilities, including transit, bicycle, equestrian, and pedestrian transportation. Emphasize fuel efficiency in the acquisition and use of City-owned vehicles.

Response: The proposed project does implement the recommended improvements related to private development in this policy (i.e., bicycle racks, pedestrian access).

Policy 7.5.5: Encourage the use of solar power and other renewable energy systems.

Response: The proposed project does not have a specific end user at this point, but the building design will allow for future installation of solar photovoltaic and solar hot water heating for the office area.

Summary. As stated in section 15002 of the CEQA Guidelines, the basic purposes of CEQA are to 1) Inform governmental decision makers and the public about the potential, significant environmental effects of proposed activities; 2) Identify ways that environmental damage can be avoided or significant reduced; 3) Prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternative or mitigation measures when the governmental agency find the changes to be feasible; and 4) Disclose to the public the reasons why a governmental agency approved the project in the manner the agency chose if significant environmental effects are involved. While the suggested goals are not cited in the Draft EIR for reasons stated previously, this Draft EIR meets the basic purposes of CEQA and adequately discloses potential project-related effects to human health and the environment within Sections 4.2 Air Quality (beginning on page 4.2-1), 4.3 Climate Change and Greenhouse Gases (beginning on page 4.3-1), 4.4 Noise (beginning on page 4.4-1), and 4.5 Transportation (beginning on page 4.5-1).
Based on project design, compliance with existing regulations and implementation of the recommended mitigation measures protects public health and safety and achieves responsible energy conservation to the extent required by the lead agency under CEQA. Therefore, the proposed project is consistent with these General Plan goals, objectives, and policies.

Response to Comment D-22. Since there is no specific end user identified at this time, it is not known if employees will be relocated from another facility. It should be noted that even relocation of an existing use from elsewhere in the region still benefits the local economy. The relocation of employees may have an indirect employment impact in other jurisdictions but an overall neutral effect on the region (likely the jobs would still stay within the region). It is speculative to predict such employment changes since the end user is not known at this time. The cited online article makes no assertion that vehicle miles travelled (VMT) were increased due to an employee transfer and the commentor provides no evidence that this was the case in that example. The context of the analysis the commentor is commenting on relates to the project's consistency with the Air Quality Management Plan (AQMP) and how the project may accommodate the expected increase in population and employment in the City. The project is consistent with existing General Plan and Zoning designations and therefore it is reasonable to assume that given the proximity of existing homes and existing commercial uses in the area coupled with the City's existing low jobs-to-housing ratio (i.e., below the existing SCAG jobs-to-housing ratio), the project has the potential to minimize the VMT within the community.

Response to Comment D-23. The Draft EIR does not find that the project will minimize VMT compared to a "typical" large industrial/warehouse type project. However, this project provides the opportunity for a reduction in employee-related VMT because the proposed project will create jobs and provide the opportunity for City of Moreno Valley residents to find employment close to their homes. Because of the high unemployment levels in the City of Moreno Valley, this potential is real. However, the commute travel reduction is virtually impossible to calculate. Nonetheless, the project will create the potential for reduction in commuting distances for employees that reside in the City or in other municipalities near the project site.

Response to Comment D-24. The conclusion referenced in this comment is based on the previous assessment of localized operational impacts to sensitive receptors (Section 4.2.5.4). Because the project would not result in any exceedances of localized operational emissions thresholds,

operational acute health risk impacts are expected to be less than significant. Additional language has been added to Section 4.2.5.5 of the Section 3.0 Errata Final EIR to refer the reader back to the previous Section 4.2.5.4 to clarify this point.

Draft EIR Section 4.2.5.5, Operational-Acute Health Risk Impacts Page 4.2-18

4.2.5.5 Operational-Acute Health Risk Impacts

Threshold Would the proposed project expose sensitive receptors to substantial pollutant concentrations?

Exposure to diesel exhaust can have immediate health effects, such as irritation of the eyes, nose, throat, and lungs, and it can cause coughs, headaches, light headedness, and nausea. In studies with human volunteers, diesel exhaust particles made people with allergies more susceptible to the materials to which they are allergic, such as dust and pollen. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks. However, according to the rulemaking on *Identifying Particulate Emissions from Diesel-Fueled Engines as a Toxic Air Contaminant* (ARB 1998), the available data from studies of humans exposed to diesel exhaust are not sufficient for deriving an acute non-cancer health risk guidance value. While the lung is a major target organ for diesel exhaust, studies of the gross respiratory effects of diesel exhaust in exposed workers have not provided sufficient exposure information to establish a short-term non-cancer health risk guidance value for respiratory effects. As previously identified in Section 4.2.5.4, none of the criteria pollutant emissions would exceed localized thresholds during the operation of the proposed project. Therefore, the proposed project would not have a significant impact on localized operational pollutant levels and no mitigation measures would be required. Similarly ~~Therefore~~, the potential for short-term acute exposure from diesel exhaust are considered to be less than significant and no mitigation is required.

Response to Comment D-25. The HRA analysis provided in the Draft EIR Section 4.2.5.5 Operational-Acute Health Risk Impacts, page 4.2-18, evaluated the health risk levels at all locations within the area covered by the receptor grid which covers the area surrounding the project and extends out to beyond where the project contribution to ambient air quality is measurable. As stated in the technical Health Risk Analysis (HRA) prepared for the project: Receptors were placed at a grid approximately five by five miles to characterize the regional risk levels and at locations of all identified sensitive receptors" (see page 12 of the HRA contained in Appendix D-2 of the Draft EIR). Within the accuracy of the air dispersion model, using a grid of receptors to allow the display of area-wide distributions and wind effects is a much better indication of predicted pollutant concentrations than only placing a single receptor at a location of interest. This is in accordance with SCAQMD HRA methodology. Furthermore, the HRA considers a worst-case scenario (i.e., health risks at the nearest receptors); therefore, it can be expected that health risks at locations further away would be less than that at the nearest receptors.

Response to Comment D-26. This comment is noted. The HRA analysis provided in the Draft EIR Section 4.2.5.5 Operational-Acute Health Risk Impacts and Section 4.2.5.6 Operational-Chronic Health Risk Impacts, page 4.2-18 includes all health risks for which there are accepted analysis methods. The health effects described in the comment do not have methodologies to support inclusion.

Response to Comment D-27. This commentor is stating the facts on diesel emissions provided by the SCAQMD and is noted. No response is required.

Response to Comment D-28. This comment is a statement of fact and is noted. No response is required.

Response to Comment D-29. The HRA analysis provided in the Draft EIR, Section 4.2.5.6 Operational-Chronic Health Risk Impacts, page 4.2-18 accounted for the health risks to all the populations affected by the predicted emissions from the project operations including children. In addition the Draft EIR, Section 4.2.1.5 Sensitive Land Uses in the Project Vicinity, page 4.2-6 identifies those sensitive receptors in the area of the proposed project that are sensitive to air pollutants, which includes residences, schools, medical offices, convalescent facilities, and similar uses. The susceptibility of various portions of the population, including infants and children as well as older people are all considered and analyzed, which includes diesel emissions, in both the air quality and HRA sections of the Draft EIR (Sections 4.2 and 4.3, respectively).

Response to Comment D-30. This comment is a statement of fact and is noted. The City of Moreno Valley General Plan is the governing body for the proposed project not the Riverside County General Plan. Consistency of the project with the Riverside General Plan is not required.

Response to Comment D-31. This comment is a statement of fact and is noted. The commentor does not provide a reference for the statement and there is confusion as to how the bullet item relates to the analysis in the Draft EIR. No response is required.

Response to Comment D-32. This comment is a statement of fact and is noted. The commentor does not provide a reference for the statement and there is confusion as to how the bullet item relates to the analysis in the Draft EIR. The proposed project and the respective HRA prepared for the project and summarized in the Draft EIR, complies with the City of Moreno Valley General Plan policies. The City of Moreno Valley General Plan is the governing body for the proposed project not the Riverside County General Plan. Consistency of the project with the Riverside County General Plan is not required.

Response to Comment D-33. The section title has been changed to reflect that the analysis considers all construction emissions and the change is provided in Section 3.0 Errata in the Final EIR.

Draft EIR Section 4.2.6.1 Construction Emissions, Page 4.2-19

4.2.6.1 Construction ~~Equipment~~ Emissions

Response to Comment D-34. The data shown in Table 4.2.I of the Draft EIR contains typographical errors; however, Table G: Short-Term Regional Construction Emissions in the Air Quality report (Appendix D-1) in the Draft EIR is correct. The 5.95.9 lbs/day of ROG is a typographical error; the actual emission value is 5.9. The 3434 lbs/day of NO_x is also a typographical error; the actual emission value is 34 lbs/day (see Draft EIR Appendix D-1, Air Quality Study). The numbers in Table 4.2.1 under Fugitive Dust PM_{10}, Exhaust PM_{10}, Fugitive $PM_{2.5}$ and Exhaust $PM_{2.5}$ are also typographical errors and now match the table in the Air Quality Report in Appendix D-1inthe Draft EIR. The amendments to Table 4.2.1 do not change the analysis or the conclusions in the Section 4.2 Air Quality in the Draft EIR. The changes to Table 4.2.I have been included in Section 3.0 Errata in the Final EIR.

Draft EIR Section 4.2.6.1 Construction Emissions, Page 4.2-20.

Table 4.2.I: Short-Term Regional Construction Emissions

Construction Phase	Pollutant Emissions (lbs/day)							
	ROG	NO_X	CO	SO_2	Fugitive PM_{10}	Exhaust PM_{10}	Fugitive $PM_{2.5}$	Exhaust $PM_{2.5}$
Site Preparation	40	386	212	0.53	329	17	4.4	16
Grading	29	272	149	0.36	325	12	1.6	12
Building Construction	13	82	94	0.18	~~1.8~~ 11	~~0.33~~ 4.1	~~0.02~~ 0.18	~~0.32~~ 3.9
Architectural Coating	72	3.7	11	0.01	~~0.2~~ 1.8	~~2.9~~ 0.33	~~0~~ 0.02	~~2.9~~ 0.32
Paving	5.95~~.9~~	34~~34~~	22	0.03	~~329~~ 0.2	~~17~~ 2.9	~~4.4~~ 0	~~16~~ 2.9
Peak Day (Phase Overlap)	90	390	210	0.53	329	17	4.4	16
SCAQMD Threshold	**75**	**100**	**550**	**150**	**150**		**55**	
Exceeds Threshold?	**Yes**	**Yes**	**No**	**No**	**Yes**		**No**	

CO = carbon monoxide
CO_2 = carbon dioxide
lbs/day = pounds per day
NO_x = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
ROG = reactive organic compounds
SO_x = sulfur oxides
SCAQMD = South Coast Air Quality Management District

Source: LSA Associates, Inc., December 2011.

Feasible mitigation measures, including several identified in the list provided by the commentor, have been already included as mitigation for the project and are identified in the Draft EIR. In addition, the mitigation measures shown as "Incorporated" have been added to the Final EIR (Section 3.0 Errata) as suggested by the commentor. The changes to the Draft EIR do not result in a significant impact and has no material effect on the findings of the EIR. The Table below contains each of the mitigation measures suggested for inclusion by the commentor and if it is already included in the Draft EIR, if will be added mitigation as part of the Final EIR, or if will not be included and why.

Suggested Mitigation Measure	Response
1. Gravel pads must be installed at all access points to prevent tracking of mud onto public roads.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.1K** on page 4.2-22.
2. Install and maintain trackout control devices in effective condition at all access points where paved and unpaved access or travel routes intersect (eg. Install wheel shakers, wheel washers, and limit site access.)	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.1K** on page 4.2-22.
3. All roadways, driveways, sidewalks, etc., should be completed as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.	**Incorporated.** Additional text has been added to Section 4.2.6.1 (page 4.2-23) of the Air Quality Section as **Mitigation Measure 4.2.6.1R** and summarized in the Errata Section of the Final EIR to include this specific requirement as suggested.
4. Pave all construction roads.	**Not Included**. All roads surrounding the site are already paved. This suggested mitigation measure is not warranted.
5. Pave all construction access roads at least 100 feet on to the site from the main road.	**Not Included.** This suggested mitigation measure is not included in Section 4.2 Air Quality of the Draft EIR because it is impractical to pave construction roads onsite. It is infeasible and ineffective to pave roads within the site as the

Suggested Mitigation Measure	Response
	entire site will be graded to process the 220,000 cubic yards of fill to be imported. Such temporary pavement would present unnecessary obstacles and would be destroyed in the process of construction. Paving construction roads within construction areas unnecessarily increase VOC generation, with little or no discernible reduction in other air pollutant emissions. Fugitive dust control is already addressed by **Mitigation Measures 4.2.6.1E** and **4.2.6.1F**.
6. Limit fugitive dust sources to 20 percent opacity.	**Not Included.** The context of this suggested mitigation measure is unclear. It is not feasible to limit fugitive dust *sources* to 20 percent opacity. It is inferred that the commentor is suggesting that fugitive dust *emissions* should be limited to 20 percent opacity consistent with SCAQMD Rule 403. SCAQMD Rule 403 is a regional requirement required of all development within its jurisdiction; therefore, the project is required to adhere to this requirement.
7. Require a dust control plan for earthmoving operations.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.1K** and **4.2.6.1L** on page 4.2-23.
8. When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.	**Incorporated.** Additional text has been added to Section 4.2.6.1 (page 4.2-24) of the Air Quality Section as **Mitigation Measure 4.2.6.1N** and summarized in the Errata Section of the Final EIR to include this specific requirement as suggested.
9. All streets shall be swept at least once a day using SCAQMD Rule 1186 certified street sweepers utilizing reclaimed water trucks if visible soil materials are carried to adjacent streets.	**Incorporated.** Additional text has been added to Section 4.2.6.1 (page 4.2-23) of the Air Quality Section as **Mitigation Measure 4.2.6.1O** and summarized in the Errata Section of the Final EIR to include this specific requirement as suggested.
10. The contractor or builder shall designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.1K** on page 4.2-22.
11. Post a publicly visible sign with the telephone number and person to contact regarding dust complaints. This person shall respond and take corrective action within 24 hours.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.1K** on page 4.2-22.
12. Extend grading period sufficiently to reduce air quality impacts below a level of significance.	**Not Included.** This suggested mitigation measure is not included in Section 4.2 Air Quality of the Draft EIR because extending the grading period would not likely achieve a level of reduction great enough to reduce air quality impacts during the grading phase. In fact, extending the grading period would result in an increase in worker vehicle and construction equipment-related emissions, increasing the severity of the impact. In addition, the same quantity of fugitive dust would be emitted to the air basin under this suggestion and impacts associated with regional emissions would not be reduced. Also refer to the response to #13 below.
13. The simultaneous disturbance of the site shall be limited to five acres per day.	**Not Included.** As noted in the CalEEMod manual, "*In order to properly grade a piece of land multiple passes with equipment may be required. The acres is based on the*

Suggested Mitigation Measure	Response
	equipment list and days in grading or site preparation phase according to the anticipated maximum number of acres a given piece of equipment can pass over in an 8-hour workday. The equipment specific grading rates are given in the table below as determined by SCAQMD in consultation with building estimator references." Thus, the CalEEMod calculates a total grading disturbed area many times the size of the project site based on the idea that there are multiple graders, dozers, scrapers, etc. making multiple passes during any one day. This suggested measure to limit simultaneous disturbance of the site to 5 acres per day would not change the results of the air quality modeling and projected air emissions identified in the Draft EIR and in fact may increase emissions due to the grading inefficiencies created by this restriction. By grading a smaller area it prolongs the grading process and releases dust and vehicular emissions (grading construction workers going back and forth to the site over a greater period of time and grading equipment moving around the site) into the air basin over a longer period of time. By grading five acres a day of a minimum grading of 7 days based on a 71 acre site at 10 acres a day the grading would be prolonged to 14 days. There are also logistical considerations getting construction equipment and people back and forth to the site. In addition, there are no sensitive receptors located in close proximity to the project site that would be affected by the dust.
14. Any vegetative cover to be utilized onsite shall be planted as soon as possible to reduce the disturbed area subject to wind erosion. Irrigation systems required for these plants shall be installed as soon as possible to maintain good ground cover and to minimize wind erosion of the soil.	**Incorporated.** Additional text has been added to Section 4.2.6.1 (page 4.2-23) of the Air Quality Section as **Mitigation Measure 4.2.6.1P** and summarized in the Errata Section of the Final EIR to include this specific requirement as suggested.
15. Any on-site stockpiles of debris, dirt or other dusty material shall be covered or watered three times daily.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measures 4.2.6.1E** and **4.2.6.1G** on page 4.2-22.
16. Any site access points within 30 minutes of any visible dirt deposition on any public roadway shall be swept or washed.	**Not Included.** It is not clear what is being suggested by this measure. Trackout (i.e., dirt deposition) is addressed through adherence to **Mitigation Measure 4.1.6.1K**.
17. A high wind response plan shall be formulated for enhanced dust control if winds are forecast to exceed 25 mph in any upcoming 24-hour period.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.1D** on page 4.2-22. While **Mitigation Measure 4.2.6.1D** does not specify the formulation of a high wind response plan as suggested, this mitigation measures requires that clearing, grading, earthmoving, or excavation activities cease upon 25 mph winds or greater. This requirement in combination with other dust control measures outlined in the Draft EIR will accomplish the intent of the suggested mitigation measures stated here.
18. Implement activity management techniques including a) development of a comprehensive construction management plan designed to minimize the number of	**Incorporated.** Additional text has been added to Section 4.2.6.1 (page 4.2-23) of the Air Quality Section as **Mitigation Measure 4.2.6.1S** and summarized in the Errata Section of the Final EIR to include a similar requirement regarding

Suggested Mitigation Measure	Response
large construction equipment operating during any given time period; b) scheduling of construction truck trips during non-peak hours to reduce peak hour emissions; c) limitation of the length of construction work-day period; and d) phasing of construction activities.	scheduling truck trips during non-peak hours as suggested. Approval of a truck haul route is already required prior to grading permit approval. commentor
19. Develop a trip reduction plan to achieve a 1.5 AVR for construction employees	**Not Included.** This suggested mitigation measure is not feasible because construction of this type typically requires a large number of small contractors rather than one large contractor such as for large public works projects. Having multiple small contractors means that workers come from many areas and do not work for the same company, therefore, making efforts to coordinate their carpooling ineffective and infeasible. As noted in **Mitigation Measure 4.2.6.1K**, documentation shall be provided to the City of Moreno Valley indicating that construction workers have been encouraged to carpool or otherwise reduce VMT to the greatest extent practical, including providing information on available park and ride programs. In addition, it should be noted that California Public Health and Safety Code Section 40717.9 states that a "public agency shall not require an employer to implement an employee trip reduction program unless the program is expressly required by federal law and the elimination of the program will result in the imposition of federal sanctions, including, but not limited to, the loss of federal funds for transportation purposes."
20. Require high pressure injectors on diesel construction equipment.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.1K** on page 4.2-22.
21. Restrict truck operation to "clean" trucks, such as a 2007 or newer model year or 2010 compliant vehicles.	**Not Included. Mitigation Measure 4.2.6.1C** which requires CARB Tier II Certified equipment or better (page 4.2-21) is identified in the Draft EIR. Where feasible, CARB Tier II Certified equipment or better will be used during construction of the project. The suggested mitigation measures is not capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, and technological factors and is infeasible.
22. Require the use of CARB certified particulate traps that meet level 3 requirements on all construction equipment.	**Not Included. Mitigation Measure 4.2.6.1C** which requires CARB Tier II Certified equipment or better (page 4.2-21) is identified in the Draft EIR. Where feasible, CARB Tier II Certified equipment or better will be used during construction of the project. infeasible because of CARB off-road regulation changes approved in 2011 making exhaust retrofits of particulate traps no longer mandatory that requiring their use is not feasible.
23. Utilize only CARB certified equipment for construction activities.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.1C** on page 4.2-21.
24. The developer shall require all contractors to turn off all construction equipment and delivery vehicles when not in use and/or idling in excess of 3 minutes.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.1M** on page 4.2-23.
25. Restrict engine size of construction	**Included.** This suggested mitigation measure is already

Suggested Mitigation Measure	Response
equipment to the minimum practical size.	included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.1K** on page 4.2-23.
26. Use electric construction equipment where technically feasible.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.1K** on page 4.2-23.
27. Substitute gasoline-powered for diesel-powered construction equipment.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.1K** on page 4.2-23.
28. Require use of alternatively fueled construction equipment, using, e.g., compressed natural gas, liquefied natural gas, propane, or biodiesel.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.1K** on page 4.2-22.
29. Use methanol-fueled pile drivers.	**Not Included.** Project construction does not require use of pile drivers.
30. Install catalytic converters on gasoline-powered equipment.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-23.
31. Require the use of Alternative Diesel Fuels on diesel equipment used. Alternative diesel fuels exist that achieve PM_{10} and NO_x reductions. PuriNOx is an alternative diesel formulation that was verified by CARB on January 31, 2001 as achieving a 14% reduction in NO_x and a 63% reduction in PM_{10} compared to CARB diesel. It can be used in any direct-injection, heavy-duty compression ignition engine and is compatible with existing engines and existing storage, distribution, and vehicle fueling facilities. Operational experience indicates little or no difference in performance and startup time, no discernable operational differences, no increased engine noise, and significantly reduced visible smoke.	**Not Included.** It has been determined that Lubrizol, the producer of PuriNox ceased production of PuriNox in December 2006. Additionally, SCAQMD has previously confirmed that PuriNox is not expected to be commercially available in the foreseeable future. Thus, the suggested mitigation measure is not capable of being accomplished in a successful manner within a reasonable period of time because PuriNox is not available commercially. In addition, the requirement to use alternative diesel fuel depends on the availability of such fuel which according to the SCAQMD is not available.
32. Electrical powered equipment shall be utilized in-lieu of gasoline-powered engines where technically feasible.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.1K** on page 4.2-23.
33. All forklifts shall be electric or natural gas powered.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.1K** on page 4.2-23.
34. Suspend use of all construction equipment operations during second stage smog alerts.	**Incorporated.** As noted on the SCAQMD website (http://www.aqmd.gov/aqmd/index.html), the Basin has not experienced a Stage II smog alert since the 1980's. This is due to cleaner burning fuels in vehicles and more stringent rules BY AQMD regarding PM_{10} and $PM_{2.5.}$ While the occurrence of a Stage II smog alert cannot be predicted. It is reasonable to assume that a Stage II smog alert would not occur during the construction phase of this project. However, as precaution the mitigation measure has been added to the Errata Section of the Final EIR as a bullet item under **Mitigation Measure 4.2.6.1K.**
35. Provide temporary traffic controls such as a	**Incorporated.** Additional text has been added to Section

Suggested Mitigation Measure	Response
flag person, during all phases of construction to maintain smooth traffic flow.	4.2.6.1 (page 4.2-24) of the Air Quality Section as **Mitigation Measure 4.2.6.1Q** and summarized in the Errata Section of the Final EIR to include this specific requirement as suggested.
36. Provide dedicated turn lanes for movement of construction trucks and equipment on- and off-site.	**Not Included.** The project site is bounded by Perris Boulevard to the east, Grove View Road to the north, Indian Street to the west, and Perris Valley Storm Channel (PVSC Lateral D unimproved service road) to the south. Perris Boulevard and Grove View Road are improved with curb and gutter on lanes adjacent to the project site, while Indian Street contains a strip of unimproved right-of-way adjacent to the project site. Perris Boulevard contains a raise center median, so left-turn access to/from the site is not possible. Access onto the project site is readily available along Grove View Road and Indian Street. Grove View Road is a low-volume street containing a center two-way left turn lane and already contains adequate provisions for truck access to the site. It is anticipated that the truck haul route permit will require that trucks access the site via Gove View Road.
37. Reroute construction trucks away from congested streets and sensitive receptor areas.	**Incorporated.** Additional text has been added to Section 4.2.6.1 (page 4.2-23) of the Air Quality Section as **Mitigation Measure 4.2.6.1T** and summarized in the Errata Section of the Final EIR as suggested. Approval of a truck haul route is already required prior to grading permit approval.
38. Configure construction parking to minimize traffic interference.	**Not Included.** The project site is bounded by Perris Boulevard to the east, Grove View Road to the north, Indian Street to the west, and Oleander Avenue (PVSC Lateral D unimproved service road). Perris Boulevard and Grove View Road are improved with curb and gutter on lanes adjacent to the project site, while Indian Street contains a strip of unimproved right-of-way adjacent to the project site. Access onto the project site is readily available along Perris Boulevard, Grove View Road and Indian Street. Construction parking is expected to be onsite at the discretion of the construction contractor to facilitate construction of the site.
39. Prior to the issuance of a grading and building permit, the applicant shall submit verification that a ridesharing program for the construction crew has been encouraged and will be supported by the contractor via incentives or other inducements.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.1K** on page 4.2-23.
40. Minimize construction worker trips by requiring carpooling and providing for lunch onsite.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.1K** on page 4.2-23.
41. Provide shuttle service to food service establishments/commercial areas for the construction crew.	**Not Included.** This suggested measure is counterproductive to the suggested measures identified in row 40 above and **Mitigation Measure 4.2.6.1K**. In addition, construction workers tend bring their own lunch because they take a limited lunch break. For this reason, the suggested measure will result in additional vehicular emission as compared to without the suggested measure. Thus, this suggested measure is not warranted.
42. Provide shuttle service to transit stations/multimodal centers for the	**Not included. .** This mitigation measure is not practical since the nearest multimodal center is in downtown Riverside

Suggested Mitigation Measure	Response
construction crew.	located 14.5 miles northwest of the project site. In addition, the Riverside Transit Authority (RTA) has an established bus route, No. 19, which services the project area and the site. The RTA has two stops one on either side of Perris Blvd. and Grove View Rd. From the project site the walk north along Perris Blvd. is approximately 0.2 mile to a stop at Perris Blvd and Nandina. There is another bus stop at 17800 Perris Blvd. approximately 0.1 mile from the project site. Therefore, the site is serviced by the RTA and no further actions are necessary.
43. Require the use of Zero-VOC paints, coatings, and solvents.	**Included.** To the extent feasible, this suggested mitigation measure is partially included (low-VOC vs. zero-VOC) in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.1J** on page 4.2-23 in accordance with SCAQMD Rule 1113.

~~* Would reduce impacts to GHGs as well~~

Response to Comment D-35. The language in Mitigation Measure 4.2.6.1.B in the Draft EIR is as specific as is possible, while still allowing the possibility that the construction contractor can implement it. Requiring the project contractor to utilize electricity from power poles may result in infeasibility if power poles do not exist on-site. Clean-fuel is fuel other than diesel or gasoline. Clarification of the term "clean-fuel" has been incorporated into the Final EIR.

Draft EIR Section 4.2.6.1 Construction Equipment Exhaust Emissions Page 4.2-21.

> **4.2.6.1B**. Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall utilize power sources (e.g., power poles) or clean-fuel (e.g., fuel other than diesel or gasoline) generators. Contract specifications shall be included in the proposed project construction documents, which shall be reviewed by the City.

Response to Comment D-36. The air quality analysis of construction shows that there will be exceedances of ROG, NO_X and PM_{10}. Tier III applies to equipment produced from 2006 to 2008. As of 2012, equipment produced since 2006 are becoming more readily available, but not to the extent that requiring their use is considered feasible mitigation. Tier II specifications result in a substantial reduction in PM_{10} and $PM_{2.5}$ (62.5% to 72.5%, depending on horsepower) over Tier I equipment, which is the basis of the mitigation measure. Tier III specifications are identical to Tier II for PM_{10} and $PM_{2.5}$, thus requiring this more stringent mitigation would have no benefit to the reduction in PM_{10} and $PM_{2.5}$ and was not required.

Response to Comment D-37. Mitigation Measure 4.2.6.1.K as written in the Draft EIR requires that the listed measures be included in "grading plans, construction specifications and bid documents". Once in these documents, they become requirements, enforceable by the City or other regulatory agencies. However, the wording of this and similar measures will be reworded to strengthen the implementation requirement of each measure.

Response to Comment D-38. Although the exact effects of the measures listed are not fully quantifiable at this time, the language of the measure will be changed to require implementation of all the listed design features, rather than a future combination of features, as shown below:

Draft EIR Section 4.2.6.3 Long-Term Operational Emissions, Page 4.2-26.

4.2.6.3A Prior to issuance of the first building permit, building and site plan designs shall ensure that the project's energy efficiencies surpass applicable 2008 California Title 24, Part 6 Energy Efficiency Standards by a minimum of 20 percent which is considered sufficient by CARB and the SCAQMD to achieve the AB 32 conservation goals for 2020. Verification of increased energy efficiencies shall be documented in Title 24 Compliance Reports provided by the Applicant, and review and approved by the City. The following ~~Any~~ combination of design features, ~~including but not limited to the following list, may~~ shall be used to fulfill this requirement provided that the total increase in energy efficiency meets or exceeds 20 percent: *(note: the list of design features remains the same except for changes outlined in Response D-39 below)*

Changes to this mitigation measure are provided in Section 3.0 Errata of the Final EIR.

The significant impact that these mitigation measures apply to are almost entirely from mobile sources. The emissions exceed the thresholds by up to 1,700%. There are no feasible mitigation measures available to reduce these emissions to anywhere close to the thresholds, therefore; 20% was proposed by the project as a good-faith effort to make a meaningful reduction.

Response to Comment D-39. The only agencies that have any control over the production of vehicles used with this project, and therefore the emissions controls installed on those vehicles, is the California Air Resources Board and the United States EPA. The indirect control the City has over vehicle operations associated with land use decisions cannot not have a substantial effect on the project's air quality impact as the vehicle emissions of concern are from trucks traveling throughout the Air Basin, far outside the City limits.

Response to Comment D-40. Impact 4.2.6.3 is the air quality impact from operational emissions of the project to the regional air quality. This impact statement includes a typographical error and Section 3.0 Errata of the Final EIR incorporates the amended language to clarify the impact statement.

Draft EIR Section 4.2.6.3 Long-Term Operational Emissions, Page 4.2-25.

> **Impact 4.2.6.3:** *Implementation of the proposed project may ~~occur~~ have the potential to exceed applicable daily thresholds for operational activities.*

Response to Comment D-41. This comment reiterates the conclusions presented in the Draft EIR. The rounding of the results is entirely appropriate. It is not inaccurate to report that emissions would be 990.93 lbs/day when all that can really be reported is that the peak emissions could be anywhere between 970 and 990 lbs/day and will be far less for most of the time.

Response to Comment D-42. The wording of Mitigation Measure 4.2.6.3A has been modified to address this comment as outlined in Responses to Comments D-38 and D-39. In addition, the mitigation measures focus on the only project emissions that the project has any ability to reduce.

Response to Comment D-43. The wording of Mitigation Measure 4.2.6.3A has been modified to address this comment as outlined in Responses to Comments D-38 and D-39.

Response to Comment D-44. The wording of Mitigation Measure 4.2.6.3A has been modified to address this comment as outlined in Responses to Comments D-38 and D-39.

Response to Comment D-45. It is not feasible to mandate mitigation on equipment that is controlled by the State and federal governments. As the EIR is only for the construction of the project and the operator has not been identified, the EIR can only specify mitigation that can be implemented by the builder. At the time the operator is known, it is at the City's discretion to impose operating parameters to the operator of the facility.

Feasible mitigation measures, including several identified in the list provided by the commentor, have been already included as mitigation for the project and are identified in the Draft EIR. In addition, the mitigation measures shown as "Incorporated" have been added to the Final EIR (Section 3.0 Errata) as suggested by the commentor. The changes to the Draft EIR do not result in a significant impact and has no material effect on the findings of the EIR. The Table below contains each of the operational emissions mitigation measures suggested for inclusion by the commentor. If the measure is included in the Draft EIR the response indicates "included". If the mitigation is being added as part of the Final EIR the response indicates "incorporated", or if the measure is not included the response discusses why the Final EIR does not contain the measure.

Suggested Mitigation Measure	Response
1. The operator of the primary facilities shall become SmartWay Partner.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-27.
2. The Project shall meet SmartWay 1.25 ratings.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-27.
3. The project shall use only freight companies that meet SmartWay 1.25 ratings.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-27.
4. (ALTERNATIVELY from 2,3 above) The operator of the primary facilities shall incorporate requirements or incentives sufficient to achieve at least 20% per year (as a percentage of previous percentage, not total trips) increase in percentage of long haul trips carried by SmartWay carriers until it reaches a minimum of 90% of all long haul trips carried by SmartWay 1.0 or greater carriers. Results, including backup data shall be reported to the Planning Department semi-annually.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-27.
5. The operator of the primary facilities shall incorporate requirements or incentives sufficient to achieve a 15% per year (as a percentage of previous percentage, not total trips) increase in percentage of consolidator trips carried by SmartWay carriers until it reaches a minimum of 85% of all consolidator trips carried by SmartWay 1.0 or greater carriers. Results, including backup data shall be reported to the Planning Department semi-annually.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-27.
6. All fleet vehicles shall conform to 2010 air quality standards or better. Results, including backup data shall be reported to the Planning Department semi-annually.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-27.
7. All spaces utilizing refrigerated storage, including restaurants and food or beverage stores, shall provide an electrical hookup for refrigeration	**Incorporated.** Similar language has been added to Section 4.2.6.3 (page 4.2-27) of the Air Quality Section under **Mitigation Measure 4.2.6.3A** and summarized in

Suggested Mitigation Measure	Response
units on delivery trucks. Trucks incapable of utilizing the electrical hookup for powering refrigeration units shall be prohibited from accessing the site. All leasing documents shall include these requirements and provide that violation of those provisions will constitute a material breach of the lease that will result in the termination of the lease. Because of the fact that these terms of the lease are designed to benefit the public, the public shall be considered to be a third party beneficiary with standing to enforce the requirements of the lease.	the Errata Section of the Final EIR to include a portion of the suggested requirement.
8. Install catalytic converters on gasoline-powered equipment.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-23.
9. Where diesel powered vehicles are necessary, require the use of alternative diesel fuels. Alternative diesel fuels exist that achieve PM10 and NOx reductions. PuriNOx is an alternative diesel formulation that was verified by CARB on January 31, 2001 as achieving a 14% reduction in NOx and a 63% reduction in PM10 compared to CARB diesel. It can be used in any direct-injection, heavy-duty compression ignition engine and is compatible with existing engines and existing storage, distribution, and vehicle fueling facilities. Operational experience indicates little or no difference in performance and startup time, no discernable operational differences, no increased engine noise, and significantly reduced visible smoke.	**Not Included.** It has been determined that Lubrizol, the producer of PuriNox ceased production of PuriNox in December 2006. Additionally, SCAQMD has previously confirmed that PuriNox is not expected to be commercially available in the foreseeable future. Thus, the suggested mitigation measures is not capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, and technological factors and is therefore infeasible. Heavy duty trucks using other types of alternative fuels are not yet widely available on the market at this time. In addition, there is no specific end user at this time, and a future user may already have a truck fleet that would make implementation of alternative fuel vehicles economically infeasible. As alternative fuel trucks become more widely available (e.g., compressed or liquefied natural gas) and are required in higher numbers at the SoCal ports, it is likely that project trucks will utilize alternative fuels.
10. Electrical powered equipment should be utilized in-lieu of gasoline-powered engines where technically feasible.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-28.
11. Utilize electrical equipment for landscape maintenance.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-28.
12. All forklifts shall be electric or natural gas powered.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.1K** on page 4.2-23.
13. Utilize electric yard trucks.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-28.
14. Prohibit idling of trucks for periods exceeding three minutes.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.1M** on page 4.2-23.
15. Provide electrical vehicle (“EV”) and compressed natural gas (“CNG”) vehicles in vehicle fleets.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-28.

Suggested Mitigation Measure	Response
16. Charge reduced or no parking fee for EVs and CNG vehicles.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-28. While **Mitigation Measure 4.2.6.3A** does not specify reduce or no parking fees for these vehicles, it does specify the "provision of preferential parking."
17. Install EV charging facilities for a minimum of 10% of all parking spaces.	**Included.** To the extent feasible, a similar mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-27.
18. Install a CNG fueling facility.	**Not Included.** The facility will not be able to take advantage of alternative fuel trucks as outlined previously in Item 9. The number of trucks this project would support does not justify the additional cost of installing a CNG fueling facility, and would likely be only one end user so the cost of such a facility could not be shared among a larger group of industrial users. Therefore, this measure is infeasible.
19. Provide preferential parking locations for EVs and CNG vehicles.*	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-28.
20. Implement parking fee for single-occupancy vehicle commuters.	**Included.** To the extent feasible, a similar mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-28.
21. Plant shade trees in parking lots to provide minimum 50% cover to reduce evaporative emissions from parked vehicles.	**Included.** To the extent feasible, this suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-26.
22. Plant at least 50 percent low-ozone forming potential (Low-OFP) trees and shrubs, preferably native, drought-resistant species, to meet city/county landscaping requirements.	**Incorporated.** The suggested measure to plant low-ozone forming potential trees and shrubs has been added to the project mitigation under **Mitigation Measure 4.3.6.1B**.
23. Plant Low-OFP, native, drought-resistant, tree and shrub species, 20% in excess of that already required by city or county ordinance. Consider roadside, sidewalk, and driveway shading.	**Incorporated.**. The suggested measure to plant low-ozone forming potential trees and shrubs has been added to the project mitigation under **Mitigation Measure 4.3.6.1B**.
24. Orient 75 percent or more of homes and buildings to face either north or south (within 30 degrees of N/S) and plant trees and shrubs that shed their leaves in winter nearer to these structures to maximize shade to the building during the summer and allow sunlight to strike the building during the winter months.	**Not Included** The suggested mitigation measure to orient buildings north or south is not applicable to a warehouse building due to the size and shape of the project site and the resulting size and orientation of the proposed industrial building.
25. Provide grass paving, tree shading, or reflective surface for unshaded parking lot areas, driveways, or fire lanes that reduce standard black asphalt paving by 10% or more.	**A Portion of the Measure is Included.** Tree shading of parking areas is a requirement of all projects and is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-26. Grass paving is not practical in the City's climate and to date not accepted by the Fire Prevention Bureau

Suggested Mitigation Measure	Response
	in addition heavy trucks cannot park on a grass surface.
26. Electrical outlets shall be installed on the exterior walls of all residential and commercial buildings (and perhaps parking lots) to promote the use of electric landscape maintenance equipment.	**Incorporated.** The suggested mitigation measure has been added to reduce air quality emissions as a bulleted item to **Mitigation Measure 4.2.6.3A**.
27. Prohibit gas powered landscape maintenance equipment within residential, commercial, and mixed-use developments. Require landscape maintenance companies to use battery powered or electric equipment **or** contract only with commercial landscapers who operate with equipment that complies with the most recent California Air Resources Board certification standards, or standards adopted no more than three years prior to date of use or any combination of these two themes.	**Incorporated.** The suggested mitigation measure has been added to reduce greenhouse gas emissions as a bulleted item to **Mitigation Measure 4.2.6.3A**.
28. Provide a complimentary cordless electric lawnmower to each residential buyer.	**Not Included.** As stated, the suggested mitigation measure applies to home buyers and is therefore inappropriate.
29. Implement parking cash-out program for non-driving employees.	**Included.** A similar mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-27.
30. Require each user to establish a carpool/vanpool program.	**Included.** To the extent feasible, this suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-27.
31. Create a car sharing program within the planned community.	**Not Included.** The suggested mitigation measure applies to a planned community and is therefore inappropriate.
32. Create a light vehicle network, such as a neighborhood electric vehicle (NEV) system.*	**Not Included.** The suggested mitigation measure applies to a residential neighborhood and is therefore inappropriate.
33. Provide preferential parking for carpool/vanpool vehicles.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-27.
34. Provide subsidies or incentives to employees who use public transit or carpooling, including preferential parking.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-27.
35. Provide secure, weather-protected bicycle parking for employees.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-27.
36. Provide direct, safe, attractive pedestrian access from project to transit stops and adjacent development.	**Not Included.** Pedestrian access to and from the project will take place from the adjacent streets on associated sidewalks that are already provided in the area.
37. Provide direct safe, direct bicycle access to adjacent bicycle routes.	**Not Included.** Bicycle access from the project will take place to and from the project site on the adjacent streets which already exist in the project area.
38. Provide showers and lockers for employees	**Included.** This suggested mitigation measure is already

Suggested Mitigation Measure	Response
bicycling or walking to work.	included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-28.
39. Short-term bicycle parking for retail customers and other non-commute trips.	**Not Included.** As stated, the suggested mitigation measure applies to a retail uses and is therefore inappropriate.
40. Connect bicycle lanes/paths to city-wide network.	**Not Included.** The suggested mitigation measure applies citywide bicycle planning, and is therefore inapplicable.
41. Design and locate buildings to facilitate transit access, e.g., locate building entrances near transit stops, eliminate building setbacks, etc.	**Included as a Part of Site Design**. The project site design includes a bus bay along the site's Perris frontage.
42. Construct transit facilities such as bus turnouts/bus bulbs, benches, shelters, etc.	**Included as a Part of Site Design.** The project site design includes a bus bay along the site's Perris frontage.
43. Provide a display case or kiosk displaying transportation information in a prominent area accessible to employees or residents.	**Incorporated** The suggested mitigation measure has been incorporated as suggested in the Errata to the Final EIR as a bullet to **Mitigation Measure 4.2.6.3A**.
44. Provide shuttle service to food service establishments/commercial areas.	**Not Included.** Warehouse workers tend bring their own lunch because they take a limited lunch break. For this reason, the suggested measure will result in additional vehicular emission as compared to without the suggested measure. Thus, this suggested measure is not warranted.
45. Provide shuttle service to transit stations/multimodal centers.	**Not Included.** The suggested mitigation measure has not been included. The project site design includes a bus bay along the site's Perris frontage. In addition
46. Provide on-site child care or contribute to off-site child care within walking distance.	**Not Included.** The suggested mitigation measure applies to areas with high number of employment and is therefore inapplicable.
47. Implement a compressed workweek schedule.	**Not Included.** The suggested mitigation measure is inapplicable for a high-cube logistics warehouse operation.
48. Implement home-based telecommunicating program, alternate work schedules, and satellite work centers.	**Not Included.** The suggested mitigation measure is inapplicable for a high-cube logistics warehouse operation.
49. All buildings shall be constructed to LEED Platinum standards.	**Not Included.** The process of obtaining a LEED rating of any level (LEED ratings levels are Certified, Silver, Gold, and Platinum, with Platinum being the highest) is not mitigation. However, the specific green building features that are part of the LEED rating equation can reduce air pollution and greenhouse gas emissions impacts by minimizing and reducing the quantity of emissions. Mitigation Measure 4.2.6.3.A in the Draft EIR prescribes a performance standard requiring a 20% improvement in energy efficiency (over and above the 2008 CBC) for the building and lists suggested measures that can be included in the building's design to obtain this improvement in energy efficiency.
50. Design buildings for passive heating and cooling and natural light, including building orientation, proper orientation and placement of windows, overhangs, skylights, etc.	**Not Included.** The suggested mitigation measure is inapplicable for a high-cube logistics warehouse operation.

Suggested Mitigation Measure	Response
51. Construct photovoltaic solar or alternative renewable energy sources sufficient to provide 100% of all electrical usage for the entire Project.	**Included.** A similar mitigation measure is provided in **Mitigation Measure 4.2.6.3A** in the Final EIR Errata. It reads as follows: "The project shall install a photovoltaic array (solar panels) or other source of renewable energy generation on-site, or otherwise acquire energy from the local utility that has been generated by renewable resources, to meet the project's office electricity needs."
52. Install an ozone destruction catalyst on all air conditioning systems.	**Not Included.** The suggested mitigation measures is not capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, and technological factors and is infeasible.
53. Construct renewable energy sources sufficient to offset the equivalent of 100% of all greenhouse gas emissions from mobile sources (internal combustion engines) for the entire Project.	**Not Included.** The suggested mitigation measure includes implementing carbon offsets in an amount equivalent to 100% of all project mobile source greenhouse gas emission. See Response to Comment E-54. This suggested mitigation measure is not capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, and technological factors and is infeasible.
54. Purchase only green/ renewable power from the electric company.	**Included.** A similar mitigation measure is provided in **Mitigation Measure 4.2.6.3A** in the Final EIR Errata. It reads as follows: "The project shall install a photovoltaic array (solar panels) or other source of renewable energy generation on-site, or otherwise acquire energy from the local utility that has been generated by renewable resources, to meet the project's office electricity needs."
55. Install solar water heating systems to generate all hot water requirements.	**Included.** To the extent feasible, this suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-26.

Response to Comment D-46. As indicated in the Draft EIR (Section 4.2.5.1, Air Quality Plan Management Plan Consistency, pages 4.2-14 and 4.2-15), the project is consistent with the City's General Plan and zoning. Therefore, regional planning agencies, including SCAG and the SCAQMD, have already accounted for future industrial use on the proposed project site as part of the land use projections contained in the AQMP and other regional planning documents/programs (i.e., Regional Transportation Plan, etc). Implementation of the AQMP and the modified project-related mitigation measures will help to improve air quality levels in the future. Since the proposed project will contribute to full attainment of national and state ambient air quality standards, future cumulative impacts associated with the proposed and cumulative projects will not make a significant contribution to cumulatively considerable air quality impacts in the region. For clarification purposes, Section 4.2.7.1 Short-Term Air Quality Impacts on page 4.2-25 of the Draft EIR has been modified as shown below and as indicated in Section 3.0 Errata in the Final EIR:

Draft EIR, Section 4.2.7.1 Short-Term Air Quality Impacts, Page 4.2-25

4.2.7.1 Short-Term Air Quality Impacts

The cumulative area for air quality impacts is the Basin. The implementation of the project would contribute criteria pollutants to the area during project construction. A number of individual projects in the area may be under construction simultaneously with the proposed project. Depending on construction schedules and actual implementation of projects in the area, generation of fugitive dust and pollutant emissions during construction would result in substantial short-term increases in air pollutants. However, each project would be required to comply with the SCAQMD's standard construction measures. In addition, implementation of the AQMP will result in improved air quality levels in the future and full attainment of national and state ambient air quality standards, resulting in less than significant cumulative impacts from all short-term and long-term air pollution sources. Therefore, cumulative impacts associated with short-term air quality impacts would be less than significant.

Response to Comment D-47. The commentor states that the biological report that was prepared for the project is outdated and limited in survey coverage, concluding that the EIR fails as an informational document. As indicated in *CEQA Guidelines*, Section 15151, "… an EIR should be prepared with a sufficient degree of analysis to provide decision-makers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. … The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure."

The August 2010 biological report *General Habitat Assessment, 71± Site (APNs: 316-210-071, -073, -075, -076), Moreno Valley, Riverside County California*, Ecological Sciences, Inc., August 1, 2010, referenced in August 2011 Initial Study and the April 2012 Draft EIR is one of several biological studies that have been conducted on the project site and vicinity. While the August 2010 Initial Study and April 2012 Draft EIR incorporated portions of the 2007 biological resource reports (refer to Response to Comment D-3 for a list of all biological technical reports) in describing site conditions, the environmental documents also included substantial additional biological survey data that was collected subsequent to the 2007 biological reports. In fact, additional surveys for burrowing owl, special status plant species, and wetland determination were conducted on the project site by the applicant's biologist in August 2009 and covered the entire project site. This data was revisited in August 2010 and confirmed as still valid. Biological survey reports often have a limited window within which the stated conclusions are considered valid. However, it must be emphasized that the conditions described in the various biological resource reports were verified and updated where necessary during the environmental process. Therefore, contrary to the commentor's opinion, the collective body of survey data for the project site is current, which accounts for the identification and full disclosure of any biological resources of concern on the project site.

2.7.1.1 **Response to Comment D-48.** The Draft EIR (Section 2.5 Effects Found Not to be Significant, 2.5.3 Cultural Resources, pages 2-12 – 2-13) did find that the proposed project would have a less than significant impact on paleontological resources (fossils) with the implementation of Mitigation Measure CUL-1. This determination was based on the Phase I Cultural Resources Assessment and Paleontological Records Review prepared for the proposed project. In that study it was determined that the site has a high potential to contain significant fossil resources due to the presence of early to middle Pleistocene alluvial fan deposits. These resources are the fossilized biotic remains of ancient environments valued for the information they yield about the history of the earth and its past ecological settings.

These resources have the potential for being unearthed and damaged during grading and construction activities and are estimated to lie at approximately 4 feet below ground surface. Construction and grading of the proposed project site will result in soil disturbance below 4 feet, which may unearth previously undetected subsurface paleontological resources. Mitigation Measure CUL-1 has been identified to reduce the significance of paleontological resource impacts.

Response to Comment D-49. The commentor is correct the mitigation measure does state that there would be a discontinuation of monitoring once maximum depth of excavation is met. If there is no excavation of soils there would not be disturbance of fossils (if they are on-site); therefore, why would monitoring be required. It is not the intent of CEQA to excavate the entire site below 4 feet in the case of this project to find fossils if they are there. If construction excavation is only going to a maximum depth of 10 feet and no fossils are found 10 feet below ground surface it can be assumed that the fossils are not within the first 10 feet below ground surface. With the deletion, the monitoring will continue below 4 feet. For clarification purposes that sentence of the Mitigation Measure CUL-1 has been deleted as indicated in Section 3.0 Errata in the Final EIR.

Draft EIR, Section 2.5.3 Cultural Resources, Page 2-13.

Mitigation Measure CUL-1: Prior to construction involving excavation four feet or more below existing surface grade, the construction contractor shall provide evidence that a qualified paleontologist has been retained, and that the paleontologist(s) shall be present during all grading and other significant ground-disturbing activities that reach four feet or more below existing surface grade. ~~If the paleontologist(s) do not find evidence for Pleistocene-era deposits once the maximum excavation depth is reached, monitoring shall be discontinued.~~ In the event fossiliferous deposits are encountered, the following measures shall be implemented:

- Monitoring shall be conducted by qualified paleontological monitor(s) of excavation in areas identified as likely to contain paleontological resources, including undisturbed older Pleistocene alluvium. Paleontological monitors shall be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors shall be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring may be reduced if the potentially fossiliferous units are determined upon exposure and examination by qualified paleontological personnel to have low potential to contain fossil resources.
- Paleontological monitoring of any earthmoving will be conducted by a monitor, under direct guidance of a qualified paleontologist. Earthmoving in areas of the parcel where previously undisturbed sediments are buried, but not otherwise disturbed, will not be monitored.
    - ~~If too few fossil remains are found after 50 percent of the planned-for earthmoving has been completed, monitoring can be reduced or discontinued in those areas at the project paleontologist's direction.~~
    - Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates.
    - Identification and curation of specimens into a professional, fully accredited museum repository with permanent retrievable storage. The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities.

- Preparation or a report of findings with and appended itemized inventory of specimens. The report and report and inventory, when submitted to the City of Moreno Valley along with confirmation of the curation of recovered of recovered specimens into an established, accredited museum repository, will signify completion of the program to mitigate impacts to paleontological resources.

Response to Comment D-50. The City disagrees with the commentor. Mitigation Measure CUL-1 clearly states ***"...****Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates and identification and curation of specimens into a professional, fully accredited museum repository with permanent retrievable storage."* Paleontologists are professional scientists and their salvaging efforts would not destroy fossils. The paleontologist's intent and that of the mitigation measure is for construction to stop so the paleontologist can recover the fossil(s) to identify and curate specimens into a professional, fully accredited museum repository with permanent retrievable storage.

Response to Comment D-51. In response to the commentor's comment that portion of Mitigation Measure CUL-1 has been deleted, refer to Response to Comment D-49.

Response to Comment D-52. There is an inherent misunderstanding as to the meaning of archeological and historic resources verses paleontological resources the definition of which is a follows:

Archaeology studies "human cultures" through the recovery, documentation, and analysis of material remains and environmental data, including architecture, artifacts, biofacts, human remains, and landscapes. The main goal of archaeology is to create the most thorough understanding of how and why both historical and prehistoric people lived, to understand the evolution of human society and civilizations, and to use knowledge of ancestors' history to discover insights into modern-day societies.[1]

An **historic resource** is building, structure, site, district, or object which is significant in American history, architecture, archaeology, engineering, and culture.[2]

Paleontology is the scientific study of life forms that existed in the earth's distant past as revealed though the examination of fossils of plants, animals, and other organisms. Included is the study of body "fossils", tracks (ichnites), burrows, cast-off parts, fossilized feces (coprolites), palynomorphs (tiny organic particle of a size between five and 500 micrometers), and chemical residues.[3]

Objective 7.6 and Policies 7.6.1 and 7.6.2 of the City's General Plan are referring to historic and archaeological resources not paleontological resources. As far as General Plan Program 9.7.3 and 7-6, a Phase I Cultural Resources Assessment and Paleontological Records Review (refer to Response to Comment D-49) was prepared for the proposed project that determined that the site has a high potential to contain significant fossil resources due to the presence of early to middle Pleistocene alluvial fan deposits. As a result the Draft EIR includes Mitigation Measure CUL-1 to ensure that there paleontological resources are protected. The City disagrees with the commentor in that the Draft EIR does include feasible enforceable mitigation. To ensure monitoring and enforcement, Mitigation Measure CUL-1 is included in the MMRP (Final EIR Section 4.0).

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1 http://www.newworldencyclopedia.org/entry/Archaeology, website accessed June 5, 2012.

2 http://www.paroute23.com/about_project/glossary.htm#H, website accessed June 5, 2012.

3 http://www.newworldencyclopedia.org/entry/Paleontology, website accessed June 5, 2012.

Response to Comment D-53. The import of fill (220,000 cubic yards) to the project site was considered in the evaluation of the proposed project in the Draft EIR in Sections 4.2 (Air Quality, page 4.2-20), 4.3 (Greenhouse Gas Emissions, calculated using same model as used for Air Quality), and 4.4 (Noise, page 4.4-18). The 80,000 cubic yards of fill that is currently on-site is considered the baseline (existing on-site conditions) and this fill was imported to the project site as part of a previously approved stockpile permit (page 3-3) that predated the proposed project. Traffic impacts associated with the soil import operations were not addressed because the operations would result in negligible effects on the local and regional circulation systems due to low trip generation anticipated for the haul trucks and the temporary in nature of the activity.

Response to Comment D-54. Mitigation Measure GEO-2 has been revised to eliminate any perception of vagueness. To ensure monitoring and enforcement, revised Mitigation Measure GEO-2 is included in the MMRP (Final EIR Section 4.0).
Draft EIR, Section 2.4.4 Geology and Soils, Page 2-16.

> **Mitigation Measure GEO-2:** Prior the issuance of grading permits, the project proponent shall inform the project engineers, architects, owner, maintenance personnel, and other interested parties of the Expansive Soil Guidelines provided in the project's geotechnical analysis [Geotechnical Engineering Investigation Proposed Industrial Development Southwest Corner of Perris Boulevard and Grove View Road Moreno Valley, California, NorCal Engineering, March 7, 2007]. The recommendations identified in the project's Expansive Soil Guidelines shall be ~~reviewed and considered~~ implemented by the project engineers, architects, owner, maintenance personnel, and other interested parties ~~to determine~~ in the applicable design guidelines. Applicable design guidelines shall be included and implemented in the project's grading plans.

Response to Comment D-55. This comment is only a statement of opinion. GHG plans, policies, and regulations are still overall vague and difficult to analyze compliance with. While VMT is a factor of GHG emissions, it is not clear how that relates to GHG plans, policies and regulations. As stated in CEQA Guidelines section 15151, "*An EIR should be prepared with a sufficient degree of analysis to provide decision makers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure."* The EIR meets the standards of adequacy of an EIR in accordance with CEQA Guidelines section 15151.

Response to Comment D-56. New development projects derive (most of) their energy from the existing energy grids (mainly electricity and natural gas), so the consumption from one individual development project cannot determine the percentage of energy production/generation from the entire energy grid, or what percentage comes from renewable sources. The achievement of renewable energy goals must be set and achieved at a regional or state level, and cannot be assigned to any individual project. The proposed project is designed to allow onsite solar (photovoltaic) electrical generation, but there is no specific end user defined yet. In addition, a number of changes have been made to the recommended Mitigation Measure 4.2.6.3A that addresses greenhouse gases and sustainability. Improvement in project operations that reduces energy consumption results in lowered GHG emissions from area power production facilities. The discussion that follows Table 4.3.B in Draft EIR Section 4.3.5.1 Greenhouse Gas Plan, Policy, and Regulation Consistency supports the EIR's conclusion of consistency.

Response to Comment D-57. The cited SCAQMD tiered thresholds are still only guidance as proposed draft thresholds and do not carry the force of law or adopted regulations. In addition, the commentor has misinterpreted the application of the 5-tier review system recommended by the SCAQMD. The cited thresholds indicate when a particular project under evaluation should move to the next stage of the evaluation (i.e., the next tier) – they are not thresholds against which to specifically determine a significant impact. In addition, as described in the Draft EIR, the greenhouse gas emissions produced by the project do not in themselves represent a project-level significant impact related to greenhouse gases. That conclusion is consistent with guidance provided by CARB and the SCAQMD. The EIR does correctly conclude that the proposed project would make a significant contribution to cumulatively considerable greenhouse gas impacts, even with implementation of the recommended mitigation, including Mitigation Measure 4.2.6.3A as revised in Responses to Comments D-38 and D-39 in this document.

Response to Comment D-58. A more precise water conservation strategy cannot be described at this point in the project development. This Mitigation Measure is included so that some sort of water conservation strategy will be included, when appropriate (i.e., prior to issuance of occupancy permits).

Response to Comment D-59. This comment is only a statement of fact, requiring no response. As there are no quantifiable reductions supplied, there is no reason not to specify these measures.

Response to Comment D-60. This comment is a statement of fact and is noted. No response is required.

Response to Comment D-61. The commentor incorrectly asserts that impacts associated with transport and storage of hazardous materials cannot be mitigated through applicable laws because the tenant is not known. The comment appears to suggest that a future tenant may not abide by applicable laws that regulate hazardous materials. The City assumes, as a reasonable and legitimate part of the CEQA process, that any future tenant of the project building is required to abide by all state and local laws that regulate the transport, use, and storage of hazardous materials. In addition, this project involves warehousing, not heavy or light industrial uses, and so the potential for onsite uses to handle, store, or transport materials that would be hazardous to public health or safety are relatively low, but would ultimately depend on the end user selected to ultimately occupy the project building.

Response to Comment D-62. The commentor states that the EIR fails to undertake an evaluation of water quality impacts beyond the cursory review done for the Environmental Assessment (i.e. Initial Study). The City disagrees with this statement. As identified in the Draft EIR, Section 2.5.6 (Hydrology and Water Quality, page 2-19 – 2-25), the analysis provides a detailed discussion regarding construction and operational activities in relation to water quality and recommends mitigation measures that would ensure that any water pollutants generated during these phases are treated appropriately. The analysis also describes in detail the proposed drainage features and drainage paths that would be constructed on the project site as well as any flooding impacts that the site would be prone to. These discussions and conclusions are based on a project-specific preliminary water quality management plan and hydrology/hydraulic analysis[1]. The water quality analysis was provided as part of the Initial Study subject to public review and comment as part of the NOP process. Based on the input received from the NOP, no additional concerns regarding water quality were identified by

[1] *Preliminary Hydrology Report and Hydraulic Analysis for PA09-004, VIP Moreno Valley, SWC Perris Boulevard and Grove View Road*, Robert A. Bebensee, R.C.E., March 27, 2009, and *Preliminary Water Quality Management Plan, for PA09-0004 VIP Moreno Valley, SWC Perris Boulevard and Grove View Road*, Robert A. Bebensee, R.C.E., July 24, 2009.

an interested member of the public, including the commentor. While the commentor opines that the evaluation of water quality impacts is cursory, the commentor does not provide any meaningful input as to how the analysis can be further evaluated. The water quality analysis included in the Initial Study and Draft EIR represents a good faith effort at full disclosure and no further response is required.

Response to Comment D-63. Section 2.5.6 (Hydrology and Water Quality) of the Draft EIR discussed potential drainage-related impacts resulting from development of the proposed project. As reflected therein, as well as the detailed preliminary Hydrologic and Hydraulic Analysis included as Appendix B-8 *(Preliminary Hydrology Report and Hydraulic Analysis for PA09-004, VIP Moreno Valley, SWC Perris Boulevard and Grove View Road,* Robert A. Bebensee, R.C.E., March 27, 2009) to the Draft EIR, development of the proposed project would result in the construction of impermeable surfaces that will alter the natural drainage of the project site.

As stated in Draft EIR page 2-24, "…storm flows generated from the northerly portion of the proposed building and truck court would be collected by a series of drop inlet catch basins. Storm water runoff generated on site would be routed to three Austin sand filters and pre-treatment hydro-dynamic clarifiers that are intended to remove and reduce the amount of oils, sediment and trash from the storm water. The treated water from these sand filters is pumped into an adjacent on-site storm drain. The on-site storm drain system has been designed to accept a full 100-year storm event and flows would ultimately be routed to the Perris Valley ADP Lateral B-1 in Perris Boulevard that connects to the Perris Valley Storm Drain Lateral B channel. Storm flows generated from the westerly side of the proposed building would be collected by a drop inlet catch basin and routed by pipe to a landscaped swale that would be located along the southerly portion of the property. In the event that the landscape swale receives excess flows, the excess flows would be then routed to a second drop inlet catch basin. From the second drop inlet catch basin, flows would continue to an off-site catch basin and ultimately be routed to the Perris Valley ADP Lateral B-3 in Indian Street, which connects to the Perris Valley Storm Drain Lateral B channel. Storm water runoff generated from the easterly side of the building would be collected by a drop inlet catch basin and route via pipe to a hydro-dynamic clarifier then to an Austin sand filter located in the southeasterly corner of the project site. In the event that the clarifier and sand filter receive excess storm flows, these excess storm flows would be routed to an off-site catch basin and ultimately routed to the Perris Valley ADP Lateral B-1 in Perris Boulevard, which connects to the Perris Valley Storm Drain Lateral B channel. Storm flows generated from would also be routed to a landscaped swale running along the southerly portion of the project site. Flows would then be routed to an Austin sand filter located near the center of the site and ultimately routed to four existing 36-inch diameter reinforced concrete pipes (RCPs) that connect to Lateral B of the Perris Valley Channel. The Austin sand filter located in the southeasterly corner of the project site would also accept stormwater flows from the project site. In the event that flows are in excess of what the sand filter can handle, the excess flows would be directed back to the southerly landscaped swale, and ultimately to an existing 30-inch diameter RCP that connects to Lateral B of the Perris Valley Channel."

The purpose of including Mitigation Measure HYD-05 was to ensure that the preliminary Hydrologic and Hydraulic Analysis was finalized by the City's Engineer and that the calculations contained in the analysis met City requirements. The Draft EIR does not improperly defer mitigation in this regard as an existing preliminary Hydrologic and Hydraulic Analysis has already been prepared for the project. Furthermore, the finalization of hydraulic calculations is a requirement of all projects in the City. Therefore, the inclusion of this requirement as Mitigation Measure HYD-05 is designed to track both the standard requirements and mitigation measures as part of the project's MMRP. Mitigation Measure HYD-05 has been revised accordingly to clarify the finalization of the Hydrologic and Hydraulic Analysis. No further response is required.

Draft EIR, Section 2.5.6 Hydrology and Water Quality Hydrology, Page. 2-24:

> To reduce the flows to below or equal to pre-development conditions, the anticipated on-site flows would be routed to the water quality features such as vegetated swales, clarifiers, and sand filters to reduce flows leaving the site to pre-development flow rates. While the increase in impervious surfaces attributable to the proposed project would contribute to a greater volume and higher velocity of storm water flows, the proposed project's drainage system would accept and accommodate runoff that would result from project construction at or below pre-project conditions. Therefore, the post-development flows generated on the project site would not exceed the capacity of the planned storm water drainage systems. Although adherence to the City's drainage requirements, which includes the preparation of drainage sizing calculations, is required of all applicable development within the City, the incorporation of this requirement as **Mitigation Measure HYD-05** is designed to track both standard requirements and mitigation measures as part of the project's MMRP. ~~To ensure that long-term drainage capacity issues are reduced to a less than significant level, **Mitigation Measure HYD-05** has been identified.~~ With adherence to this mitigation measure, impacts associated with this issue are less than significant.
>
> ***Mitigation Measure HYD-05:*** *Prior to grading plan approval and the issuance of a grading permit by the City, the project proponent shall receive approval from the City of Moreno Valley, a Final Hydrologic and Hydraulic Analysis based on the City's existing drainage requirements.* ~~*submit a detailed grading plan and drainage report, with supporting engineering calculations, to the City Engineer for review and approval. The plan and report shall incorporate relevant requirements identified by the City and/or site-specific geotechnical investigations. The plan and report shall provide evidence that the storm drainage system would be adequate to convey water for the 100-year storm event from the project site and that the post-development flows exiting the proposed project site are less than or equal to pre-development flows.*~~

Response to Comment D-64. The commentor opines that the project would conflict with an applicable habitat conservation plan or natural community conservation yet does not provide any specific comment as to how the project does conflict. As stated in *CEQA Guidelines,* Section 15151, "… an evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate." The comment posed is identified as being part of the land use discussion. As identified in Draft EIR Section 2.5.7 Land Use, page 2-25 the discussion of the project's consistency with applicable habitat conservation plans is provided in Draft EIR Section 2.5.2, Biological Resources, pages 2-8 – 2-12. The applicable habitat conservation plan for the area is the Western Riverside County MSHCP.

As stated on Draft EIR Section 2.5.2, Biological Resources page. 2-9, "*The MSHCP defines two distinct consistency processes for development projects based on their location within the MSHCP Plan Area, with separate processes for projects located outside of Criteria Areas and those within a Criteria Area. Through implementation of these requirements, development projects are found to be consistent with the MSHCP, and impacts to covered species are considered less than significant. The project site is not located within an MSHCP Criteria Area, but is located in an area requiring habitat assessments for burrowing owl (Athene cunicularia), five Narrow Endemic Plant Species (NEPS), and nine Criteria Area Plant Species (CAPS). A Jurisdictional Delineation is required to assess potential jurisdiction of the ditch running north/south through the center of the project site."*

Burrowing owls or their sign (pellets, fecal material, or prey remains) were not observed during the habitat assessment surveys (February 2007) or focused surveys (August 2009) conducted on site. It

is unlikely that burrowing owls would be located on site as burrowing owls tend to avoid heavily disked areas because of potential burrows occlude/collapse. However, in the event that burrowing owls are found on site, the inclusion of the Mitigation Measures BIO-1 through BIO-4 (which requires pre-construction surveys for burrowing owl), would fulfill MSHCP requirements. The fulfillment of MSHCP requirements would enable the project to be consistent with the Riverside County MSHCP.

Based on the information contained in the Draft EIR, the five Narrow Endemic Plant Species (NEPS) and nine Criteria Area Plant Species (CAPS) were not observed during the general survey (February 2007) and focused surveys (May, June, and July 2009) conducted on site. Overall, the project site lacks suitable habitat for these species due to historic agricultural activities. Because of the absence of members of the species and suitable habitat, a less than significant impact to special status plants would occur. Since the project would not impact any of the plants identified in the MSHCP, the project is consistent with this component.

The potential for agency jurisdiction of the on-site drainage ditch was assessed as part of the previously referenced Jurisdictional Survey and MSHCP Riparian/Riverine/Vernal Pools Evaluation prepared for the project. The ditch does not meet the three-parameter test for jurisdiction (vegetation, hydrology, and soils). Therefore, the project would not impact jurisdictional waters and would be consistent with the requirements identified in the MSHCP for this component. Based on the analysis contained in the Draft EIR, the project is consistent with the MSHCP, is supported by project specific biological data and survey work, and represents a good faith effort at full disclosure. No further response is required.

Response to Comment D-65. The 3 dBA increase was not identified in the noise impact analysis as a threshold. Rather, it was stated that “audible impacts that refer to increases in noise levels noticeable to humans generally refer to a change of 3 dB or greater, since this level has been found to be barely perceptible in exterior environment;” For noise level changes that are not perceptible by the human ear, they would not cause any audible change and would therefore not result in any significant noise impacts.

Response to Comment D-66. Noise standards identified in the City’s Municipal Code are used to determine if projected noise levels from the proposed on-site operations would result in any significant stationary sources noise impacts on sensitive uses in the project vicinity. Failing to comply with these noise standards would cause project operations, after project implementation, to violate the City’s Municipal Code. Therefore, it is appropriate to use the City’s Municipal Code noise standards to evaluate potential on-site noise-generating operations.

Response to Comment D-67. The City’s noise standards in terms of the 24-hour weighted Community Noise Equivalent Level (CNEL), identified in the General Plan Noise Element, are applicable for land use planning purposes to avoid placing noise-sensitive land uses within the high noise impact zones. Use of these noise standards are adequate when proposing noise-sensitive land uses such as residences near airport, railroad tracks, or heavily traveled highways/freeways. Noise standards included in the City’s Municipal Code are typically used for enforcement purposes to determine if noise associated with a stationary source would exceed or violate the City’s noise standards from stationary sources. They were used in the noise impact analysis (Draft EIR Section 4.4.2.1 City of Moreno Valley General Plan Policies, page 4.4-5) to determine the potential impacts from on-site operations.

Response to Comment D-68. Use of “hard site” is appropriate in an urban area where the majority of the ground surface is paved, and most sound energy is reflected back up in the air. In suburban or rural areas where almost half of the ground surface between the traffic and the receptor location is either vacant land or planted with landscaping vegetation, the use of “soft site” is more appropriate.

Nevertheless, the choice of hard site or soft site for ground reflection only affects the potential noise level on the project site. Project-related changes would be the same under both scenarios. On off-site land uses, the 2013 with project traffic noise levels showed that project-related traffic noise level increases would be 0.8 dBA or less. This range of traffic noise level changes in an outdoor environment gradually over a time period would not be perceptible by the human ear and would not result in any significant noise impacts. As the proposed land use is not noise-sensitive, the use of soft site or hard site for noise reflection would not have any effect on the project findings.

Response to Comment D-69. The proposed project would generate approximately 2,731 vehicular trips a day, and about half of these vehicles are trucks. These project-related vehicles would be 7.5 to 15 percent of the projected 2012 cumulative traffic volumes along roadway segments that would be used by these vehicles. An increase of 7.5 to 15 percent vehicles along these roadway segments would result in an increase of approximately 0.3 to 0.6 dBA on these roads. Even though the proposed project is a distribution facility with higher truck percentage, the change in overall vehicle mix along these affected roadway segments would not be substantial. The resulting traffic noise level changes or increases on off-site land uses would remain small and less than significant. Since the proposed on-site land use is not considered noise-sensitive, and the project-related traffic noise level increases would be the same under both scenarios, this factor would not affect the findings of the noise impact analysis.

Response to Comment D-70. As stated in the Responses to Comments D-65 and D-68, project-related traffic noise level increases would be small and not perceptible by the human ear. The four study roadway segments that have noise levels that already exceed the City's noise standards, with or without the proposed project, have pre-existing conditions that are not a consequence of the proposed project, and therefore, the proposed project is not responsible for the noise level existing noise exceedance on those roadway segments.

Response to Comment D-71. The noise impact analysis for the proposed project (*Noise Impact Analysis VIP Moreno Valley*, LSA Associates, Inc., March 2012) evaluated the long-term operational traffic noise impact in terms of CNEL and the on-site operations noise impact comparing them to the City's Municipal Code noise standards. No exceedance or violation of the noise standards was found and no significant long-term noise impacts would occur. The project site is surrounded by vacant land which is planned for light/industrial uses and commercial/light industrial uses to the south or other existing non-noise-sensitive industrial uses to the north, east and west. The City's Municipal Code states that the noise standards shall apply "*when measured at a distance of 200 feet or more from the real property line of the source of the sound if the sound occurs on privately owned property, or from the source of the sound, if the sound occurs on public right-of-way, public space or other publicly owned property*." In this case, evaluating the potential noise levels at the property line of the nearest existing noise-sensitive land uses (i.e., residences) that are at a distance of 200 feet or more would adequately determine the project's potential noise impacts. Future noise-sensitive land uses, if proposed in the vicinity of the project site, will be required to mitigate noise associated with all neighboring sources, including the proposed project.

Response to Comment D-72. As stated in the Response to Comment D-71, the project site is surrounded by vacant land that is planned for light industrial/business park in the City of Moreno Valley and to the south in the City of Perris for light industrial/commercial uses or other non-noise-sensitive land uses (refer to Figure in the Draft EIR Section 1.0 page 1-3). These land uses that are directly adjacent to the project would not be significantly affected by the project noise. Noise from on-site operations, including loading/unloading and onsite maneuvering, have been adequately evaluated at the nearest noise-sensitive land uses and no significant noise impacts were identified. Truck noise from trucks driving on public streets is not regulated by the local governments (city or county).

Response to Comment D-73. As stated in the Response to Comment D-71, the noise impact analysis evaluated the traffic noise impact in terms of CNEL and the on-site operations were compared to the City's Municipal Code noise standards. No exceedance or violation of the noise standards was found and no significant long-term noise impacts would occur. All potential noise impact sources were identified and properly evaluated. Please refer to Appendix F (*Noise Impact Analysis VIP Moreno Valley,* LSA Associates, Inc., March 2012) of the Draft EIR for more detailed analysis and discussion on these impacts.

Response to Comment D-74. The noise levels obtained from the 1987 edition of Noise Control for Buildings and Manufacturing Plants (Bolt, Beranek & Newman, 1987) represent a conservative analysis for construction equipment. Because of technology advancement, most current day construction equipment emits lower noise levels compared to the 1987 version. In addition, the project site is surrounded by vacant land or other non-noise-sensitive land uses such as industrial uses. Noise from the on-site construction activity would not result in any significant impacts to adjacent uses (Draft EIR, Section 4.4.5.4 Long-Term Operational Noise Impacts. Page 4.4-13).

Response to Comment D-75. As demonstrated in the Responses to Comments D-65 through D-74, no significant noise impacts would occur with the implementation of the mitigation measures for on-site construction and in addition the requirement of the applicant/contractor to follow the City's Municipal Code Mitigation is provided to reduce construction impacts as well. The land uses that are directly adjacent to the project site are not noise-sensitive and would not be significantly affected by project construction noise. Potential construction noise impacts on the nearest noise-sensitive receptor locations, i.e., existing residences approximately 1,000 feet to the north of the project site, have been adequately evaluated and no significant noise impacts were identified.

It should be noted that the *Moreno Valley Municipal Code* in Chapter 11.80.030 Prohibited Acts (Title 11). Sound level limits are established for both continuous and impulsive (momentary) sounds. The City prohibits grading activities between the hours of 8:00 p.m. and 7:00 a.m. and prohibits construction activities from 8:00 p.m. to 6:00 a.m. during the week and between 8:00 p.m. and 7:00 a.m. on weekends and holidays.

The City's Municipal Code, Section 8.14.040.E, specifies the hours of any construction within the City to occur only as follows: Monday through Friday (except for holidays that occur on weekdays), 6:00 a.m. to 8:00 p.m.; weekends and holidays (as observed by the City and described in Chapter 2.55 of the Municipal Code), 7:00 a.m. to 8:00 p.m., unless written approval is obtained from the City building official or City engineer. According to the City's Municipal Code Ordinance 8.21.050, grading permit requirements, the hours are limited to between 7 am and 6 pm weekdays and 8 am to 4 pm on weekends and holidays.

In addition the Draft EIR, page 4.4-17 states "*The nearest noise-sensitive receptor locations to the project site are existing residences approximately 1,000 feet to the north. These nearest residents may be subject to short-term, intermittent, maximum noise reaching 65 dBA L_{max}, generated by construction activities on the project site. The ambient noise associated with vehicular traffic and industrial uses in the project area would mask the majority of the construction noise from the project site. No significant construction noise impacts would occur if construction of the proposed project would occur within the permitted hours of 6:00 a.m. to 8:00 p.m. of any working day, and within the permitted hours of 7:00 a.m. and 8:00 p.m. on weekends and federal holidays. Compliance with the construction hours specified in the City's Municipal Code would result in construction noise impacts that are less than significant. While impacts would be considered less than significant as long as construction activities occur within the designated hours identified in the City's Municipal Code, mitigation measures [Mitigation Measures 4.4.6A – 4.4.6D] have been identified to reduce the noise*

levels that would expose nearby sensitive receptors to noise levels in excess of the City's noise standards."

Response to Comment D-76. As demonstrated in the Responses to Comment D-74, no significant noise impacts would occur with the implementation of the mitigation measures for on-site construction. Therefore, it is not warranted to include these additional mitigation measures, because none of them would apply to this project.

Suggested Mitigation Measure	Response
1. Temporary noise barriers must be installed during project construction.	**Not required.** As indicated in the noise impact study, there are no noise-sensitive land uses in the immediate project neighborhood and no noise barriers would be required during project construction. The proposed project will comply with all mitigation measures identified and comply with applicable federal, State, and City guidelines.
2. Where technically feasible, utilize only electrical construction equipment.	**Not required.** As evaluated in the noise impact study, practical procedures will be taken for the onsite operations. There are no noise-sensitive land uses located in the immediate neighborhood of the project site. No noise impacts would occur.
3. During construction, the developer shall require that all contractors turn off all construction equipment and delivery vehicles when not in use and prohibit idling in excess of 3 minutes.	**Not required.** Construction equipment will be turned off when not in use. Idling for delivery vehicles will be limited to no more than 5 minutes per truck per trip per day, according to the requirements established by the California Air Resources Board.
4. Provide a "windows closed" condition requiring a means of mechanical ventilation (e.g. air conditioning) for all buildings.	**Not required, no nexus to the impact.** As indicated in the noise impact analysis, no significant operation noise impacts would occur for noise-sensitive land uses in the project vicinity. No mitigation measures are required.
5. Provide upgraded windows with a minimum Sound Transmission Class (STC) rating of 34 for all buildings, and/or require the installation of double-paned windows.	**Not required, no nexus to the impact.** As indicated in the noise impact analysis, no significant operational noise impacts would occur for noise-sensitive land uses in the project vicinity. No mitigation measures are required.
6. Keep new transportation facilities away from vibration sensitive areas.	**Not required, no nexus to the impact.** This comment does not apply to the project because no transportation facilities are being proposed.
7. When dealing with existing transportation facilities, obvious vibration causes, such as pot holes, pavement cracks, differential settlement in bridge approaches or individual pavement slabs, etc., may be eliminated by resurfacing.	**Not required, no nexus to the impact.** As indicated in the noise impact analysis, no significant operational noise impacts would occur for noise-sensitive land uses in the project vicinity. No mitigation measures are required.
8. Require the use of rubberized asphalt for construction of all roadways and parking areas.	**Not required, no nexus to the impact.** As indicated in the noise impact analysis, no significant operational noise impacts would occur for noise-sensitive land uses in the project vicinity. No mitigation measures are required.
9. Maintain quality pavement conditions that are free of bumps, pot holes, pavement cracks, differential settlement in bridge approaches or individual pavement slabs, etc.	**Not required, no nexus to the impact.** As indicated in the noise impact analysis, no significant operational noise impacts would occur for noise-sensitive land uses in the project vicinity. No mitigation measures

Suggested Mitigation Measure	Response
	are required.
10. Require resurfacing of roads.	**Not required, no nexus to the impact.** As indicated in the noise impact analysis, no significant operational noise impacts would occur for noise-sensitive land uses in the project vicinity. No mitigation measures are required.
11. Ban heavy trucks near vibration sensitive uses.	**Not required, no nexus to the impact.** As indicated in the noise impact analysis, no significant operational noise impacts would occur for noise-sensitive land uses in the project vicinity. No mitigation measures are required.
12. Use alternate construction methods and tools to reduce construction vibrations. Examples are predrilling of pile holes, avoiding cracking and seating methods for resurfacing concrete pavements near vibration sensitive areas, using rubber tired as opposed to tracked vehicles, placing haul roads away from vibration sensitive areas.	**Not required.** There are no noise sensitive land uses in the immediate project vicinity. Noise and vibration associated with the proposed project would not result in any significant impacts to adjacent uses.
13. Scheduling construction activities (particularly pile driving) for times when it does not interfere with vibration sensitive operations (e.g. night time).	**Not required.** There are no noise sensitive land uses in the immediate project vicinity. Noise and vibration associated with the proposed project would not result in any significant impacts to adjacent uses.

Response to Comment D-*77.* Refer to Responses to Comments D-74 and D-76, no significant noise impacts would occur with the implementation of the mitigation measures for on-site construction. Mitigation Measure 4.4.6.1D "*During all project site construction activities, the construction contractor shall limit all construction-related activities that would result in high noise levels to between the hours of 6:00 a.m. and 8:00 p.m. on weekdays and between the hours of 7:00 a.m. to 8:00 p.m. on weekends and holidays, unless written approval is obtained from the City Building Official or City Engineer. For grading activity, the hours are limited to between 7:00 a.m. and 6:00 p.m. weekdays and 8:00 a.m. to 4:00 p.m. on weekends and holidays,"* is provided to ensure that the Municipal Code is implemented.

Response to Comment D-78. As demonstrated in the noise impact analysis, project-related traffic noise increases in the project vicinity would be small and not perceptible by the human ear (Draft EIR, Section 4.4.5.3 Long-Term Traffic Noise Impacts, page 4.4-10). Project on-site operational noise impacts were also found to be less than significant (Draft EIR Section 4.4.5.4 Long-Term Operational Noise Impacts, page 4.4-13). Since the projected 2013 traffic volumes include traffic trips from other cumulative projects in the project area, no significant project-related long term cumulative noise impacts would occur.

Response to Comment D-79. The commentor's referral to "traffic counts" is erroneous and is assumed he was referring to the "trip generation" of the project. The trip generation rates for High-Cube Warehouse were the modified National Association of Industrial and Office Properties (NAIOP) rates (based on a 2007 NAIOP letter summarizing the trip generation studies of 13 high-cube warehouses located in western Riverside County) that was approved by the City of Moreno Valley Transportation Engineering staff. The City's modified NAIOP rates are higher than the Institute of Transportation Engineers (ITE) *Trip Generation, 8th Edition* rates for High-Cube Warehouse, therefore the air pollution, greenhouse gas, and trip generation estimates for the proposed project are overstated resulting in a conservative analysis.

ITE *Trip Generation 8th Edition* is the standard used by City of Moreno Valley in determining project trip generation for new developments. When the initial version of the traffic study for the project was first prepared, the previous version, *7th Edition,* of *Trip Generation* was available. In the previous version, the high-cube warehouse category (land use 152) was not utilized because only p.m. peak hour data was available and the sample size was too small. Due to the lack of data with the high-cube warehouse rates, the City analyzed the 2007 NAIOP trip generation rate data and developed reasonable trip generation rates for high-cube warehouse reflecting a full standard deviation above the average rates disclosed in the 2007 NAIOP trip generation study. As stated above, the City's modified NAIOP rates are higher than the current ITE *Trip Generation 8th Edition* rates for high-cube warehouses. Further, the rate for High-Cube warehouse is dependent on the square footage of the building and not the number of dock doors or parking stalls.

Response to Comment D-80. The intersections analyzed in the EIR were based on discussion with City of Moreno Valley Transportation Engineering staff during the scoping process. Furthermore, intersections on Harley Knox Boulevard from Indian Street to Interstate 215 are not part of the 2010 Riverside County Congestion Management Program and were not included in the analysis. The traffic study did not include the intersection of Patterson Avenue/Harley Knox Boulevard in the analysis because project passenger vehicles and trucks will travel eastbound and westbound on Harley Knox Boulevard and would not make left- or right-hand turns to/from Patterson Avenue. For this reason, potential project impacts to the intersection were determined to be not substantial and the intersection was not included as a study intersection.

Caltrans requires analysis to a State highway facility if a project generates over 100 peak hour trips. The project generates over 100 peak hour trips at the Interstate 215/Harley Knox Boulevard interchange and was included in the Project's Traffic Impact Analysis. Project traffic at Cactus Avenue and Ramona Expressway are less than 100 peak hour trips and were not included in the Draft EIR. Based on the City of Moreno Valley Traffic Impact Analysis guidelines, a General Plan Build-out analysis was not required since the project did not propose a General Plan Amendment or Zone Change.

Response to Comment D-81. It appears the commentor is incorrectly stating that analysis of local intersections, local roadways, freeway mainline segments, and freeway merge/diverage areas as conducted in the EIR constitutes segmenting. The comment is therefore unclear and needs refinement to warrant a response.

Nonetheless, the traffic analysis conducted for the project examined project impacts on existing baseline conditions and year 2013 cumulative conditions. For the each time horizon, a.m and p.m. peak hour impacts were assessed based on a level of service analysis of local intersections, local roadways, freeway mainline segments, and freeway merge/diverage areas.

Response to Comment D-82. As stated in the Project TIA *(Traffic Study VIP Moreno Valley,* LSA Associates, Inc., April 9, 2012*)*, the payment of DIF and TUMF fees is considered the appropriate mechanism for the project to contribute to future roadway improvements, resulting in full and complete mitigation of project-specific impacts. The timing to use the TUMF and DIF fees is established through the capital improvement plan (CIP) overseen by the City, which uses traffic counts, trends, and review of traffic accidents to determine the project priority of the improvements. Project priority categories in the City's CIP include essential (start within 1 year), necessary (start within 1 to 3 years), desirable (start within 3 to 5 years), and deferrable (start within 5 to 10 years).

As stated in the Level of Significance After Mitigation following Mitigation Measures 4.5.6.1A and 4.5.6.1B (see page 4.5-19 of the Draft EIR), improvements to Perris Boulevard are out to bid to potential construction contractors, with construction of the improvement anticipated to finish in May of

2013. Page 4.5-19 of the of the Draft EIR also notes that these improvements to Perris Boulevard for the existing plus project condition are consistent with the City's General Plan and are included in the County's TUMF program. The Draft EIR goes on to note that a portion of the City's DIF is allocated toward funding improvements to the City's transportation system, and the specific improvements are based on the General Plan Circulation Element. For these reasons, the Draft EIR concluded that the project's impacts to affected roadway segments (Perris Boulevard) will be mitigated through payment of the City's DIF and the County's TUMF.

As stated in the Level of Significance After Mitigation following Mitigation Measures 4.5.6.2A (see page 4.5-27 of the of the Draft EIR), the improvements defined to maintain the applicable level of service standard at local intersections and roadways in the 2013 cumulative plus project condition will be built per the City's DIF and County's TUMF programs. Payment of these fees in accordance with Mitigation Measures 4.5.6.1A and 4.5.6.1B was therefore determined to be full and complete mitigation of project impacts to roadway segments and intersections in the 2013 cumulative plus project condition. The intersections and roadway segments on Perris Boulevard and Indian Street are included in the City of Moreno Valley's CIP and are planned to be funded by DIF and TUMF. The intersections and roadway segments on Harley Knox Boulevard are included in the City of Perris' "North Perris Road and Bridge Benefit District" and are also planned to be funded by DIF and TUMF. However, the Draft EIR notes that the necessary improvements to freeway segments are outside the City's jurisdiction and therefore the City has no control over when or how these improvements will be put in place, the impacts to freeways would remain significant and unavoidable until such improvements are built.

It should also be noted that the City also uses other funding sources for future roadway improvements such as Measure "A" (Fund 125), gas tax fund (Fund 121), SCAG Article 3 (SB 821 Grant Awards), proposition 42 replacement funds (Fund 224), CDBG (Fund 285), general city capital projects fund (Fund 412), and public works general capital projects fund (Fund 414). Furthermore, the Perris Boulevard widening project that is expected to begin construction in July 2012 is anticipated to be 100% paid for by TUMF funding (CIP 2012-2013). Improvements in the City that are covered by DIF funds in the CIP 2012-2013 include Cactus Avenue EB improvements/I-215 to Veterans Way, Cactus Avenue EB improvements/Veterans Way to Heacock Street, and Day Street Widening, Heacock Street/Perris Valley Storm Drain to Cactus Avenue, and Ironwood Avenue/Perris Boulevard to Nason Street.

The commentor assumes that all cumulative projects will be built by 2013 and therefore all roadway improvements recommended in the project TIA will be required by 2013. However, the cumulative (2013) scenario analyzed in the project's TIA analysis is a scenario required by the City and doesn't represent real world conditions where most cumulative projects won't be built by 2013 and therefore all improvements won't be required.

Response to Comment D-83. Please refer to the Response to Comment D-82.

Response to Comment D-84. Please refer to the Response to Comment D-82.

Response to Comment D-85. Please refer to the Response to Comment D-82.

Response to Comment D-86. Please refer to the Response to Comment D-82.

Response to Comment D-87. The commentor appears to be suggesting that, because the proposed project exceeds SCAQMD construction and operational emission thresholds, it cannot be consistent with SCAQMD's AQMP. The purpose of the daily thresholds is to provide benchmarks against which to examine a project's short-term (construction) and long-term (operational) air quality impacts as part

of the CEQA process. The purpose of the AQMP is to provide regulation and guidance for achieving federal and state criteria attainment status in the future. The daily thresholds and the AQMP therefore serve two separate and distinct purposes. The land uses proposed by this project are consistent with the local and regional plans that form the basis for the AQMP (i.e., the City's General Plan and SCAG's Regional Comprehensive Plan and Regional Transportation Plan). Therefore, the proposed project is consistent with the AQMP. However, the SCAQMD has also established daily thresholds for construction and operational air pollutant emissions that, if exceeded, represent a significant air quality impact under CEQA. As described in the project's air quality study and the EIR Section 4.2 Air Quality, the proposed project exceeds one or more daily thresholds for both construction and operations. Therefore, the project can be consistent with the AQMP as well as exceed daily thresholds for construction and operational air pollutant emissions. Also refer to Response to Comment D-46 for a discussion on the project's consistency with the AQMP.

Response to Comment D-88. The proposed project will create jobs, providing the opportunity for City of Moreno Valley residents to find employment close to their homes. Although the quantity of commute travel reduction is virtually impossible to calculate, the project will create the potential for reduction in commuting distances for employees that reside in the City or in other municipalities near the project site. Regarding traffic impacts, see Response to Comment D-83. The City has determined that payment of DIF and TUMF fees is considered the appropriate mechanism for the project to contribute to future roadway improvements, resulting in full and complete mitigation of project-specific impacts.

Response to Comment D-89. The commentor opines that the goal of "diversifying the region's economy" is not satisfied by "add[ing] to the City's portfolio of industrial services." As stated in *CEQA Guidelines,* Section 15151, "… an evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate." The commentor is selective in which part of the goal is focused on and fails to take the entirety of all the economy goals into consideration. The full goal from which "diversifying the region's economy" was pulled from is as follows:

"**Goal** Promote sustained economic health through diversifying the region's economy, strengthening local self-reliance and expanding competitiveness."

The EIR does not make the assertion that the addition of the project would diversify the region's economy. Furthermore, it appears that the goal is to promote sustained economic health through a three pronged approach – diversifying the region's economy, strengthening local self-reliance, and expanding competitiveness. As stated on Draft EIR page 5-10, "…*the proposed project would add to the City's portfolio of industrial services, which would enable the City to be more self-reliant through the provision of goods and services to residents within the City. Through the addition of the proposed project, the City would also expand its economic competitiveness with other areas in the region. Therefore, the proposed project is consistent with this policy.*"

These statements are supported by analysis contained in the Draft EIR. Specifically, the analysis contained in the Economy Chapter (Draft EIR page 5-10) identifies the number of jobs that would be created as part of the project and the balancing of the jobs to housing ratio in the City which generally would allow for the City to be more self-reliant. As identified in Table 2.C of the Draft EIR (Cumulative Projects List page 2-34), there are multiple warehousing projects within adjacent jurisdictions (e.g. City of Perris, City of Riverside, and County of Riverside). The addition of the proposed project would enable the City to offer a similar type of warehousing stock in comparison to other areas in the region.

Lastly, the commentor does not offer any specific detail as to how the analysis contained in this section is unsupported. The analysis contained in the Draft EIR represents a good faith effort at full disclosure and no further response is required.

Response to Comment D-90. The commentor states that Draft EIR fails to evaluate how the project is consistent with the Compass Growth Vision Principles. Table 5.D has been added to the EIR (Section 3.0 Errata in the Final EIR) indicating the proposed project's consistency with the Compass Growth Vision Principles. No further response is required.

Draft EIR, Section 5 5.4 Consistency With Local And Regional Plans, Page 5-12:

> ~~The proposed project is consistent with the four principles identified above. The nature of the proposed project allows the transport of commodities from a single area rather than multiple areas, minimizing vehicle trip generation. The proposed project supports the prosperity for all people by providing employment opportunities close to existing housing within the City of Moreno Valley. The proposed project is located in an area that is already developed with urban uses and where existing infrastructure (freeway, sewer, electrical, water, etc.) is accessible. During the construction of the project and as needed throughout the process, necessary utility and roadway improvements will be installed or extended to the project site from adjacent existing facilities. The utility and roadway improvements will facilitate future growth in the surrounding area. The development of the proposed project is consistent with the land use vision for the site and will augment existing services available in the City and region.~~

In addition, a new table (Table 5.D: Compass Growth Vision Report Consistency) has been added as follows.

Table 5.D: Compass Growth Vision Report Consistency

Policy	Consistency Analysis
Principle 1: Improve mobility for all residents. • Encourage transportation investments and land use decisions that are mutually supportive. • Locate new housing near existing jobs and new jobs near existing housing. • Promote a variety of travel choices.	The project is consistent with this principle. The actions associated with implementation of the proposed project would allow for warehousing uses to be clustered around other industrial and commercial uses and would encourage a reduction of vehicle miles traveled within the City. Implementation of the project would create approximately 646 jobs. Existing housing is located approximately 1 mile to the north and 2 miles to the south of the project site. The project is consistent with this portion of Principle 1. There are a number of transit-oriented strategies that could be implemented by the proposed project to encourage alternate modes of travel, including informational strategies, incentives, and services. (Refer to Mitigation Measure 4.2.6.3A).

Table 5.D: Compass Growth Vision Report Consistency

Policy	Consistency Analysis
Principle 2: Foster livability in all communities. • Promote developments which provide a mix of uses. • Promote "people scaled, "walkable communities. • Support the preservation of stable, single-family neighborhoods.	The project is consistent with the applicable portions of this principle. The proposed project is a warehousing project and does not include any residential uses. Therefore, the project is not considered to be a mixed use project and this portion of Principle 2 is not applicable to the project. The project site is located in an industrial warehouse area. The project would include sidewalks so that the opportunity of being walkable within this warehouse area is possible. Therefore, the project is consistent with this portion of Principle 2. The proposed project is a warehousing project and does not include any residential uses. Therefore this portion of Principle 2 is not applicable to the project.
Principle 3: Enable prosperity for all people. • Provide in each community a variety of housing types to meet the housing needs of all income levels. • Support educational opportunities that promote balanced growth. • Ensure environmental justice regardless of race, ethnicity, or income class. • Support local and state fiscal policies that encourage balanced growth. • Encourage civic engagement.	Based on the information provided below, this principle is not applicable to the project. The proposed project is a warehousing project and does not include any residential or educational uses. Therefore this portion of Principle 3 is not applicable to the project. The project site is vacant and the project located in an area identified for industrial and commercial uses. Therefore, this issue not applicable to the project. The supporting of local and state fiscal policies and the encouragement of civic engagement is at the City level not the project level. Therefore, this portion of the principle is not applicable to the project.
Principle 4: Promote sustainability for future generations. • Focus development in urban centers and existing cities. • Develop strategies to accommodate growth that uses resources efficiently, eliminate pollution and significantly reduce waste. • Utilize "green" development techniques.	The project is consistent with this principle. The proposed project is located in an area that is already developed with urban uses and where existing infrastructure (freeway, sewer, electrical, water, etc.) is accessible. Mitigation Measure 4.3.1.6B requires the project to implement various sustainability strategies and "green" development techniques that uses resources efficiently, eliminates pollution, and reduces waste.

Response to Comment D-91. See Response to Comment D-53. The import of fill (220,000 cubic yards) to the project site was considered in the evaluation of the air quality impacts attributable to the proposed project (Section 4.2 Air Quality, page 4.2-20) The 80,000 cubic yards of fill that is currently on-site is considered the baseline (existing on-site conditions) and this fill was imported to the project site as part of a previously approved stockpile permit (page 3-3) that predated the proposed project.

Response to Comment D-92. As noted in Response to Comment D-11, the commentor incorrectly asserts that the environmentally superior alternative meets most project objectives and must be approved instead of the proposed project. Although the City concedes that the environmentally superior alternative (reduced density) will result in reduced air pollution and GHG emissions, it bears

noting that impacts associated with these issues would remain significant and unavoidable for air quality, global climate change, and traffic in the same manner as the proposed project (see Table 6.K, page 6-31). The significant and unavoidable project impacts associated with greenhouse gas emissions and traffic cannot be reduced to less than significant though reduction in the size of the project. However, the significant and unavoidable project impacts associated with air quality can be eliminated if the project is reduced to approximately 90,000 square feet (based on a linear reduction in the project's 990 pounds per day of operational NO_x emissions to below the 55 pounds per day threshold).

The commentor mistakenly claims that the reduced intensity alternative (Alternative 2) would meet the following project objectives: "Provide a high density, high-quality large-scale industrial development to provide jobs for residents at a variety of income levels" and "Cluster industrial warehouse uses near efficient access points to the state highway system to reduce traffic congestion on surface streets and to reduce concomitant air pollutant emissions from vehicle sources reduces impacts to air quality, global climate change, and traffic." This is due to the fact that reduced-intensity development patterns are in concept diametrically opposite of the highly dense form of development patterns that are characteristic of clustered development. Said another way, the reduced intensity alternative would result in use of the entire project site in an inefficient manner with associated negative effects such as sprawl.

Response to Comment D-93. The commentor mistakenly claims that there is no basis for the Draft EIR statement that the reduced intensity alternative would have impacts similar to the proposed project. As shown in Table 6.K, the reduced intensity alternative (Alternative 3) would reduce impacts to air quality, global climate change, and traffic. This is due to the reduction in the air pollution emissions, greenhouse gas emissions, and trip generation attributable to the alternative linearly related to the reduction in building square footage (1,616,133 square feet versus 1,212,100 square feet). However, the significant and unavoidable impacts associated with this alternative would remain, similar to the proposed project.

Response to Comment D-94. See Response to Comment D-92.

Response to Comment D-95. See Response to Comment D-93. The significant and unavoidable air quality, global climate change, and traffic impacts associated with the reduced intensity alternative would remain, similar to the proposed project.

Response to Comment D-96. It is not clear as to what the commentor is attempting to point out. If the commentor is suggesting that an alternative be examined that couples both a reduction in development intensity and at an alternative site, the City disagrees. The purpose of the alternative site is to examine the possibility of reducing project impacts by moving it to an alternate location.

Response to Comment E-97. The commentor has attached various references. No response is required.

SAN GORGONIO CHAPTER

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Regional Groups Serving Riverside and San Bernardino Counties:
Big Bear, Los Serranos, Mojave, Moreno Valley, Mountains, Tahquitz.

Jeff Bradshaw
Associate Planner
P.O. Box 88005
Moreno Valley, CA 92552

June 3, 2012

RE: VIP Moreno Valley project's Draft Environmental Impact Report (DEIR).

The Sierra Club appreciates this opportunity to comment on this DEIR. Much of what you will read below was in our NOP comments, but we feel they were not adequately addressed. We hope to read your responses in the FEIR which do fully answer our comments, concerns, suggestions and questions. Most of our concerns are about Global Warming, Climate Change, Greenhouse Gas Pollution and Air Pollutant emissions. These concerns can be read below and we expect this project to do everything possible to mitigate these problems in our non-attainment area. 1

Your NOP mentions that the consumption of electricity by this warehouse "would generate air pollutant emissions." 2 While the Sierra Club understands that you "expect to reach LEED certified rating", we do not understand why you do not match the higher Gold LEED certification recently agreed to by the Alessandro Business Center warehouse in the City of Riverside or even the LEED Silver of Skechers. In fact your words do not guarantee anything about even reaching the lowest level of LEED certification. The City needs to require you to hire a LEED expert and then require you to become LEED certified--hopefully higher than just certified. You could pay less than $1,000 and lock in current LEED standards for your building. 3 Through the installation of solar panels and other LEED ideas you could avoid generating air pollutants with the electricity you consume. This warehouse and all warehouses need to be required to have their roofs built to accommodate the maximum number of solar panels. 4 You are now able to sell excess energy back and earn money as well as do right for our non-attainment area. The DEIR indicates that the "proposed project would unavoidably contribute to significant long-term cumulative air quality impacts."(p 4.2-29) 5 The Sierra Club does not believe it is totally unavoidable. The fact you are given a cafeteria list of mitigations to chose from shows that there is more that could and should be done to protect the health of area residents. Why isn't there a requirement to exceed Title 24 by at least 25% instead of just "exceed" Title 24? (p 4.3-25) Agreeing to require 90% of your off road construction equipment meet Tier III standards would also significantly help our non-attainment city and county. Your DEIR only mentions Tier II and therefor it shows you are not serious about the health of the area's residents. 6

Continuing to pave over Prime Agricultural lands as well as those of Local and State Importance must be mitigated. Having locally grown products also cuts down on the Climate Change problems mentioned above and below. Recently a developer donated $100,000 to the Riverside Land Conservancy to help mitigate for the loss of Ag Lands. The San Jacinto Basin Resource Conservation District is another entity which would use your monetary donation to mitigate the loss of important Ag lands as well as the loss of lands for raptor foraging. It is therefore incorrect to say that "no feasible mitigation is available." Please consider how your project will seriously mitigate you impacts to Agriculture. You should also make sure your parking provides ample reserved spaces for several form of cars using alternative fuels. Their parking lot also needs to be made of porous material to help with ground water recharge and to lessen run off. 7 8 9

The Sierra Club appreciates that you have the World Logistic Center on your Cumulative Project List. We, however, do not believe all of your analysis have included this massive project. The FEIR will be inadequate unless this and all other projects are part of the analysis in each area of the FEIR. I also did not see the Pro Logis project listed which would be located near the Moreno Valley Auto Mall. Since some of Moreno Valley's designated truck routes pass by schools and their playgrounds, the Sierra Club expects the FEIR to explain what requirements will be placed on the tenants to avoid this very toxic situation as well as the truckers who will deliver/pickup products for your warehouse. The FEIR needs to show the walking/bicycling routes students take to and from school as well as show how this project's diesel truck traffic will impact the health of these students. There are two schools which are only about one mile from the project as well as others which may have students impacted by VIP's toxic diesel trucks. The projects distance from homes needs to be easily understood as well as all the paths trucks could take to the warehouse. Requiring staging areas for diesel equipment to be only a couple of hundred feet from sensitive receptors is inadequate for the health of Moreno Valley Residents. How will you protect the warehouse workers from the long term health affects of breathing toxic diesel emissions throughout their workday and employment? What equipment will you make sure is electric instead of diesel or gasoline in order to lessen pollution and better protect the workers-- this includes gardening equipment? The FEIR needs to explain how noise barriers used during construction and use of the warehouse could lessen impacts identified in the Initial Study. Impacts to our local streets as well as our very crowded freeways need to be explained so the average citizen will understand. The FEIR-not just appendices- needs to show the length of trips the diesel trucks will be taking when driving to and from the warehouse as well as their routes. We need to know the maximum number of tucks which will use this warehouse each workday and not just after the first year, but when the warehouse is being used to its maximum capacity during peak times of the year. Your traffic analysis is inadequate unless it includes all of SR 60 which border any part of Moreno Valley. This two and three lane roadway will be significantly affected by VIP traffic-especially when part of cumulative impacts. Decision makers have a right to know before they vote that the section of SR 60 passing through Moreno Valley will become a parking lot with significant pollution. Even your own analysis of some major intersection in our City show they will become LOS F by 2013. Simply paying into a pot of money which may not be used in the impacted part of Moreno Valley does not mitigate your traffic. 10 11 12 13 14 15 16 17 18 19 20

The land should not be disced or graded for at least six months prior to doing the Burrowing Owl survey otherwise many will believe you are just making it difficult on this special animal as well as making it more likely it will be listed as endangered. The Sierra Club believes the FEIR will 21 22

be inadequate unless our concerns and issues found throughout this letter are thoroughly addressed within the document. 22

I. THE DEIR MUST ADEQUATELY ADDRESS THE IMPACTS OF GLOBAL WARMING AND CLIMATE CHANGE

As a potential significant impact, the Final EIR (FEIR) must more thoroughly evaluate alternatives and mitigation measures that would reduce the Project's greenhouse gas emissions. Curbing greenhouse gas emissions to limit the effects of climate change is one of the most urgent challenges of our time. Fortunately, the California Environmental Quality Act ("CEQA"), Cal. Pub. Res. Code ¤¤ 21000 et seq., 14 Cal. Code Regs. ¤ 15000 et seq. ("Guidelines"), set forth a clear and mandatory process to address the Project's greenhouse gas and global warming impacts. This letter sets forth how this analysis should be completed. 23

A. THE DEIR MUST ADEQUATELY SET FORTH THE THREAT OF GREENHOUSE GAS POLLUTION AND GLOBAL WARMING

The FEIR must discuss the grave threats posed by global warming to California and the world. Current scientific consensus on climate change has now determined that the link between greenhouse gas emissions and global warming is highly certain. In California, elected leaders, through Executive Order S-03-05 and the California Global Warming Solutions Act of 2006 (AB 32), have also squarely linked greenhouse gases with global warming. 24

In order to conform to CEQA's informational mandates and properly inform the public and decision makers of the significance of the Project's contribution to greenhouse gases, the DEIR must first adequately discuss the threat posed by greenhouse gas emissions and avoid minimizing or discounting the severity of global warming's impacts. *See* Guidelines ¤ 15151. *See, e.g., Laurel Heights Improvement Ass'n v. Regents of Univ. of Cal.* ("Laurel Heights I"), 47 Cal.3d 376, 392 (1988) (EIR is intended "to demonstrate to an apprehensive citizenry that the agency has, in fact, analyzed and considered the ecological implications of its action."); Guidelines ¤ 15151 (requiring an FEIR be detailed, complete, and reflect a good faith effort at full disclosure). A discussion of global warming impacts need not be lengthy, but should, at a minimum, convey the magnitude of the threat posed by global warming to humans and the environment. For the City's convenience, a scientific background on global warming and the specific threats posed to California is provided below. 25 26

i. Scientific Background on Climate Change

There is no longer credible scientific dispute that the climate is warming. In its most recent assessment, the Intergovernmental Panel on Climate Change ("IPCC") concluded that "[w]arming of the climate is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting snow and ice, and rising mean sea level." (IPCC 2007a). Expressed as a global average, surface temperatures have increased by about 0.74°C over the last hundred years, with 11 of the 12 warmest years on record having occurred in the past 12 years (IPCC 2007a). In September 2007, Arctic sea ice plummeted to a record-low level not anticipated by most climate models until 2050, leading scientists to predict 27

that the Arctic could be ice-free in summer by 2030 (National Snow & Ice Data Center 2007).[1] Other observed consequences of the warming climate include sea level rise, increased frequency of droughts, floods, and heat waves and substantial increases in the duration and intensity of hurricanes (IPCC 2007a).

The IPCC now states with "very high confidence" that most of the warming observed over the past 50 years is the result of human generation of greenhouse gases, including carbon dioxide, methane, and nitrous oxide[2] (IPCC 2007a). The rapid warming observed since the 1970s has occurred in a period when the increase in greenhouse gases has dominated over all other factors (IPCC 2007a). The largest known contribution to global warming is from carbon dioxide (IPCC 2007a). Fossil fuel combustion is responsible for more than 75% of human caused carbon dioxide emissions with the remainder due to land-use change (primarily deforestation) (IPCC 2007a). The global atmospheric concentration of carbon dioxide has increased from a pre-industrial value of about 280 parts per million (ppm) to 379 ppm in 2005, a level that has not been exceeded during the past 650,000 years (during which carbon dioxide concentrations remained between 180 and 300 ppm). (IPCC 2007a; Canadell et al. 2007). In 2006, carbon dioxide concentrations reached a new high of 381.2 ppm (World Metrological Organization 2007). As greenhouse gas concentrations increase, more heat reflected from the earth's surface is absorbed by these greenhouse gases and radiated back into the atmosphere and to the earth's surface.[3] Consequently, the higher the level of greenhouse gas concentrations, the larger the degree of warming experienced.

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At current growth rates and continued reliance on fossil fuels, atmospheric concentrations of carbon dioxide would likely exceed 1,000 ppm by the end of the century, resulting in an average global temperature increase of more than 5°C (United Nations Foundation & Sigma XI 2007). This is equivalent to the change in temperature since the last ice age – an era in which Europe and North America was under more than one kilometer of ice (United Nations Foundation & Sigma XI 2007). The growing consensus among climate scientists is that the threshold for dangerous climate change, whereupon a potential "tipping point" is reached and ecological changes become dramatically more rapid and out of control, is estimated at a temperature increase of around 2°C from pre-industrial levels, or an atmospheric concentration of carbon dioxide of approximately 450 ppm (United Nations Foundation & Sigma XI 2007; IPCC 2007c). In 2006, Dr. James E. Hansen, Director of the NASA Goddard Institute for Space Studies, and NASA's top climate scientist, stated: "In my opinion there is no significant doubt (probability > 99%) that . . . additional global warming of 2° C would push the earth beyond the tipping point and cause dramatic climate impacts including eventual sea level rise of at least several meters, extermination of a substantial fraction of the animal and plant species on the planet, and major regional climate disruptions" (Hansen et al. 2006). More recently however, given the recent unpredicted and extreme rate of loss of arctic ice observed in 2007, Dr. Hansen

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[1] Based on the startling loss of sea ice in 2007, some scientists have predicted that "the Artic Ocean could be nearly ice-free at the end of the summer by 2012." Seth Borenstein, *Ominous Arctic Melt Worries Experts*, Associated Press, Dec. 11, 2007.

[2] *IPCC, 2007: Summary for Policymakers*, *in* CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS, CONTRIBUTION OF WORKING GROUP I TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE at 4 (Susan Solomon et al. eds., Cambridge Univ. Press 2007) at 2-3. "Very high confidence" is defined at "at least a 9 out of 10 chance of being correct." *Id.* at 3 n.7.

[3] Greenhouse gases have a warming effect because, when solar radiation is reflected by the earth, greenhouse gases capture this thermal radiation and reradiate it back to earth, much like the effect of a common garden greenhouse resulting in the "greenhouse effect."

concluded that "the safe upper limit for atmospheric CO_2 is no more than 350 ppm" (McKibben 2007). Moreover, according to Hansen, just 10 more years of "business-as-usual" global emissions will make it difficult, if not impossible, to keep atmospheric concentrations of greenhouse gases at levels necessary to avoid a temperature increase above 2°C (Hansen et al. 2007).

Keeping the climate within the 2°C threshold requires significant reductions in the world's greenhouse gas emissions. To reach this objective, it is estimated that developed countries would have to target an emissions peak between 2012 and 2015, with 30 percent cuts by 2020 and 80 percent cuts from 1990 levels by 2050 (United Nations Foundation & Sigma XI 2007). In recognition of need for immediate action, California has committed itself though Executive Order S-3-05 and the California Global to reduce the state's emissions to 1990 levels by 2020 and by 80% reductions from 1990 levels by 2050. Ca. Health & Safety Code ¤ 38550; Cal. Executive Order S-3-05 (2005).

The costs of taking no action to reduce greenhouse gas emissions far outweigh the costs of stabilizing emissions. The Stern Review of the Economics of Climate Change, a comprehensive report commissioned by the British government, recently concluded that allowing current emissions trajectories to continue unabated would eventually cost the global economy between 5 to 20 percent of GDP each year within a decade, or up to $7 trillion, and warned that these figures should be considered conservative estimates (Stern 2006). By contrast, measures to mitigate global warming by reducing emissions were estimated to cost about one percent of global GDP each year, and could save the world up to $2.5 trillion per year (Stern 2006). The Stern Report determined that if no action is taken to control greenhouse gas emissions, each ton of CO_2 emitted causes damage worth at least $85 (Stern 2006). 27

ii. Impacts to California from Global Warming

Climate change poses enormous risks to California. Scientific literature on the impact of greenhouse gas emissions on California is well developed.[4] The California Climate Change Center ("CCCC") has evaluated the present and future impacts of climate change to California and the project area in research sponsored by the California Energy Commission and the California Environmental Protection Agency (Cayan et al. 2007). The severity of the impacts facing California is directly tied to atmospheric concentrations of greenhouse gases (Cayan et al. 2007; Hayhoe et al. 2004). According to the CCCC aggressive action to cut greenhouse gas emissions today can limit impacts, such as loss of the Sierra snow pack to 30%, while a businessas-usual approach could result in as much as a 90% loss of the snowpack by the end of the century. As aptly noted in a report commissioned by the California EPA:

Because most global warming emissions remain in the atmosphere for decades or centuries, the choices we make today will greatly influence the climate our children and grandchildren inherit. The quality of life they experience will depend on if and how rapidly California and the rest of the world reduce greenhouse gas emissions (Cayan et al. 2007).

Some of the types of impacts to California and estimated ranges of severity – in large part dependent on the extent to which emissions are reduced – are summarized as follows:

• A 30 to 90 percent reduction of the Sierra snowpack during the next 100 years, including earlier melting and runoff.

• An increase in water temperatures at least commensurate with the increase in air

[4] Additional reports issued by California agencies are available at http://www.climatechange.ca.gov, and IPCC

temperatures.
• A 6 to 30 inch rise in sea level, before increased melt rates from the dynamical properties of ice-sheet melting are taken into account.
• An increase in the intensity of storms, the amount of precipitation and the proportion of precipitation as rain versus snow.
• Profound impacts to ecosystem and species, including changes in the timing of life events, shifts in range, and community abundance shifts. Depending on the timing and interaction of these impacts, they can be catastrophic.
• A 200 to 400 percent increase in the number of heat wave days in major urban centers.
• An increase in the number of days meteorologically conducive to ozone (O_3) formation.
• A 55 percent increase in the expected risk of wildfires (Cayan et al. 2007).
By providing details as to the ranges of proposed impacts, and indicating that the higher-range of impact estimates are projected if greenhouse gas emissions continue to increase under a "business as usual" scenario, decision-makers and the public will be better informed of the magnitude of the climate crisis and the urgency with which it must be addressed.
Finally, the DEIR should also include a brief discussion of other laws to address climate change, including California's mandate to reduce emissions to 1990 levels by 2020 and goal of further reducing emissions to 80% below 1990 levels by 2050. Achievement of state mandated emissions reductions will be severely impeded if agencies across the state continue to approve *new* projects without incorporating measures to reduce the added emissions created by these.

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B. The EIR the Project Must Include an Inventory and Analysis of the Project's Projected Greenhouse Gas Emissions

The first step in determining a project's greenhouse gas pollution impact is to complete a full inventory of all emissions sources. In conducting such an inventory, all phases of the proposed project must be considered. *See* 14 Cal. Code Regs. ¤ 15126. A basic requirement of CEQA is that "[a]n EIR should be prepared with a sufficient degree of analysis to provide decision-makers with information which enables them to make a decision which intelligently takes account of environmental consequences." 14 Cal. Code Regs. ¤ 15151. The greenhouse gas inventory for a project must include a complete analysis of all of a project's substantial sources of greenhouse gas emissions, from building materials and construction emissions to operational energy use, vehicle trips, water supply and waste disposal.
A greenhouse gas inventory for the project must include the project's direct and indirect greenhouse gas emissions. *See* 14 Cal. Code Regs ¤ 15358(a)(1) (Indirect or secondary effects may include effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems.). Consequently, a complete inventory of a project's emissions should include, at minimum, an estimate of emissions from the following:
• Fugitive emissions of greenhouses gases, such as methane, from the proposed project;
• Emissions during construction from vehicles and machinery;
• Manufacturing and transport of building materials;
• Electricity generation and transmission for the heating, cooling, lighting, and other energy demands of the project;
• Water supply and transportation to the project;

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• Vehicle trips and transportation emissions generated by the project;
• Wastewater and solid waste storage or disposal, including transport where applicable; and
• Outsourced activities and contracting.

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Methodologies are readily available to inventory the emissions from the proposed project. In its recent white paper, CEQA & Climate Change, Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act (Jan. 2008), the California Air Pollution Control Officers Association (CAPCOA) set forth methodologies for analyzing greenhouse gas pollution (CAPCOA 2008) The California Office of Planning and Research ("OPR") has also released technical guidance on the preferred approach for analyzing greenhouse gas emissions and climate change entitled "Technical Advisory, CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act Review" (California OPR 2008). OPR also provides references to methodologies to quantify greenhouse gas emissions. In addition to the methodologies set forth by CAPCOA and OPR, ICLEI's Clean Air/Climate Protection (CACP) software allows cities to calculate emissions reductions, track and quantify emission outputs, and develop emissions scenarios to inform the planning process.[5] As noted in the ICLEI Climate Action Handbook, "Expertise in climate science is not necessary" to conduct an emissions inventory and compare this inventory against a forecast year (ICLEI). "A wide range of government staff members, from public works to environment and facilities departments, can conduct an inventory" (ICLEI). ICLEI also provides technical assistance and training to local government using the CACP software. It is incumbent on the City to "disclose all it can" about project impacts and educate itself on methodologies that are available to measure project emissions. *Berkeley Keep Jets Over the Bay Comm. v. Board of Port Comm'rs ("Berkeley Jets")*, 91 Cal. App. 4th 1344, 1370 (2001).

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As with any other project under CEQA, the baseline used for analyzing the impacts of a project is the existing on the ground environmental conditions at the time of the NOP. *See Environmental Planning & Information Council v. County of El Dorado (EPIC)*, 131 Cal.App.3d 350, 355 (1982) (effect of general plan amendment must be compared against actual environment, not assumptions in existing general plan). Accordingly, the DEIR should compare emissions from existing conditions with those that would result from the development of the project, as well as those that would occur under any proposed alternative scenarios. Because the Project envisions development over a long period, the EIR should also provide data on the trajectory for emissions in the planned community and under each proposed alternative in five-year increments.

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Without a complete inventory, the DEIR cannot adequately inform the public and decision-makers about the Project's impacts. Similarly, without a complete inventory and analysis of greenhouse gas emissions that will result from the project, there is simply no way that The EIR can then adequately discuss alternatives, avoidance, and mitigation measures to reduce those impacts.

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C. THE EIR MUST ADDRESS THE IMPACT GLOBAL WARMING WILL HAVE

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[5] ICELI's Clean Air/Climate Protection software is available at http://www.cacpsoftware.org/ ICLEI-Local Governments for Sustainability is an international association of more than 650 local governments. Cities, counties, towns and villages around the world are members of ICLEI. ICLEI's mission is to improve the global environment through local action. On the issue of global warming, for example, ICLEI provides resources, tools, peer networking, best practices, and technical assistance to help local governments measure and reduce greenhouse gas emissions in their communities.

ON THE PROJECT

California's temperatures are expected to rise "dramatically" over the course of this century (Cayan 2007). These factors will impact the planned project, as well as exacerbate its own environmental impacts.

The rise in temperatures resulting from global warming will create a more conducive environment for air pollution formation (Cayan 2007). This will intensify the adverse effects the proposed project will already have on air quality in the project area and threaten residents' health (Cayan 2007).

Significantly for the state, as well as the project area, is global warming's impact on water supply. The IPCC specifically identified the American West as vulnerable, warning, "Projected warming in the western mountains by the mid-21st century is very likely to cause large decreases in snowpack, earlier snow melt, more winter rain events, increased peak winter flows and flooding, and reduced summer flows" (IPCC 2007b). Recently, researches found that an increase in atmospheric greenhouse gases has contributed to a "coming crisis in water supply for the western United States" (Barnett 2008). Using several climate models and comparing the results, the researches found that "warmer temperatures accompany" decreases in snow pack and precipitation and the timing of runoff, impacting river flow and water levels (Barnett 2008). These researchers concluded with high confidence that up to 60 percent of the "climate related trends of river flow, winter air temperature and snow pack between 1950-1999" are human-induced.

(Barnett 2008). This, the researchers wrote, is "not good news for those living in the western United States" (Barnett 2008).

The California Center on Climate Change has also recognized the problem global warming presents to the state's water supply and predicts that if greenhouse gas emissions continue under the business-as-usual scenario, this snowpack could decline up to 70-90 percent, affecting winter recreation, water supply and natural ecosystems (Cayan 2007). Global warming will affect snowpack and precipitation levels, and California will face significant impacts, as its ecosystems depend upon relatively constant precipitation levels and water resources are already under strain (Cayan 2007). The decrease in snowpack in the Sierra Nevada will lead to a decrease in California's already "over-stretched" water supplies (Cayan 2007). It could also potentially reduce hydropower and lead to the loss of winter recreation (Cayan 2007). All of this means "major changes" in water management and allocation will have to be made (Cayan 2007). Thus, global warming may directly affect the City's ability to supply clean, affordable water to the residents, or force the City to change how it will utilize water, and it may also impact other activities outside the project area, such as agriculture.

Scientists indicate that climate change will also exacerbate the problem of flooding by increasing the frequency and magnitude of large storms, which in turn will cause an increase in the size and frequency of flood events (NRDC 2007). The increasing cost of flood damages and potential loss of life will put more pressure on water managers to provide greater flood protection (NRDC 2007). At the same time, changing climate conditions (decreased snowpack, earlier runoff, larger peak events, etc.) will make predicting and maximizing water supply more difficult (NRDC 2007). These changes in hazard risk and water supply availability must be considered during environmental review.

Water quality, in addition to water quantity and timing, will also be impacted. Changes in precipitation, flow, and temperature associated with climate change will likely exacerbate water quality problems (NRDC 2007). Changes in precipitation affect water quantity, flow rates, and flow timing (Gleick 2000). Shifting weather patterns are also jeopardizing water quality and

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quantity in many countries, where groundwater systems are overdrawn (Epstein 2005). Decreased flows can exacerbate the effect of temperature increases, raise the concentration of pollutants, increase residence time of pollutants, and heighten salinity levels in arid regions (Schindler 1997).

These are only examples of how global warming will impact the proposed project and intensify the environmental impacts the project will already have. It is not an exhaustive list. Thus, when assessing the impact of the Project on air quality, water supply, flood hazards, and biological resources, the EIR must take into account global warming. To ignore the impact of global warming on the Project and the resources impacted by the Project would significantly understate Project impacts.

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D. THE PROJECT'S GREENHOUSE GAS IMPACTS ARE CLEARLY SIGNIFICANT

The greenhouse gas emissions generated by a project of this size and scope will have a clearly significant cumulative impact. An impact is considered significant where its "effects are individually limited but cumulatively considerable." Guidelines ¤ 15065(a)(3). Climate change is the classic example of a cumulative effects problem; emissions from numerous sources combine to create the most pressing environmental and societal problem of out time. *Ctr. for Biological Diversity*, 508 F.3d 508, 550 (9th Cir. 2007) ("the impact of greenhouse gas emissions on climate change is precisely the kind of cumulative impacts analysis that NEPA requires agencies to conduct."); *Kings County Farm Bureau v. City of Hanford*, 221 Cal. App. 3d 692, 720 (1990) ("Perhaps the best example [of a cumulative impact] is air pollution, where thousands of relatively small sources of pollution cause a serious environmental health problem."). While a particular project's greenhouse gas emissions represent a fraction of California's total emissions, courts have flatly rejected the notion that the incremental impact of a project is not cumulatively considerable because it is so small that it would make only a de minimis contribution to the problem as a whole. *Communities for a Better Environment v. California Resources Agency*. 103 Cal.App.4th 98, 117 (2002); see also *Kings County Farm Bureau,* 221 Cal. App. 3d at 720 ("[p]erhaps the best example of [a cumulative impact] is air pollution, where thousands of relatively small sources of pollution cause a serious environmental health problem.").

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In addition. there is nothing speculative about the fact that higher levels of greenhouse gas pollution will lead to greater impacts, which is why the State of California has prioritized greenhouse gas pollution reductions under AB 32. Moreover, in the analogous context of the National Environmental Policy Act (NEPA), the Ninth Circuit has already rejected the argument that "global warming is too speculative to warrant NEPA analysis." *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 508 F.3d at 554.

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In addition, lack of established significance thresholds does not excuse an agency from its obligation under CEQA to determine the significance of a Project's impacts. CEQA routinely calls for an agency to evaluate impacts in the absence of thresholds or to exercise its individual discretion in determining the significance of an impact. *See, e.g., Protect the Historic Amador Waterways*, 116 Cal. App. 4th at 1111 (agency required to assess potential impact not listed in CEQA checklist). The development of significance thresholds is "encouraged" and not a prerequisite for an impact analysis. Guidelines ¤ 15064.7. Indeed, as noted in the CAPCOA white paper on CEQA and Climate Change, "[t]he absence of a threshold does not in any way relieve agencies of their obligations to address GHG emissions from projects under CEQA" (CAPCOA 2008). In fact, CEQA may require additional analysis even if a project meets an adopted standard, if other evidence indicates the project may nonetheless have a significant

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impact. *See Berkeley Keep Jets Over the Bay Committee v. Board of Port Commissioners*, 91 Cal.App.4th 1344, 1380-82 (2001).

As the lead agency, CEQA requires the City to determine the significance of the Project's emissions with or without established significance thresholds. Guidelines ¤ 15064. CAPCOA provides various means by which a lead agency can determine the significance of project emissions (CAPCOA 2008). Importantly, a universally adopted methodology is *not* necessary to analyze project impacts. *Berkeley Keep Jets*, 91 Cal.App.4th at 1370 ("the fact that a single methodology does not exist…requires the [respondent] to do the necessary work to educate itself about the different methodologies that *are* available.").

"The determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data." Guidelines ¤ 15064(b). Any determination of whether there is a fair argument that the project may have a significant impact must include the consideration of the California Global Warming Solutions Act of 2006 (AB 32), wherein the State of California recognized that "global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California" and required that existing levels of greenhouse gases be reduced to 1990 levels by 2020. Health & Safety Code ¤¤ 38501(a), 38550. Because AB 32 establishes that existing greenhouse gas levels are unacceptable and must be substantially reduced within a fixed timeframe, any additional emissions that contribute to existing levels frustrate California's ability to meet its ambitious and critical emissions reduction mandate. Ignoring emissions from smaller sources would be neglecting a major portion of the greenhouse gas inventory.

In accordance with the scientific and factual data, the City should adopt a zero significance threshold for the Project's greenhouse gas emissions. As noted by the Ninth Circuit in *Center for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*:

[W]e cannot afford to ignore even modest contributions to global warming. If global warming is the result of the cumulative contributions of myriad sources, any one modest in itself, is there not a danger of losing the forest by closing our eyes to the felling of the individual trees?

508 F.3d 508, 550 (9th Cir. 2007). Accordingly, the City must unequivocally consider Project emissions to be a potentially significant impact.

E. THE EIR MUST ANALYZE AND ADOPT ALL FEASIBLE MITIGATION MEASURES TO REDUCE THE PROJECT'S GREENHOUSE GAS EMISSIONS

In addition to thoroughly evaluating project alternatives, because it is clear that the project's greenhouse gas emissions will cumulatively contribute to global warming, "the EIR must propose and describe mitigation measures that will minimize the significant environmental effects that the EIR has identified." *Napa Citizens for Honest Gov't v. Napa County Bd. of Supervisors*, 91 Cal.App.4th 342, 360 (2001). CEQA requires that agencies "mitigate or avoid the significant effects on the environment of projects that it carries out or approves whenever it is feasible to do so." Pub. Res. Code ¤ 21002.1(b). Mitigation of a project's significant impacts is one of the "most important" functions of CEQA. *Sierra Club v. Gilroy City Council*, 222 Cal.App.3d 30, 41 (1990). Therefore, it is the "policy of the state that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures which will avoid or substantially lessen the significant environmental effects of such projects." Pub. Res. Code ¤ 21002. Importantly, mitigation measures must be "fully enforceable through permit conditions, agreements, or other measures" so "that feasible mitigation measures will

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actually be implemented as a condition of development." *Federation of Hillside & Canyon Ass'ns v. City of Los Angeles*, 83 Cal.App.4th 1252, 1261 (2000).

To the extent that the project moves forward as planned, there are many mitigation measures the City can consider, as described below. This is not an exhaustive list and the EIR should explore these and all other feasible mitigation measures that will reduce the project's greenhouse gas emissions (CAPCOA 2008; California Office of the Attorney General 2008). 47

i. Land Use Measures Reducing Traffic Flow

The development plan for the proposed project should incorporate public transit into the project design and should attempt to facilitate the use of public transit. (California Office of the Attorney General 2008). Additionally, the FEIR should analyze ways of including pedestrian and bicycle only streets and plazas within the development and create routes that will allow residents to reach the commercial center, schools and parks by public transportation, bicycling and walking. 48

ii. Land Use and Energy

The FEIR should consider mitigation measures that will ensure the planned community will use energy efficiently and conservatively. In doing so, it should analyze incorporating "green building" in the development. Green buildings are those buildings that lower energy consumption, use renewable energy, conserve water, harness natural light and ventilation, use environmentally friendly materials and minimize waste (Commission for Environmental Cooperation 2008). 49

Buildings create environmental impacts throughout their lifecycle, from the construction phase to their actual use to their eventual destruction (Commission for Environmental Cooperation 2008). In the United States, buildings account for 40 percent of total energy use, 68 percent of total electricity consumption, and 60 percent of total non-industrial waste (Commission for Environmental Cooperation 2008). Buildings also significantly contribute to the release of greenhouse gases. In the U.S. they account for 38 percent of total carbon dioxide emissions (Commission for Environmental Cooperation 2008). More specifically, residential buildings cause up to 1,210 megatons of carbon dioxide, while commercial building create approximately 1,020 megatons (Commission for Environmental Cooperation 2008). This is because buildings require a lot of energy for their day to day operations. Most of the coal-fired power plants – one of the biggest sources of greenhouse gas emissions – slated for development in the United States will supply buildings with the energy they need. In fact, 76 percent of the energy these plants produce will go to operating buildings in the U.S. (Commission for Environmental Cooperation 2008). 50

Using green building techniques, however, can substantially reduce buildings' influence in increasing greenhouse gas emissions. Green buildings help reduce the amount of energy used to light, heat, cool and operate buildings and substitute carbon-based energy sources with alternatives that do not result in greenhouse gas emissions (Commission for Environmental Cooperation 2008). Currently green buildings can reduce energy by 30 percent or more and carbon emissions by 35 percent. (Commission for Environmental Cooperation 2008). The technologies available for green building are already in wide-use and include "passive solar design, high-efficiency lighting and appliances, highly efficient ventilation and cooling systems, solar water heaters, insulation materials and techniques, high-reflectivity building materials and 51

multiple glazing (IPCC 2007c). Additionally, the U.S. Green Building Council (USGBC), a private, nonprofit corporation, has established a nationwide green building rating system, called Leadership in Energy and Environmental Design ("LEED"). The LEED standard supports and certifies successful green building design, construction and operations. It is one of the most widely used and recognized systems, and to obtain LEED certification from the USGBC, project architects must verify in writing that design elements meet established LEED goals.
Specific mitigation for the greenhouse gas emissions generated by the Project's energy consumption include, but are not limited to:
• Analyzing and incorporating the U.S. Green Building Council's LEED (Leadership in Energy and Environmental Design) or comparable standards for energy efficient building during pre-design, design, construction, operations and management.
• Designing buildings for passive heating and cooling, and natural light, including building orientation, proper orientation and placement of windows, overhangs, skylights, etc.;
• Designing buildings for maximum energy efficiency including the maximum possible insulation, use of compact florescent or other low-energy lighting, use of energy efficient appliances, etc.
• Reducing the use of pavement and impermeable surfaces;
• Requiring water re-use systems;
• Installing light emitting diodes (LEDs) for traffic, street and other outdoor lighting
• Limiting the hours of operation of outdoor lighting
• Maximizing water conservation measures in buildings and landscaping, using droughttolerant plants in lieu of turf, planting shade trees;
• Ensure that the Project is fully served by full recycling and composting services;
• Ensure that the Project's wastewater and solid waste will be treated in facilities where greenhouse gas emissions are minimized and captured.
• Installing the maximum possible photovoltaic array on the building roofs and/or on the project site to generate all of the electricity required by the Project, and utilizing wind energy to the extent necessary and feasible;
• Installing solar water heating systems to generate all of the Project's hot water requirements;
• Installing solar or wind powered electric vehicle and plug-in hybrid vehicle charging stations to reduce emissions from vehicle trips.

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iii. Mitigation Related to Project Construction
• Utilize recycled, low-carbon, and otherwise climate-friendly building materials such as salvaged and recycled-content materials for building, hard surfaces, and non-plant landscaping materials;
• Minimize, reuse, and recycle construction-related waste;
• Minimize grading, earth-moving, and other energy-intensive construction practices;
• Landscape to preserve natural vegetation and maintain watershed integrity;
• Utilize alternative fuels in construction equipment and require construction equipment to utilize the best available technology to reduce emissions.

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iv. Transportation Mitigation Measures
• Encourage and promote ride sharing programs through such methods as a specific percentage of parking spaces for ride sharing vehicles;
• Create a car sharing program within the planned community;
• Create a light vehicle network, such as a neighborhood electric vehicle (NEV) system;

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• Provide necessary facilities and infrastructure to encourage residents to use low or zero-emission
vehicles, for example, by developing electric vehicle charging facilities and conveniently located alternative fueling stations;
Provide a shuttle service to public transit within and beyond the planned community; • Incorporate bicycle lanes and routes into the planned community's street systems.

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v. Carbon Offsets

After all measures have been implemented to reduce emissions in the first instance, remaining emissions that cannot be eliminated may be mitigated through offsets. Care should be taken to ensure that offsets purchased are real (additional), permanent, and verified, and all aspects of the offsets must be discussed in the FEIR. As demonstrated by the Office of the Attorney General offsets are a feasible CEQA mitigation measures[6] once all feasible mitigation measures have been adopted to reduce the Project's carbon footprint and produce energy using renewable sources.

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II. THE EIR MUST CONSIDER A REASONABLE RANGE OF ALTERNATIVES

The EIR must consider a meaningful analysis of reasonable alternatives to the Project in order to lessen or avoid the Project's significant impacts. CEQA mandates that significant environmental damage be avoided or substantially lessened where feasible. Pub. Res. Code ¤ 21002; Guidelines ¤¤ 15002(a)(3), 15021(a)(2), 15126(d). A rigorous analysis of reasonable alternatives to the project must be provided to comply with this strict mandate. "Without meaningful analysis of alternatives in the EIR, neither courts nor the public can fulfill their proper roles in the CEQA process." *Laurel Heights Improvement Ass'n v. Regents of University of California*, 47 Cal.3d 376, 404 (1988). Moreover, "[a] potential alternative should not be excluded from consideration merely because it 'would impede to some degree the attainment of the project objectives, or would be more costly" even when that alternative includes Project development on an alternative site. *Save Round Valley Alliance v. County of Inyo* , 157 Cal. App. 4th 1437, 1456-57 (2007) (quotations omitted). In analyzing the no-project alternative, the EIR must discuss the need for this project andwhether the uses that would potentially utilize the Project can be accommodated in existing areas. As CAPCOA states in its white paper, one way local governments can avoid significant increases in greenhouse gas emissions and help solve the problem of global warming is to "facilitate more efficient and economic use of the lands" already developed within the community (CAPCOA 2008). Reinvesting in existing communities is "appreciably" more efficient than new development and may even result in a net reduction of greenhouse gases (CAPCOA 2008). The EIR should consider an alternative that relies more on higher-density mixed commercial/residential development projects on existing disturbed lands in order to support the reduction of vehicle trips, promote alternatives to individual vehicle travel, and encourage efficient delivery of services and goods (Office of the California Attorney General 2008).

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An analysis of alternatives should also quantify the estimated greenhouse gas emissions, quantified impacts to biological resources, water resources including water quality and water

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[6] The California Attorney General's Office has adopted CEQA settlements calling for the auditing, reduction, and offsetting of greenhouse gas emissions related with a Project demonstrating that offsets are a feasible way to reduce a Project's negative environmental effects on global warming. See http://ag.ca.gov/newsalerts/release.php?id=1466&category=global%20warming See generally http://ag.ca.gov/globalwarming/ceqa.php

availability, and traffic resulting from each proposed alternative. Where is the alternative which mentions agricultural uses in total or part? The quality of this land is such that even I could become a successful farmer. The less dense alternative two is by far superior than this project if one is serious about lessening one's impact on the environment. 57 58 59

CONCLUSION

Thank you for your attention to these comments. We look forward to working with the City to assure that the FEIR conforms to the requirements of CEQA to assure that all significant impacts to the environment are fully analyzed, mitigated or avoided. I hope the FEIR will fully address the concerns found within this letter as I did not see that within the DEIR. The Sierra Club wishes to be placed on the mailing list for all future notices and documents regarding this project. Please mail all notices to Sierra Club, San Gorgonio Chapter, Moreno Valley Group, 26711 Ironwood Ave, Moreno Valley, CA. 92555. 60 61

Thank you,

George Hague
Conservation Chair
Moreno Valley Group
San Gorgonio Chapter
Sierra Club
951.924.0816

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2.12 RESPONSE TO LETTER E

Sierra Club

Response to Comment E-1. This comment suggests that the Draft EIR did not adequately address the concerns raised in their NOP response letter. The comment also requests that their concerns be addressed in the Final EIR, which they advise focuses on global warming, climate change, greenhouse gas pollution, and air pollutant emissions. Lastly, the commentor requests that the project do everything possible to mitigate these issues due to the non-attainment status of the air basin. The commentor notes that their specific issues follow in their letter.

Short-term and long-term project specific and cumulative effects of the proposed project on air quality are evaluated in Section 4.2 Air Quality pages 4.2-1 through 4.2-29 in the Draft EIR. Greenhouse gas emissions and climate change were evaluated in Section 4.3 Climate Change and Greenhouse Gas Emissions pages 4.3-1 through 4.3-27 in the Draft EIR. Where the proposed project's impacts were determined to be significant mitigation was provided to lessen those impacts. It was determined that even with the implementation of feasible mitigation measures the proposed project will have a significant and unavoidable impact on short-term construction air quality, long-term operational air quality impacts, cumulative air quality, and cumulative greenhouse gas emissions.

The concerns raised by the commentor have been responded to in Response to Comments E-1 though E-62. Any comments that were raised by the Commentor that required additions or revisions to the language in the Draft EIR are provided in Section 3.0 Errata to the Draft EIR in the Final EIR.

Response to Comment E-2. This comment states that the NOP mentions consumption of electricity by the warehouse would generate air pollutant emissions. The air quality emissions of the proposed project are analyzed in Section 4.2 Air Quality and also energy use (electricity) is analyzed in Section 4.3 Global Climate Change and Greenhouse Gas Emissions in the Draft EIR.

Response to Comment E-3. Please see Response to Comment D-8. The commentor inaccurately suggests that the project should be required to obtain a LEED Gold rating as a form of mitigation of significant impacts associated with air pollution and greenhouse gas emissions. The process of obtaining a LEED rating is not mitigation. The specific green building features that are part of the LEED rating equation can reduce air pollution and greenhouse gas emissions impacts by minimizing and reducing the quantity of emissions associated with operations of a building.

However, additional air quality related mitigation measures have been added in the Final EIR (refer to Section 3.0 Errata). Please refer to the Table contained in Response to Comment D-45 regarding operational mitigation measures that have been added. The added measures are also in the Mitigation Monitoring and Reporting Plan in Section 4.0 in the Final EIR to ensure they are implemented

Response to Comment E-4. This comment suggests that the roof of the warehouse be built to accommodate solar panels. This measure is included as part of Mitigation Measure 4.2.6.3A has been changed as follows to ensure that solar or other renewable energy source. The mitigation measure has been added in the Final EIR (refer to Section 3.0 Errata. The added measures are also in the Mitigation Monitoring and Reporting Plan in Section 4.0 in the Final EIR to ensure they are implemented

Draft EIR Section 4.2.6.3 Long Term Operation Omissions, Page 4.2-27

4.2.6.3A Prior to issuance of the first building permit, building and site plan designs shall ensure that the project's energy efficiencies surpass applicable 2008 California Title 24, Part 6 Energy Efficiency Standards by a minimum of 20 percent. Verification of increased energy efficiencies shall be documented in Title 24 Compliance Reports provided by the Applicant, and review and approved by the City. The following ~~Any~~ combination of design features, ~~including but not limited to the following list, may~~ shall be used to fulfill this requirement provided that the total increase in energy efficiency meets or exceeds 20 percent:

- ~~All buildings shall be designed to accommodate renewable energy sources, such as photovoltaic solar electricity systems, appropriate to their architectural design.~~

- The project shall install a photovoltaic array (solar panels) or other source of renewable energy generation on-site, or otherwise acquire energy from the local utility that has been generated by renewable resources, to meet the project's office electricity needs.

Response to Comment E-5. This commentor opines that they disagree with the significant and unavoidable impact associated with long-term (operational) air quality impacts. This impact is related to SCAQMD's thresholds of significance. Mitigation Measures 4.2.6.1A through 4.2.6.1M and 4.2.6.3A and 4.2.6.3B set forth a comprehensive list of measures designed to reduce the quantity of air pollution emissions from project construction as well as project operations. These construction and operational mitigation measures have been supplemented in this Final EIR with the feasible mitigation measures suggested by this commentor and comments received from Johnson & Sedlack (Letter D). It bears noting that there is no readily available way to calculate the air pollution emission reductions associated with these mitigations measures and therefore show that long-term emissions cannot be reduced to below the threshold based on this technical limitation even with implementation of unlimited mitigation.

Response to Comment E-6. Mitigation Measure 4.2.6.3.A in the Draft EIR prescribes a performance standard requiring a 20% improvement in energy efficiency (over and above the 2008 CBC) for the building and lists suggested measures that can be included in the building's design to obtain this improvement in energy efficiency. The 20% energy efficiency improvement over and above 2008 CBC building requirements has been established by air quality and climate change technicians as the project-specific energy efficiency improvement (and associated reduction in GHGs) necessary to meet the Statewide mandate of obtaining a 30% reduction in GHG emissions in comparison to 1990 levels by year 2020. In 2006, the California Legislature passed and Governor Schwarzenegger signed AB 32, the Global Warming Solutions Act of 2006, which set a 2020 greenhouse gas emissions reduction goal into law. AB 32 requires California to reduce GHG emissions to 1990 levels (estimated at 426.6 million metric tons) by 2020 (forecast to be 600 million metric tons under "business as usual"), requiring a 30% reduction in emissions in comparison to the "business as usual" scenario. Since that time, the energy efficiency requirements contained in the 2008 and 2010 updates to the CBC now require that new buildings obtain energy efficiencies that exceed the "business as usual" scenario. For this reason, the City has determined that the appropriate performance standard to meet the statewide GHG emissions reduction goals is a 20% improvement over the 2008 CBC.

Response to Comment E-7. This comment is noted. As identified in the Draft EIR (Section 4.1 Agriculture and Forestry Resources, page 4.1-5), "*Approximately 16.89 acres (23%) of the project site is designated as Prime Farmland, 16.23 acres (23%), is designated Farmland of Statewide Importance, and 38.69 acres (54%) is designed Farmland of Local Importance*." The Draft EIR accurately identifies that the project would result in the significant and unavoidable conversion of farmland to a non-agricultural use (Section 4.1 Agriculture and Forestry Resources, page 4.1-15). The project site was historically used for agricultural operations but currently lies fallow and has been fallow for a number of years. The site was most recently used as a sod farm that ceased operating in

August 2005 and has not been in agricultural production since that time. Thus no existing agricultural operation exists onsite. The project site has not been utilized to grow agricultural products in the last seven years and it is therefore not reasonable to assume that this land is available for cultivation of crops that can be grown locally to reduce potential climate change problems as cited in Comment Letter E.

This commentor also states that a developer recently donated $100,000.00 to the Riverside Land Conservancy to help mitigate for the loss of agricultural lands but fails to appropriately cite the information and identify the basis for determining the amount of agricultural lands lost in relation to this monetary amount. The City disagrees with the commentor and relys on the Fourth District Court of Appeal, *Cherry Valley Pass Acres and Neighbors v. City of Beaumont* (2010) 190 Cal.App.4th 316 (*Cherry Valley*) decision that concerned a challenge to an EIR for a project that would convert agricultural land to residential uses. Though recognizing the potential for mitigation in the form of agricultural "*conservation easements, Williamson Act preserve status, or temporary protection or conservation plans*," the EIR noted the long-term trend in agricultural land conversion in the region and concluded that mitigation was not feasible. The court upheld the City's determination regarding the feasibility of mitigation on the grounds it was supported by substantial evidence in the record. The court also examined the City and County General Plans, which acknowledged that development pressures were constraining the continued viability of agriculture and included the expansion of housing, commercial and industrial land uses. The court then determined that the project was compatible with these planning documents. The court concluded the particular circumstances surrounding the project such mitigation was infeasible and therefore was not required to be adopted. As with this project the site has been planned for industrial uses since 1987, the City has recognized that the conversion of agricultural land under its jurisdiction is an eventual and expected outcome of current and future growth and the current General Plan does not include any agricultural designations; therefore mitigation for the loss of is not required.

The trend of the reduction in agriculture in the Inland Empire is discussed in *Assessing the Economic and Market Trends Affecting Agriculture in the Western Inland Empire* prepared by Justin L. Adams, Ph.D. of Chang & Adams Consulting, September 2011 and *Economic Viability of Agriculture in the East Inland Empire* report prepared by CBRE Consulting, March 18, 2009. Both reports are provided in Appendices B and C to the Final EIR. This reduction in "farming" is due to pressures of the growth in the demand for housing and development and the transportation and warehousing sector; increased restrictions on water deliveries for agricultural uses after several consecutive drought seasons; higher wages in other industries in the region; strong agricultural competition from the southern Central Valley for dairies; increased regulatory pressures from air quality and local jurisdictions regarding particulate matter emissions and land use adjacency issues; and the trend in Riverside and San Bernardino Counties is for agricultural operations to continue to shift to places like Kern County regardless independent of land use policy due to the economic issues.

As stated on Section 4.1.6.1 Conversion of State Designated Farmland, page 4.1-12 of the Draft EIR, "*the City has specifically recognized that the conversion of agricultural land under its jurisdiction is an eventual and expected outcome of current and future growth. The current General Plan does not include any agricultural designations. The City allows agricultural uses in all land use designations as an interim use until such time as the land is developed per the vision identified in the General Plan. One of the goals stated in the City's recent General Plan is the '…orderly conversion of agricultural lands.' The proposed project is a continued extension of development in the surrounding area (industrial/business park). The proposed project does not interfere with the ability of other adjacent properties to be used for agricultural production should the property owner wish to do so, nor does it create any gaps of vacant or agricultural land between the proposed project and the existing adjacent development*." As described in the Draft EIR, the City's General Plan and General Plan EIR have considered and evaluated the eventual and expected conversion of agricultural activity within the City

(Section 4.1.6.1 Conversion of State Designated Farmland, page 4.1-12) Therefore, the City has already anticipated the eventual conversion of all agricultural activity within the City.

As stated in the Draft EIR, mitigation measures must be feasible and fully enforceable through permit conditions, agreements, or other legally binding considerations. To be feasible, mitigation must be capable of being accomplished in a successful manner within a reasonable period of time, taking into account the economic, environmental, legal, social, and technological factors. Identification as to the infeasibility of mitigation measures suggested by the commentor has been provided in the Draft EIR. No mechanism for the mitigation of impacts to State-designated Farmland and/or existing agricultural operations has been enacted by either the City of Moreno Valley or the County of Riverside. Rather, the City has specifically recognized that the conversion of agricultural land under its jurisdiction is an eventual and expected outcome of current and future growth. The current General Plan does not include any agricultural designations. The City allows agricultural uses in all land use designations as an interim use until such time as the land is developed per the vision identified in the General Plan. One of the goals stated in the City's recent General Plan is the "…orderly conversion of agricultural lands." The proposed project is a continued extension of development in the surrounding area (industrial/business park). The proposed project does not interfere with the ability of other adjacent properties to be used for agricultural production should the property owner wish to do so, nor does it create any gaps of vacant or agricultural land between the proposed project and the existing adjacent development.

The potential mitigation measures identified by the City in its General Plan EIR and California Department of Conservation (CDC), which are listed in the Draft EIR (Section 4.1.6.1 Conversion of State Designated Farmland, page 4.1-11), are not considered to be feasible by the City of Moreno Valley as determined in the City's General Plan EIR. Providing protection for ongoing agricultural activities from new developments, such as requiring buffers between agricultural operation and new development or requiring the notification and disclosure of agricultural activities to the purchasers adjacent properties will not permanently protect agricultural land. As identified in the Draft EIR, the City supports agriculture as an interim use within the City and no land is dedicated or designated for agricultural use or agricultural preservation within the City's jurisdiction. With no such dedication or designation in place at this time, the establishment of urban limits, greenbelts, and buffers would not result in permanent protection of agricultural land as none exists within the City. Areas where agriculture land use designations may exist that are outside of the City limits cannot be preserved as it is outside of the City's jurisdiction.

The purchase or transfer of development rights, purchase of conservation easements, or donation of funds to assist in the conservation of agricultural land would need to be implemented to ensure the preservation of agricultural land. The City does not have a funding source for the acquisition of farmland. As stated previously, the City anticipates the conversion of agricultural land within the City and does not set aside land for permanent preservation. The City expects that the majority of the land within the City will be converted to urban uses, although some agriculture will continue as interim uses, as allowed by the City's Development Code for all zoning categories. The City of Moreno Valley has determined that these measures are economically infeasible based on the higher costs associated with land, water and labor, increased environmental regulation, and competition from neighboring regions where agricultural operations are less costly; thus, resulting in an inability to make farming profitable. Furthermore, these measures are contrary to the City's vision (as stated in its General Plan) for the project site; therefore, they are not feasible and alternative mitigation has not been identified.

Response to Comment E-8. Refer to Response to Comment E-7.

Response to Comment E-9. Mitigation Measure 4.2.6.3A already provides for preferential parking for alternative fueled cars. This mitigation located in the Draft EIR, Section 4.2 Air Quality, pages 4.2-26, 4.2-27, and 4.2-28 reads as follows with changes proposed in Section 3.0 Errata in the Final EIR to address other commentor concerns:

> ***4.2.6.3A*** *Prior to issuance of the first building permit, building and site plan designs shall ensure that the project's energy efficiencies surpass applicable 2008 California Title 24, Part 6 Energy Efficiency Standards by a minimum of 20 percent. Verification of increased energy efficiencies shall be documented in Title 24 Compliance Reports provided by the Applicant, and review and approved by the City. The following ~~Any combination of~~ design features~~, including but not limited to the following list, may~~ shall be used to fulfill this requirement provided that the total increase in energy efficiency meets or exceeds 20 percent:*
>
> - *Lease/purchase documents shall ~~identify that~~ require tenants ~~are encouraged~~ to ~~promote~~ provide the following:*
> - *Provision of preferential parking for EV and CNG vehicles.*

This comment also suggests that the parking lot be required to include porous materials for groundwater recharge. As identified in Table 1.B on page 1-34 of the Draft EIR, impacts associated with groundwater supplies were determined to be less than significant and no mitigation is required. Therefore, there would be no nexus to require this mitigation measure.

Response to Comment E-10. This comment suggests that the World Logistics Project identified as a cumulative project in the Draft EIR was not included in the analysis of the proposed project. The City acknowledges that the World Logistics Project 41,500,000 SF high cube warehouse uses (refer to Table 2.C in Section 2.7 Cumulative Projects on page 2-38 of the Draft EIR). This cumulative project was considered along with the other cumulative projects in Table 2.C in the consideration of traffic impacts on the highway mainline, air quality, greenhouse gas emissions, and loss of agricultural lands in the Draft EIR.

Response to Comment E-11. The ProLogis project is contained in the Draft EIR. It is referred to as the Eucalyptus Industrial Park, cumulative project number 67, shown in Table 2.A and Figure 2.1.

Table 2.C of the Draft EIR identifies the Eucalyptus Industrial Park as A-67, while Figure 2.1 identifies it as M-67. The project is in the City, so the table entry will be modified as follows and as indicated in Section 3.0 Errata in the Final EIR.

Draft EIR, Section 2.7 Cumulative Projects, Table 2.C, Page 34

~~A~~M-67	Eucalyptus Industrial Park	East of Moreno Beach Drive, west of Quincy channel, south of SR-60	2,244,638 SF of high cube warehouse uses

Response to Comment E-12. The nearest schools to the project site are located approximately one mile to the east and northeast of the project site. Because the primary truck route between the project and I-215 will be Harley Knox Boulevard to the west, the trucks will not be passing by a school. In addition, the project is in an area of the City that has been zoned for industrial uses and the proposed project is consistent with this zoning. This sensitive receptor is a residence located at Patterson Avenue and Harley Knox Boulevard in the City of Perris. It should be noted that the entire area surrounding and adjacent to the proposed project has been previously designated and zoned by the City for future industrial uses. Similarly, the entire area surrounding and adjacent to Harley Knox Boulevard between Perris Boulevard and I-215 has been previously designated and zoned by the City of Perris for future commercial and industrial uses. This means that the single residence located

adjacent to Harley Knox Boulevard in the study area is a legally nonconforming land use. Because this residence on Harley Knox Boulevard is a legally nonconforming use, it is highly unlikely that the residence will exist in the area in the future. Thus, in light of these factors, it is highly unlikely that the currently existing residential use will be exposed to diesel over the course of a long period of time, such as a 70 year exposure used to calculate health risks from diesel particulates.

Response to Comment E-13. The project will not impact the health of students walking or riding their bicycles to school because the majority of the residential areas are located to the east of Perris Boulevard and north and northwest and northeast of Perris Boulevard where it passes over the Perris Valley Storm Drain. This area is more than one mile north of the project site. As noted above the primary trucking route will be Harley Knox Boulevard to the west to the I-215 which does not pass by any schools.

Response to Comment E-14. See Response to Comments E-13. There are no sensitive receptors in close proximity to the project site that would be impacted during project construction or by project truck use of the local roadway system. Nonetheless, the EIR contains a measure requiring a 200 foot buffer between construction staging areas and sensitive receptors (Draft EIR Mitigation Measure 4.2.6.1A, page 4.2-21).

Response to Comment E-15. A *Health Risk Assessment (HRA) VIP Moreno Valley*, LSA Associates, Inc., March 2012 was prepared for the proposed project and included in Appendix D-2 to the Draft EIR. The HRA examined the short-term and long-term potential health effects from project-related emissions of toxic air pollutants (TAP) in the exhaust of diesel-powered delivery trucks on existing surrounding sensitive receptors, including single- and multifamily residences. Onsite workers will be protected by the requirements established by the Occupational Safety and Health Administration (OSHA) and are not considered sensitive receptors in accordance to the California Air Resources Board (CARB). The CARB defines "sensitive" land uses, as homes, medical facilities, daycare centers, schools, and playgrounds.

According to the HRA prepared for the proposed project, "*Toxic air pollution emissions associated with the project would occur from a variety of activities related to the project operations. The only significant amount of TAP known to be released from the proposed distribution facility is contained in the exhaust of project-related vehicles. While there may be other toxic air pollutants in use on site, compliance with City, SCAQMD, State, and federal handling regulations will keep those emissions below a level of significance.*

Page 13 of the HRA states, "*As evaluated in the air quality/health risk assessment, practical procedures will be taken for the onsite operations. The results of the conservative modeling are shown in Table C for carcinogenic and chronic inhalation health risks at the sensitive receptors. Even with the conservative modeling technique used (assuming that an individual stays outdoors at his or her residence 24 hours per day for 70 years, which is the State-required period of time that all HRAs must assess), the nearest sensitive receptor would be exposed to an unmitigated inhalation cancer risk of no more than 3.5 in 1 million, less than the threshold of 10 in a million.* ……"*The highest worker exposure occurs at the facility to the west of the project, at the corner of Indian Street and E. Oleander Avenue. The unmitigated inhalation cancer risk at that facility will be no more than 0.36 in 1 million, also less than the threshold of 10 in a million. The Chronic Hazard Index would be 0.0022, less than the threshold of 1.0. These risk levels are much higher than are actually expected to occur. No significant health risk would occur from project-related truck traffic, and no mitigation is necessary.*"

Table C: Long-Term Health Risk Levels from Project Operations

Location	***Maximum Cancer Risk (risk per million)***	***Maximum Noncancer Risk (risk per million)***
SCAQMD Threshold	*10*	*1*
School 1	*0.11*	*0.000069*
School 2	*0.79*	*0.00050*
School 3	*0.26*	*0.00016*
Nearest Residential to the north	*6.6*	*0.0041*
Nearest Residential to the east	*5.0*	*0.0031*
Nearest Residential to the south	*1.2*	*0.00074*
Workers at facility to the west	*4.5*	*0.0029*
Significant?	***No***	***No***

Source: LSA Associates, Inc., March 2012.

Response to Comment E-16. The Draft EIR, Section 4.2 Air Quality contains the following Mitigation Measure 4.2.6.1K that provides for electric or alternative fuel construction equipment and forklifts and Section 4.3 Greenhouse Gas Emissions and Climate Change contains Mitigation Measure 4.2.6.3A which specifies electric trucks and yard trucks in Mitigation Measure 4.2.6.3A. Changes proposed to Mitigation Measure 4.2.6.1K are provided in Section 3.0 Errata in the Final EIR to address other commentor concerns. The measures are as follows:

> ***4.2.6.1K*** *Grading plans, construction specifications and bid documents shall also include the following notations:*
>
> - *Off-road construction equipment shall utilize alternative fuels where feasible e.g., biodiesel fuel (a minimum of B20), natural gas (CNG), liquefied natural gas (LNG), propane, except for equipment where use of such fuels would void the equipment warranty;*
> - Use electric construction equipment where feasible.
> - All forklifts used during construction and in subsequent operation of the project shall be electric or natural gas powered.
>
> ***4.2.6.3A*** *Prior to issuance of the first building permit, building and site plan designs shall ensure that the project's energy efficiencies surpass applicable 2008 California Title 24, Part 6 Energy Efficiency Standards by a minimum of 20 percent. Verification of increased energy efficiencies shall be documented in Title 24 Compliance Reports provided by the Applicant, and review and approved by the City. The following ~~Any combination of~~ design features~~, including but not limited to the following list, may~~ shall be used to fulfill this requirement provided that the total increase in energy efficiency meets or exceeds 20 percent:*
>
> - *Lease/purchase documents shall ~~identify that~~ require tenants ~~are encouraged~~ to ~~promote~~ provide the following:*
> - *Inclusion of electric powered and/or compressed natural gas fueled trucks and/or vehicles in fleets.*
> - *Use of electrical equipment (instead of gasoline-powered equipment) for landscape maintenance.*
> - *Use of electric (instead of diesel or gasoline-powered) yard trucks.*

Response to Comment E-17. The Draft EIR, Section 4.4.6.1 Short-Term Construction Noise Impacts page 4.4-17 states "*The nearest noise-sensitive receptor locations to the project site are*

existing residences approximately 1,000 feet to the north. These nearest residents may be subject to short-term, intermittent, maximum noise reaching 65 dBA L_{max}, generated by construction activities on the project site. The ambient noise associated with vehicular traffic and industrial uses in the project area would mask the majority of the construction noise from the project site. No significant construction noise impacts would occur if construction of the proposed project would occur within the permitted hours of 6:00 a.m. to 8:00 p.m. of any working day, and within the permitted hours of 7:00 a.m. and 8:00 p.m. on weekends and federal holidays. Compliance with the construction hours specified in the City's Municipal Code would result in construction noise impacts that are less than significant. While impacts would be considered less than significant as long as construction activities occur within the designated hours identified in the City's Municipal Code, mitigation measures [Mitigation Measures 4.4.6A – 4.4.6D] have been identified to reduce the noise levels that would expose nearby sensitive receptors to noise levels in excess of the City's noise standards."

The noise impact analysis for the proposed project (*Noise Impact Analysis VIP Moreno Valley*, LSA Associates, Inc., March 2012, Appendix F to the Draft EIR) evaluated the traffic noise impact in terms of CNEL and the on-site operations noise impact comparing to the City's Municipal Code noise standards. No exceedance or violation of the noise standards was found and no significant long-term noise impacts would occur. The project site is surrounded by vacant land or other non-noise-sensitive land uses such as industrial or commercial uses. Although the City's Municipal Code states that the noise standards shall apply "when measured at a distance of 200 feet or more from the real property line of the source of the sound if the sound occurs on privately owned property, or from the source of the sound, if the sound occurs on public right-of-way, public space or other publicly owned property", in this case, evaluating the potential noise levels at the property line of the nearest noise-sensitive land uses (i.e., residences) would adequately determine the project's potential noise impacts.

As indicated in the noise impact study, no noise barriers would be required during project construction nor are they required during operation of the proposed project. The proposed project will comply with all mitigation measures identified and comply with applicable federal, State, and City guidelines.

Response to Comment E-18. A Traffic Impact Analysis (*Traffic Study VIP Moreno Valley*, LSA Associates, Inc., April 9, 2012) was prepared for the proposed project that analyzed the proposed project's impacts to area roadways during construction and operation of the project. Draft EIR Section 4.5 Traffic and Circulation, pages 4.5-1 – 4.5-28 analyzed the construction and operational impacts to not only area roadways but on the freeway system as well. It was determined that the proposed project would be expected to generate 327 passenger car equivalent (PCE) trips in the a.m. peak hour, 388 PCE trips in the p.m. peak hour, and 5,052 daily PCE trips when built. It was determined that the proposed project upon build out in the year 2013 would have impacts that are cumulative resulting in exceeding the established LOS standard at the following intersections:

- I-215 Southbound Ramps/Harley Knox Boulevard (a.m. and p.m. peak hours);
- I-215 Northbound Ramps/Harley Knox Boulevard (a.m. and p.m. peak hours);
- Indian Street/South Project Driveway (p.m. peak hour);
- Indian Street/Harley Knox Boulevard (a.m. and p.m. peak hours);
- Perris Boulevard/Gentian Avenue (a.m. and p.m. peak hours);
- Perris Boulevard/Iris Avenue (a.m. and p.m. peak hours);
- Perris Boulevard/Krameria Avenue (a.m. and p.m. peak hours);
- Perris Boulevard/Nandina Avenue (a.m. and p.m. peak hours);
- Perris Boulevard/Grove View Road (a.m. and p.m. peak hours);

- Perris Boulevard/South Project Driveway (a.m. and p.m. peak hours); and
- Perris Boulevard/Harley Knox Boulevard (a.m. and p.m. peak hours).

This is a significant impact and mitigation was provided. It is important to note that ten of the eleven intersections also operate at unsatisfactory levels of service under year 2013 cumulative without the project conditions. The unsatisfactory level of service at the Indian Street/South Project Driveway intersection is considered to be a project-specific impact.

The air quality/health risk assessment has discussed the number of truck trips per day that will visit the project site. Trip length assumptions and the truck routes have also been identified in the analysis. Figure 3 of the Health Risk Assessment report (Appendix D-2: *Health Risk Assessment VIP Moreno Valley*, LSA Associates, Inc., March 2012) shows the location of all the truck emissions sources modeled. As described in the report; *"An approximate representation of the roadway was obtained by placing a number of volume sources at equal intervals along the roads on site and far enough off site to characterize the emissions at the sensitive receptors near the project site. For other sensitive receptors further from the project site but near the roads the trucks will travel, it is assumed that the health risk levels from the project traffic will be low compared to the total risk from all existing road traffic.*"

The Air Quality Study Table I page 26 Appendix D of the Draft EIR indicates the average trip length is 17 miles. This section of the Air Quality study is provided as follows:

5.2.1 Long-Term Project Operational Emissions

Long-term air pollutant emission impacts are those associated with stationary sources and mobile sources involving any project-related changes. The proposed project would result in a net increase in the number of employees in the project area; therefore, the proposed project would result in net increases in both stationary and mobile source emissions. The stationary source emissions would come from additional natural gas consumption for on-site buildings and electricity for the lighting in the buildings and at the parking area. The proposed project is a warehouse/distribution in the Inland Empire area of Southern California. Average truck trip length in this area has been shown to be greater than the default trip length in the CalEEMod model. Table I lists the potential origin and destination points for the truck trips that would be associated with the proposed project. The average trip length for the employee commute is assumed to be 17 mi. This is also greater than the default commute trip length included in the CalEEMod model for the Inland Empire area.

Table I: Average Truck Trips Lengths

Truck Route	***Route Length (miles)***	***Percentage of Trucks on Route***
East on State Route 60 to Basin Boundary	*30*	*10%*
Port of Los Angeles/Long Beach	*80*	*50%*
South on the I-215 to San Diego	*50*	*20%*
Inland Empire (i.e., Ontario, Mira Loma, Fontana)	*50*	*10%*
Perris Destinations	*40*	*5%*
Moreno Valley Destinations	*20*	*5%*
Average Truck Trip (54% of trips)	***61***	

Source: Project Plans

Response to Comment E-19. The trip generation for daily trucks is listed in Table 4.5.D in the Draft EIR, Section 4.5.3.1 Project Trip Generation, page 4.5-14. As shown in Table 4.5.D, the total number of daily trips (total raw trucks) is 1,475. The number of daily truck trips is based on NAIOP rates for High-Cube Warehouse that were approved by the City of Moreno Valley.

Response to Comment E-20. Freeway segment and merge/diverge analysis locations are based on Caltrans guidelines which requires analysis to a State highway facility if a project generates over 100 peak hour trips[1]. The project generates over 100 peak hour trips at the Interstate 215/Harley Knox Boulevard interchange and was included in the Draft EIR. Project traffic at freeway segments on SR-60 are less than 100 peak hour trips and were not included in the Draft EIR.

Regarding commenters opinion that payment of DIF and TUMF is inadequate mitigation, please refer to Response to Comment D-82. The payment of DIF and TUMF fees is considered the appropriate mechanism for the project to contribute to future roadway improvements, resulting in full and complete mitigation of project-specific impacts.

Response to Comment E-21. The commentor opines that the project site should not be disced or graded for at least six months prior to doing the burrowing owl survey. Mitigation Measures BIO-1 through BIO-4 require pre-construction surveys and establish what actions must be taken if the burrowing owl is found on-site during the pre-construction surveys that are in accordance with the Burrowing Owl Consortium 1993 Burrowing Owl Survey Protocol and Mitigation Guidelines[2] and referred to the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) survey instructions[3] to complete the pre-construction burrowing owl survey.

Response to Comment E-22. This comment states that the Final EIR will be inadequate unless the concerns and issues identified in the comment letter are addressed within the document. This comment does not raise any specific issue associated with the Draft EIR. In addition, any concerns and issues identified in the comment letter have been addressed through Responses E-1 through E-62 of the Final EIR. No further response is required.

Response to Comment E-23. Draft EIR Section 4.3 Climate Change and Greenhouse Gas Emissions, pages 4.3-1 – 4.3-27 provides an analysis of the proposed project's impact on greenhouse gas emissions and climate change. The analysis is based on the *Greenhouse Gas Emissions and Global Climate Change Study*, LSA Associates, Inc., December 2011 included as an Appendix D in the Draft EIR. Responses to Comments E-24 through E-54 include specific responses to the commentor's assertions that the Draft EIR did not thoroughly evaluate alternatives and mitigation measures that would reduce greenhouse gas emissions. Where appropriate additional mitigation measures have been add to the Section 3.0 Errata in the Final EIR.

Response to Comment E-24. The commentor opines that global warming poses a grave threat to California and the Draft EIR is obligated to discuss the threats posed by greenhouse gas emissions for the public and decision makers. Page 4.3-1 through 4.3-3 in the Draft EIR (Section 4.3 Climate Change and Greenhouse Gas Emissions) already established the existing background information related to climate change as requested in this comment.

The commenter suggests that there is consensus among scientists regarding the link between GHG and global warming. However, there is still considerable debate about the existence of anthropogenic global warming, and about the long term environmental effects of anthropogenic global warming if in fact such warming is occurring and will occur long term. (*See, e.g., U.S. Senate Minority Report; More Than 700 International Scientists Dissent Over Man-Made Global Warming Claims*; March 16, 2009.)

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1 *Guide for the Preparation of Traffic Impact Studies*, State of California Department of Transportation, December 2002, page 2.

2 http://www2.ucsc.edu/scpbrg/burrowingowls.htm.

3 http://www.tlma.co.riverside.ca.us/epd/documents/survey_protocols/burrowing_owl_survey_instructions.pdf.

This body of scientific literature argues that (i) there is no scientific consensus on the existence of anthropogenic global warming; (ii) that the Intergovernmental Panel on Climate Change (IPCC) literature is deeply flawed; (iii) that scientists and research grant funding sources have deliberatively ignored other possible explanations in global temperature variations.

In addition, quantitative data published by the State Air Resources Board and the IPPC demonstrates that even if California achieved the specified AB 32 greenhouse reduction goals, that this may have no effect on climate increases based on greenhouse gas emissions because emissions from China, Russia, Indonesia and other developing countries have and will greatly surpass the emissions of California.

Response to Comment E-25. Draft EIR Section 4.3 Climate Change and Greenhouse Gas Emissions, pages 4.3-1 – 4.3-27 provides an analysis of the proposed project's impact on greenhouse gas emissions and climate change. The analysis is based on the *Greenhouse Gas Emissions and Global Climate Change Study*, LSA Associates, Inc., December 2011 included as an Appendix D in the Draft EIR. In addition, the commentor asserts that the "ecological implications of its actions" must be discussed. Also refer to Response to Comment E-38 for an explanation on a recent court case regarding global climate change. As set forth in Response to Comment E-38, the courts have confirmed the longstanding tenant of CEQA that impacts from the environment onto a project need not be analyzed.

Response to Comment E-26. Please see Responses to Comments E-25, E-27, and E-38.

Response to Comment E-27. The commentor is providing information relating to the scientific background on climate change and global warming. See Response to Comment E-24 regarding an alternative view of greenhouse gas emissions and the effect of such emissions.

Response to Comment E-28. Section 4.3 Climate Change and Greenhouse Gas Emissions, Subsection 4.3.2 Regulatory Setting in the Draft EIR pages 4.3-7 through 4.3-11 contains a discussion on the various federal, state, local and City laws, regulations and policies concerning greenhouse gas.

Response to Comment E-29. The greenhouse gas impact study (*Greenhouse Gas Emissions and Global Climate Change Study*, LSA Associates, Inc., December 2011) provided emissions from both construction and operation periods. During the construction period, emissions from both equipment exhaust and other area sources were calculated. During the operational period, emissions associated with vehicular (including automobiles and trucks) trips, water and energy usage, waste treatment, and other known sources have been calculated and identified in the study.

Response to Comment E-30. Please see Response to Comment E-29. All known emissions during construction and operations of the proposed project have been identified and calculated.

Response to Comment E-31. Please see Response to Comment E-29. All known emissions during construction and operations of the proposed project have been identified and calculated.

Response to Comment E-32. Please see Response to Comment E-29. All known emissions during construction and operations of the proposed project have been identified and calculated. If the commentor is suggesting that an exhaustive "life-cycle" inventory of the project's greenhouse gas

emissions be prepared, the State Office of Planning and Research provided guidance on this issue and clarified that a life-cycle analysis is not required.[1]

Response to Comment E-33. Please see Response to Comment E-29.All known emissions during construction and operations of the proposed project have been identified and calculated.

Response to Comment E-34. Please see the Response to Comment E-29. All known emissions during construction and operations of the proposed project have been identified and calculated. The preparer of the greenhouse gas impact study has followed the guidelines provided by the OPR and CAPCOA and has provided an adequate analysis. It is the City's opinion that it has disclosed the impacts of the proposed project adequately and mitigated the impacts of greenhouse gas emissions where applicable (Draft EIR Section 4.3 Climate Change and Greenhouse Gas Emissions, pages 4.3-1 – 4.3-27).

Response to Comment E-35. The commentor points out that existing conditions must be utilized as the environmental baseline throughout the Draft EIR. The Draft EIR does just this by calculating and presenting the air pollution and greenhouse gas emissions attributable to the proposed project. Because there is currently no land use activity on the project site, existing baseline emissions are zero. Consequently, the calculated emissions represent the emissions associated with the project.

Response to Comment E-36. The project will not be built over a long period of time. There is no phasing proposed with the development. The commentor is confused, the project is not a planned community, it is an approximately 1,616,133 square feet of distribution warehouse (refer to Draft EIR, Section 3.0 Project Description). There is no reason to evaluate the emissions of the proposed project over five year increments since the building will be built all within the same year.

Response to Comment E-37. It is the commentor's opinion that the Draft EIR does not provide a complete inventory of impacts. The Draft EIR evaluated the impacts of the project on air quality (Section 4.2) and greenhouse gas emissions and global climate change (Section 4.3). In addition a full air quality study and greenhouse gas emissions study were prepared for the proposed project and included in their entirety in the Appendix to the Draft EIR. No further response is required.

Response to Comment E-38. According to the greenhouse gas impact study (*Greenhouse Gas Emissions and Global Climate Change Study*, LSA Associates, Inc., December 2011), "*Global climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans along with other significant changes in climate (such as precipitation or wind) that last for an extended period of time. The term "global climate change" is often used interchangeably with the term "global warming," but "global climate change" is preferred to "global warming" because it helps convey that there are other changes in addition to rising temperatures."* The Draft EIR did analyze the project's effects on greenhouse gas emissions which is a component of global climate change or global warming (Section 4.3 Climate Change and Greenhouse Gas Emissions, pages 4.3-1 – 4.3-27).

In addition, the California requires mandatory measures to be implemented on all new construction projects that consist of a wide array of green measures concerning project site design, water use reduction, improvement of indoor air quality, and conservation of materials and resources. The Cal Green Building Code refers to Title 24, Part 6 compliance with respect to energy efficiency; however, it encourages 15 percent energy use reduction over the required in Part 6. The Cal Green Code prescribes a wide array of measures that would directly and indirectly result in reduction of GHG

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1 *Transmittal of the Governor's Office of Planning and Research's Proposed SB97 CEQA Guidelines Amendments to the Natural Resources Agency*, California Governor's Office of Planning and Research, April 13, 2009, page 2.

emissions from the Business as Usual Scenario (California Building Code). The mandatory measures that are applicable to nonresidential projects include site selection, energy efficiency, water efficiency, materials conservation and resource efficiency, and environmental quality measures.

If the commentor is suggesting that the Draft EIR should analyze global warming on the proposed project there is a a recent CEQA Case *Ballona Wetlands Land Trust v. City of Los Angeles and Ballona Ecosystem Education Project v City of Los Angeles,* No.B231965 (Cal. Ct. App 2d Dist., November 9, 2011) where the opponents claimed that the EIR was inadequate because it did not analyze the effects of sea rise due to global warming on the project. The Court held that CEQA did not require the EIR to analyze this risk, concluding that "the purpose of an EIR is to identify the environmental effects of the project on the environment and not the significant effects of the environment on the project." The court reasoned: "[w]e believe that identifying the environmental effects of attracting development and people to an area is consistent with CEQA's legislative purpose and statutory requirements, but identifying the effects on the project and its users of locating the project in a particular environmental setting is neither consistent with CEQA's legislative purpose not required by CEQA statutes." Therefore an analysis of the effects of global climate change on the project is not appropriate and is not required.

Response to Comment E-39. Refer to Response to Comment E-38.

Response to Comment E-40. Refer to Response to Comment E-38.

Response to Comment E-41. As stated in Response to Comment E-38, CEQA does not require that the effects of global climate change on the project and other environmental resources must be analyzed in the EIR. CEQA does require that the proposed project's effects on greenhouse gas emissions and global climate change must be addressed. This analysis was provided in Section 4.3 Greenhouse Gas Emissions and Global Climate Change in the Draft EIR. The Draft EIR did analyze the significant effects on air quality (Section 4.2), water supply (Section 2.0), flood hazards (Section 2.0) and biological resources (Section 2.0) and provided mitigation to reduce those impacts where feasible.

Response to Comment E-42. The Draft EIR analyzed the cumulative effects of the project on greenhouse gas emissions (Section 4.3.7 Cumulative Impacts, page 4.3-26) and it was determined that "*While it is not possible to determine whether the project individually will have a significant impact on global warming or climate change, it will contribute to cumulative GHG emissions in California. Cumulatively, the build out of the proposed project would contribute approximately 0.044 metric tons of CO_2e per year, which is 0.009 percent of California's existing total emissions for carbon dioxide, methane, and nitrous oxide (478 metric tons of CO_2e per year). The mitigation measures discussed above will likely reduce the project's emissions of greenhouse gases; however, without the necessary science and analytical tools, it is not possible to determine with certainty whether the project's emissions of greenhouse gases will be cumulatively considerable, within the meaning of CEQA Guidelines Sections 15065(a)(3) and 15130. The CARB is currently in the process of designing regulations to monitor, limit, and ultimately reduce California GHG emissions but there are as yet no adopted standards for assessing the significance of cumulative impacts from projects.*

Cumulatively, the emissions from electricity production would comprise approximately 3.4 percent of the project's total CO_2e emissions. Water usage and solid waste disposal emissions comprise approximately 18 percent of the project's total CO_2e emissions while the emissions from vehicle exhaust would comprise approximately 77 percent of the project's total CO_2e emissions. The emissions from vehicle exhaust are controlled by the State and Federal governments and are outside the control of the City. The remaining CO_2e emissions are primarily associated with building systems. The proposed project is required to comply with existing State and Federal regulations regarding the energy efficiency

of buildings, appliances, and lighting, which would reduce the project's electricity demand. The new buildings constructed in accordance with current energy efficiency standards would be more energy efficient than older buildings.

With implementation of the strategies and programs described previously, the project is consistent with the strategies to reduce California's emissions to the levels proposed in Executive Order S-3-05. However, given the uncertainty of data and appropriate methodology to accurately analyze, and the inability to quantify the reduction achieved through implementation of strategies and programs previously identified, the proposed project's GHG emission contribution would result in a cumulative impact regarding global climate change and the cumulative impacts of the proposed project on global climate change are considered to be significant and unavoidable."

The Draft EIR did analyze the cumulative effects of the project on greenhouse gas emissions and determined the impacts on global climate change are considered to be significant and unavoidable.

Response to Comment E-43. To clarify, the project is not subject to NEPA and the environmental documentation that was completed is under CEQA. The findings or rulings under NEPA do not apply in this case; however, State CEQA Guidelines Section 15064(b) provides that "…the determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data," and further, that an "ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting." The State CEQA Guidelines further indicate that even when thresholds are established, they may include "identifiable quantitative, qualitative or performance level of a particular environmental effect" (State CEQA Guidelines, Section 15064.7).

Furthermore, the Draft EIR page 4.3-26 as modified in this Final EIR, determined "*project-related GHG emissions and their contribution to global climate change impacts in the State are less than significant ~~and less than cumulatively considerable~~* <u>on a project specific basis</u> *because: (1) the project's impacts alone would not cause or significantly contribute to global climate change, and (2) the project has no substantial effect on consumption of fuels or other energy resources, especially fossil fuels that contribute to GHG emissions when consumed.*

The Draft EIR (Section 4.3) made a determination that the proposed project would not conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases and no mitigation is required. However, it was determined that the proposed project would generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment and mitigation was proposed to reduce these project-specific effects to less that significant (Draft EIR, page 4.3-21 – 4.3-26).

It should be noted that any GHG emissions reductions achieved locally and within the State may be offset by emissions increases in developing countries such as Brazil, Russia, India and China. In the absence of worldwide reduction commitments that are fully funded, any project level reduction measures cannot assure that significant effects from greenhouse gas emissions will be fully mitigated because significant impacts from greenhouse gas emissions may occur even with implementation of the measures set forth in CARB's AB 32 Scoping Plan.

Response to Comment E-44. Refer to Response to Comment E-43.

Response to Comment E-45. Refer to Responses to Comments E-42 and E-43.

Response to Comment E-46. As the comment is the opinion of the commentor the City is not in the position nor is it reasonable to adopt a "zero" significance threshold. SCAQMD and other air quality

agencies agree that GHG and climate change should be assessed as a potentially significant "cumulative impact" rather than a "project-specific" impact. SCAQMD is considering the adoption of a numeric plan-level efficiency target of 6.6 MTCO2E per service population.

The intent of CEQA is to determine the significant effects of a project on the environment and provide feasible and reasonable mitigation to reduce impacts to less than significant. In instances where the impact of the project cannot be reduced to less than significant and it is determined the impact is significant and unavoidable, the Lead Agency, must adopt a Statement of Overriding Considerations that finds (1) under Public Resources Code Section 21081(a)(3), and CEQA Guidelines Section 15091(a)(3), that specific economic, legal, social technological, or other considerations, including provisions of employment opportunities to highly trained workers make infeasible the mitigation measures or project alternatives identified in the Final EIR; and (2) under CEQA Guidelines section 15092(b), that the remaining significant effects are acceptable due to overriding concerns described in the CEQA Guidelines Section 15093. CEQA does have a provision as stated above that an impact can be significant and unavoidable if the City makes findings as to why it is willing to accept the significant impact; therefore, it was not CEQA's intent to not allow any tolerance for impacts on the environment as long a good faith effort is made to reduce the impacts where reasonable.

Response to Comment E-47. See Response to Comment D-8. Mitigation Measure 4.2.6.3.A (Draft EIR page 4.2-26) requires "Any combination of design features, including but not limited to the following list, may be used to fulfill this requirement provided that the total increase in energy efficiency meets or exceeds 20 percent:" With implementation of this measure, the building will meet a 20% reduction in energy performance standard which will render greenhouse gas emissions impacts to a less than significant level on a project-specific basis and consistent with the intention of AB32. It should be noted, however, that many new mitigation measures have been added in the Final EIR. Please refer to the Table contained in Response to Comment D-45 regarding air quality operational mitigation measures as well as indicated in Section 3.0 Errata in the Final EIR.

Response to Comment E-48. Riverside Transit Authority (RTA) has an established bus route, No. 19, which services the project area and the site. The RTA has two stops one on either side of Perris Blvd. and Grove View Rd. From the project site the walk north along Perris Blvd. is approximately 0.2 mile to a stop at Perris Blvd and Nandina. There is another bus stop at 17800 Perris Blvd. approximately 0.1 mile from the project site. Therefore, the site is serviced by the RTA and no further actions are necessary. However, a bus bay has been included in the project design along the site's Perris frontage.

The commentor is erroneously confusing this project which is a distribution warehouse with a mixed use or commercial project that would have residents living within the project area. It is not appropriate to include plazas and pedestrian and bicycle only streets within the project and to create routes that will allow residents to reach the commercial center, schools and parks by public transportation, bicycling and walking as suggested by the commentor. The project is not building transportation routes. The project is located on existing roadways, Perris Boulevard, Indian Street, and Grove View Road.

Response to Comment E-49. The commentor is erroneously confusing the proposed project, which is a high-cube logistics distribution warehouse, by inferring that it is a planned community with a residential component. Nonetheless, the warehouse building will be required to incorporate many green building techniques required as part of Mitigation Measures 4.2.6.3A-4.2.6.3B and 4.3.6.1A-4.3.6.1C.

Response to Comment E-50. The commentor is erroneously confusing the proposed project, which is a high-cube logistics distribution warehouse, by inferring that it is a residential project. Nonetheless,

please see the response to Comments E-29 and E-32. All known emissions during construction and operations of the proposed project have been identified and calculated (Draft EIR Section 4.3 Climate Change and Greenhouse Gas Emissions, pages 4.3-1 – 4.3-27).

Response to Comment E-51. See Response to Comments D-8 and E-47.

Feasible mitigation measures, including several identified in the list provided by the commentor, have been already included as mitigation for the project and are identified in the Draft EIR. In addition, the mitigation measures shown as "Incorporated" in the following Table have been added to the Final EIR (Section 3.0 Errata) as suggested by the commentor. The changes to the Draft EIR do not result in a significant impact and has no material effect on the findings of the EIR. The Table below contains each of the greenhouse gas reduction measures suggested for inclusion by the commentor and if it is already included, if will be added mitigation as part of the Final EIR, or if will not be included and why.

Suggested Mitigation Measure	Response
1. Analyzing and incorporating the U.S. Green Building Council's LEED (Leadership in Energy and Environmental Design) or comparable standards for energy efficient building during pre-design, design, construction, operations and management.	**Incorporated.** The project description states In recognition of the trend towards Green Building, the proposed project will pursue the Leadership in Energy and Environmental Design (LEED) Core & Shell rating program. LEED is a voluntary, consensus-based standard to support and certify successful green building design, construction, and operations.
2. Designing buildings for passive heating and cooling, and natural light, including building orientation, proper orientation and placement of windows, overhangs, skylights, etc.	**Included.** A similar mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-27.
3. Designing buildings for maximum energy efficiency including the maximum possible insulation, use of compact florescent or other low-energy lighting, use of energy efficient appliances, etc.	**Included.** A similar mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-27.
4. Reducing the use of pavement and impermeable surfaces.	**Included where appropriate.** Impermeable surfaces will be installed were appropriate but it is not feasible to use impermeable surfaces in the truck parking area since a soft permeable surface will not support the weight of a large truck.
5. Requiring water re-use systems.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.3.6.1C** on page 4.3-25.
6. Installing light emitting diodes (LEDs) for traffic, street and other outdoor lighting.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.3.6.1A** on page 4.3-24.
7. Limiting the hours of operation of outdoor lighting.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-27.
8. Maximizing water conservation measures in buildings and landscaping, using drought tolerant plants in lieu of turf, planting shade trees.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-27.
9. Ensure that the Project is fully served by full recycling and composting services.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3B** on page 4.2-28.
10. Ensure that the Project's wastewater and solid waste will be treated in facilities where greenhouse gas emissions are minimized and captured.	**Infeasible.** The site is served by public entities for wastewater and solid waste, Neither the City nor the project proponent has control over those facilities.

Suggested Mitigation Measure	Response
11. Installing the maximum possible photovoltaic array on the building roofs and/or on the project site to generate all of the electricity required by the Project, and utilizing wind energy to the extent necessary and feasible.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.3.6.1A** on page 4.3-24.
Mitigation Related to Construction	
1. Utilize recycled, low-carbon, and otherwise climate-friendly building materials such as salvaged and recycled-content materials for building, hard surfaces, and non-plant landscaping materials.	**Included.** A similar mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.3.6.1B** on page 4.3-25.
2. Minimize, reuse, and recycle construction-related waste.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.3.6.1A** on page 4.3-24.
3. Minimize grading, earth-moving, and other energy-intensive construction practices.	**Infeasible.** The entire site must be graded to accommodate the building structure and parking lot.
4. Landscape to preserve natural vegetation and maintain watershed integrity.	**Infeasible.** The site does not contain natural/native vegetation**.**
5. Utilize alternative fuels in construction equipment and require construction equipment to utilize the best available technology to reduce emissions.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measures 4.2.6.1B, 4.2.6.1I, and 4.2.6.1K** on pages 4.2-21- 4.2.22.
6. Utilize recycled, low-carbon, and otherwise climate-friendly building materials such as salvaged and recycled-content materials for building, hard surfaces, and non-plant landscaping materials.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.3.6.1B** on page 4.3-25.
Transportation Mitigation Measures	
1. Encourage and promote ride sharing programs through such methods as a specific percentage of parking spaces for ride sharing vehicles.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-27.
2. Create a car sharing program within the planned community;	**Not required.** The project is not a planned community. . As noted in **Mitigation Measure 4.2.6.1K**, documentation shall be provided to the City of Moreno Valley indicating that construction workers have been encouraged to carpool or otherwise reduce VMT to the greatest extent practical, including providing information on available park and ride programs.
3. Create a light vehicle network, such as a neighborhood electric vehicle (NEV) system.	**Included.** This suggested mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-27.
4. Provide necessary facilities and infrastructure to encourage residents to use low or zeroemission vehicles, for example, by developing electric vehicle charging facilities and conveniently located alternative fueling stations.	**Included.** A similar mitigation measure is already included in Section 4.2 Air Quality of the Draft EIR under **Mitigation Measure 4.2.6.3A** on page 4.2-27. The mitigation measure the commentor suggests relates to "residents". This project is a high-cube warehouse not a residential development.
5. Provide a shuttle service to public transit within and beyond the planned community.	**Not required.** The RTA has two stops one on either side of Perris Blvd. and Grove View Rd. From the project site the walk north along Perris Blvd. is approximately 0.2 mile to a stop at Perris Blvd and Nandina. There is another bus stop at 17800 Perris Blvd. approximately 0.1 mile from the project site. Therefore, the site is serviced by the RTA and no further actions are necessary. However, a bus bay has been included in the project design along the site's Perris frontage.

Suggested Mitigation Measure	Response
6. Incorporate bicycle lanes and routes into the planned community's street systems.	**Not required.** Bicycle access to and from the project will take place from the adjacent streets In addition the project is not a planned community.

Response to Comment E-52. See the Table included in the Response to Comment E-51 under "Mitigation Related to Construction" Items 1-6.

Response to Comment E-53. See the Table included in the Response to Comment E-51 under "Transportation Mitigation Measures" Items 1-6.

Response to Comment E-54. The use of carbon offsets are infeasible because:

- The cited precedent is a negotiated settlement for a major oil refinery in Contra Costa County, rather than a warehouse development in Riverside County;
- The cited precedent was for the period prior to 2012;
- California has not established any generally applicable standards for requiring offsets for GHG emissions; and
- Most cities and counties in California have not required offsets for GHG emissions on projects of the scale of the proposed project. Since this is a cumulative rather than a project level impact, mitigation for the cumulative level impact will be ineffective unless it is applied to all the cumulative projects.

Using such carbon offsets to mitigate for cumulative impacts is fraught with uncertainty. As the comment implies ("… offsets purchased are real…"), but there is considerable controversy regarding whether offsets that are available today will actually mitigate this cumulative effect.

First, it requires an accurate measure of the emissions to be offset and the offsets to be provided. That calculation turns out to be riddled with uncertainty on both ends. As noted above in the example cited by the commenter, this initial offset of $7 million for the Rodeo refinery was later reduced to $4.4 million due to revised calculations of GHG emissions. The UN's Intergovernmental Panel on Climate Change found a margin of error of 10% with measuring emissions from making cement or fertilizer; 60% with the oil, gas and coal industries; and 100% with some agricultural processes.

Second, the provision of offsets requires an accurate measure of the carbon saved elsewhere. Most of the earliest offset projects involved planting trees, which naturally ingest carbon, a complex and unpredictable process which forbids accurate measurement.

Finally, the very idea of offsetting relies on what is known as additionally - evidence that a carbon reduction would not have occurred in the natural order of commercial life. For example, one of the biggest UK companies that sells offsets, Climate Care, distributed 10,000 energy-efficient light bulbs in a South African township; offered the carbon reductions as offsets; and then discovered that an energy company was distributing the same kind of light bulbs free to masses of customers, including their township, so the reduction would have happened anyway.

To accurately calculate the amount of credit for each of the above actions, the offset program must make a number of critical assumptions:

- What is the baseline of emissions for the existing facilities that would be retrofitted to reduce their energy consumption? Would they ultimately be retrofitted in any case, thus limiting the actual resulting reduction in GHG emissions?

- Is the development of the alternative energy source actually dependent on the external funding provided by the offset? Or is the alternative energy developer simply achieving another subsidy?

- How much extra energy (and GHG emissions) is required to construct the alternative energy facility? What period of time should this be amortized over? For example, the development of the California High Speed Rail Project is estimated to reduce energy consumption in the long run. However, the extra energy involved with construction is estimated to have a 40 year payback.

As such, the actual amount of mitigation provided by an offset program can be speculative, based upon the actual performance of the program.

While the above cited issues with offsets are problematic, even if they are successful, they are based upon the assumption that a 1:1 reduction in emissions will actually result in the same reduction in global CO2 values. This static analysis fails to take into account the dynamic nature of energy consumption worldwide. When energy consumption (a proxy for GHG emissions) is reduced in one location, there are powerful economic reasons to assert that the same energy consumption (GHG emissions) will simply be shifted to another location.

There is a global marketplace for fossil fuel energy based upon a market between buyers and sellers. The sellers, those who own the sources and production of fossil fuel energy, have a powerful economic interest to keep and increase their income stream from the production of fossil fuels.

To the extent that the actions cited above as potential offset measures, in combination with other conservation measures, reduce the demand for fossil fuels in the countries where they are implemented, the owners of these fossil fuel supplies will still want to preserve and enhance their income as much as possible. And there is a large unmet need (unmet as defined by consumer actions) for increased energy consumption in developing countries. For example the average annual energy consumption of a citizen of China or sub-Saharan Africa, at 4.5 metric tons, is far less than that of the average US citizen, at 20 metric tons. To the extent that the US and other countries reduce energy consumption based upon energy efficiency measures, the owners of fossil fuel resources will seek to sell the same energy, perhaps at a lower price, to the less developed countries. If the energy is sold at a lower price, then more energy would need to be sold to generate the same income, and the resulting energy consumption and GHG emissions could actually increase.

There is uncertainty regarding the efficacy, reliability and legal standing of carbon off-sets at this time. For this reason, such mitigation is considered to be infeasible.

Response to Comment E-55. The commentor is correct in stating that the EIR must contain a "*reasonable*" [emphasis added] range of alternatives to the proposed project that avoid or lessen the significant impacts to the proposed project (Pub. Res. Code §21002; CEQA Guidelines §§ 15002(a)(3), 15021(a)(2), 15126.6(d)). According to CEQA Guidelines §15126.6(a) "[A]n EIR need not consider every conceivable alternative to a project. An EIR is not required to consider alternatives which are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of

reason. (Citizens of Goleta Valley v. Board of Supervisors (1990) 52 Cal.3d 553 and Laurel Heights Improvement Association v. Regents of the University of California (1988) 47 Cal.3d 376)."

The Draft EIR does include an analysis of a reasonable range of alternatives to the proposed project (Section 6.0 Alternatives, pages. 6-1 – 6-33) incompliance with CEQA. The Draft EIR discusses the No Project Alternative (Section 6.3.2.1) and an Off-Site Alternative (Section 6.3.2.4) as suggested by the commentor.

Response to Comment E-56. The commentor is misinterpreting the Draft EIR or has failed to understand that the proposed project is not a higher density mixed use commercial/residential project. The project analyzed in the Draft EIR is an industrial project (refer to Draft EIR Section 3.0 Project Description) which is consistent with the General Plan Designation of Business Park/Light Industrial. Zoning for the site and surrounding area in the City is governed by Specific Plan (SP) 208. SP 208, which is known as the Moreno Valley Industrial Area Plan, was originally adopted in 1989, amended in 2001 and 2002. The entire area surrounding the project site is zoned SP 208 which has planned the area for business park and industrial uses since 1989 (23 years). The area to the south in the City of Perris is also planned for industrial and commercial uses. Clearly, the Cities of Moreno Valley and Perris have planned this area for industrial/business park and commercial uses in their respective General Plans for years. The City has already determined the appropriate lands uses for the area and conducted the appropriate CEQA review for that determination. This project implements that prior determination consistent with the existing general plan and specific plan.

If the commentor is suggesting that a high density mixed use commercial/residential project be considered as an alternative to the proposed project, the Draft EIR Section 6.3.2.3, page 6-22 does include an analysis of Alternative 3 Mixed Use Commercial Office Center. A Mixed Commercial/Residential Alternative was analyzed in Section 6.2.3 and it was determined *[t]hat the mixed commercial/residential alternative would not meet the project objectives of providing new employment and revenue generation options in close proximity to local consumers to the same degree as the proposed project. The employment opportunities and economic benefits derived from the proposed project are superior to the Mixed Commercial/Residential Alternative. This alternative has been rejected because it would result in greater impacts and would not satisfy the basic City objectives for development of the project site.*

Also refer to Response to Comment D-96.

Response to Comment E-57. The Draft EIR does analyze the various alternatives impacts on greenhouse gas emissions (Table 6.G page 6-16) biological resources, water resources including water quality and water availability(Table 6.E page 6-16) and traffic (Table 6.C page 6-15). In addition, detailed analysis for each of the alternatives is proposed in Draft EIR Sections 6.3.1.1, 6.3.1.2, 6.3.1.3 and 6.3.1.4 on pages. 6-12 – 6-31 as it related to the environmental issues listed by the commentor. An agricultural alternative was not considered because the site has been planned by the City since 1987 for industrial land uses. In addition the current General Plan does not include any agricultural designations. The City allows agricultural uses in all land use designations as an interim use until such time as the land is developed per the vision identified in the General Plan. One of the goals stated in the City's recent General Plan is the "…orderly conversion of agricultural lands." Therefore, an agricultural use as an alternative is not a practical alternative that requires analysis. No further analysis is necessary and the comment does not change the conclusion in the Draft EIR.

Response to Comment E-58. This is the commentor's opinion and is not relevant to the analysis in the Draft EIR. However, the Draft EIR, Section 3.0 Project Description, page 3-1, states that "*The proposed project site has been used historically for agricultural purposes but currently lies fallow. It*

was most recently used as a sod farm growing that ceased operating in August 2005." The site has not been farmed over the last seven years.

Response to Comment E-59. A less dense alternative (which is to assume an alternative that considers a building of less square footage) is analyzed in the Draft EIR as Alternative 2. In this Alternative, warehouse uses would be reduced to 1,212,100 square feet on 71 acres. It was determines that Alternative 2 would be the environmentally superior alternative and it would have similar impacts as the proposed project on: agriculture and forestry resources, biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, mineral resources and recreation (Draft EIR Section 6.3.2.2 Alternative 2: Reduced Intensity , pages 6-17 – 6-22). It was concluded on page 6-21 that [*U]nder the Reduced Intensity Alternative, impacts related to short-term construction-related air quality would be similar to the proposed project as the same amount of land would be disturbed and the same mix of equipment would be utilized. Long-term operational-related air quality impacts would be reduced in magnitude when compared to the project but would remain significant and unavoidable. The decrease in warehouse uses would result in a reduction of permanent jobs that would be created. This alternative would have a reduced demand on public services and utilities and service systems. However, similar to the proposed project, the payment of fees and adherence to utility requirements would reduce these impacts to a less than significant level.*

Because of the decrease in vehicle trips achieved under this alternative, impacts to the operation of local roadways and intersections would be proportionally reduced from what was identified for the proposed project; however, long-term traffic impacts would remain significant and unavoidable. Construction-related noise would be similarly mitigated like the proposed project and would remain less than significant. Water use for this alternative would be less than the proposed project and would generate less wastewater and solid waste. Under this alternative, the proposed project objectives are met and warehouse uses would still be built, but on a smaller scale.

As stated above, the Reduced Intensity Alternative would reduce the intensity of some impacts of the proposed project. However; loss of farmland, long-term air quality, greenhouse gas emissions cumulative impacts, and long-term traffic impacts would remain significant and unavoidable. The Reduced Intensity Alternative is a reduction in actual size of the warehouse but the significant unavoidable impacts of the proposed project are not reduced to less than significant.

Additionally, the Reduced Intensity Alternative would not meet the following project objectives: "Provide a high density, high-quality large-scale industrial development to provide jobs for residents at a variety of income levels" and "Cluster industrial warehouse uses near efficient access points to the state highway system to reduce traffic congestion on surface streets and to reduce concomitant air pollutant emissions from vehicle sources reduces impacts to air quality, global climate change, and traffic." This is due to the fact that reduced-intensity development patterns are in concept diametrically opposite of the highly dense form of development patterns that are characteristic of clustered development. Development of the project site in such an inefficient manner would result in negative effects such as sprawl leading to increased VMT and associated air pollution and greenhouse gas emissions.

Response to Comment E-60. The City has fully responded to the commentor's concerns and comments and others who had submitted comments on the Draft EIR. The Final EIR is conformance with CEQA Guidelines §§ 15090, 15091, and 15132. In addition, the significant impacts of the proposed project have been analyzed in Section 4.1 through Section 4.5 in the Draft EIR and mitigation proposed for those impacts that were found to be significant. For those impacts for agriculture, air quality, greenhouse gas emissions, and traffic that were determined to be significant and unavoidable the City would have to adopt findings and a statement of overriding considerations

that the state the specific economic, legal, social technological, or other considerations, outweigh the significant unavoidable effects of the proposed project.

Response to Comment E-61. The City has included the Sierra Club on its mailing list for all future notices and documents regarding this project.

Response to Comment E-62. The commentor has attached various references. No response is required.

DEPARTMENT OF TRANSPORTATION
DISTRICT 8
PLANNING
464 WEST 4th STREET, 6th Floor MS 725
SAN BERNARDINO, CA 92401-1400
PHONE (909) 383-4557
FAX (909) 383-6890
TTY (909) 383-6300

Flex your power!
Be energy efficient!

June 4, 2012

Jeff Bradshaw
Associate Planner
City of Moreno Valley
14177 Frederick Street
P.O. Box 88005
Moreno Valley, CA 92552

Notice of availability DEIR for the VIP Moreno Valley. Riv-215-PM 32.62

Dear Mr. Bradshaw,

We have completed our review for the above noted project which is a 1,616,133 square foot warehouse distribution building on a 71.13 net acre site. The building includes 268 dock high doors and 44,000 square feet of office area in four potential office locations. Located within the Moreno Valley Industrial Area Plan (SP 208) at the City's southern boundary, between Perris Boulevard and Indian Street and between Grove View Road and the Perris Valley storm channel Tentative Parcel Map No. 36162 is proposed to combine four existing parcels into a single parcel for development of the 1.6 million square warehouse facilities. — 1

As the owner and operator of the State Highway System (SHS), it is our responsibility to coordinate and consult with local jurisdictions when proposed development may impact our facilities. As the responsible agency under the California Environmental Quality Act (CEQA), it is also our responsibility to make recommendations to offset associated impacts with the proposed project. Although the project is under the jurisdiction of the City of Moreno Valley due to the Project's potential impact to State facilities it is also subject to the policies and regulations that govern the SHS. — 2

We recommend the following: however, additional comments maybe forth coming. — 3

Traffic Forecasting

Appendix G- Traffic Study VIP Moreno Valley page 6, Under section "Existing Without Project Traffic Volumes" please use year 2007 for Caltrans AADT volume data which can be found online. This will keep the consistency in traffic volume projections. — 3

Appendix G- Traffic Study VIP Moreno Valley page 7, Under section "Existing Without Project Traffic Volumes" please specify which year(s) have been used to determine the D and K factors derived from Caltrans data. — 4

We appreciate the opportunity to offer comments concerning this project. If you have any questions regarding this letter, please contact Talvin Dennis at (909) 383-6908 or myself at (909) 383-4557 for assistance.

"Caltrans improves mobility across California"

Sincerely,

DANIEL KOPULSKY
Office Chief
Community Planning/IGR-CEQA

2.14 RESPONSE TO LETTER F

California Department of Transportation, District 8

Response to Comment F-1. The commentor has accurately summarized the general aspects of the proposed project.

Response to Comment F-2. The comment is introductory and states that the California Department of Transportation (Caltrans) is the owner and operator of the State Highway System as is a "responsible agency" pursuant to Public Resources Code Section 21070 for making recommendations to offset associated traffic impacts with the proposed project.

The comment is introductory in nature and outlines Caltrans' authority and role as a commenting agency. Caltrans' introduction in this comment is noted, and no further response is required.

Response to Comment F-3. Response to Comment F-3. The project Traffic Impact Analysis used 2009 Caltrans Annual Average Daily Traffic (AADT) volume data because it was the most current data available and was comparable to the 2007 AADT. In addition, 2007 counts for the intersection analysis were used because it was determined that the volumes in 2007 were significantly higher at some locations than in 2009 and would represent the worst-case scenario.

Response to Comment F-4. The project Traffic Impact Analysis used 2009 Caltrans data for K and D factors to be consistent with the 2009 Caltrans AADT volume data that was used in the analysis.

EASTERN MUNICIPAL WATER DISTRICT
SINCE 1950

June 4, 2012

Jeff Bradshaw, Associate Planner
City of Moreno Valley
P.O. Box 88005
Moreno Valley, CA 92552-0805

SUBJECT: VIP Moreno Valley
Notice of Availability (NOA) of a
Draft Environmental Impact Report

Dear Mr. Bradshaw:

Thank you for the opportunity to review the Notice of Availability (NOA) for the above referenced project. The project proposes to develop approximately 1,616,133 square feet of distribution warehouse space on an approximately 71 acre site. The single building will be constructed with 264 vertical-lift dock-high roll-up doors on the long (north and south) sides of the building to allow access for the loading and unloading of products from diesel truck/trailers. The project is estimated to be constructed by the year 2013. Eastern Municipal Water District (EMWD) offers the following comments. 1

The subject project requires water, sewer and recycled water services from EMWD. The details of said service connection points will be further detailed in a separate document, known as EMWD's Plan of Service, which is still not yet developed by the project proponent. To that end, EMWD requires dialog with the project proponent, to develop the EMWD Plan of Service, as clarified in the attached letter. 2

Again, EMWD appreciates the opportunity to comment on this project. Please forward the Final Environmental Impact Report to the attention of Helen Stratton at the mailing address shown on page one. If you have questions concerning these comments, please feel free to contact Helen Stratton at 951 928-3777, Ext. 4545, or Eli Rodriguez at Ext. 4450.

Sincerely,

Joseph B. Lewis
Director of Engineering Services

JBL:hs
Cc: Eli Rodriguez
Encls.

Mailing Address: Post Office Box 8300 Perris, CA 92572-8300 Telephone: (951) 928-3777 Fax: (951) 928-6177
Location: 2270 Trumble Road Perris, CA 92570 Internet : www.emwd.org

EASTERN MUNICIPAL WATER DISTRICT
SINCE 1950

June 4, 2012

City Of Moreno Valley
14177 Frederick Street
Moreno Valley, CA 92553

Re. NOP of DEIR, VIP Moreno Valley, TPM 36162

Attn. Jeff Bradshaw, Associate Planner, City Of Moreno Valley

In order to receive water, sewer or recycled water service(s) from Eastern Municipal Water District (EMWD), the following information will be helpful to the project proponent:

EMWD requires beginning dialogue with the project proponent at an early stage in site design and development, via a one-hour complimentary Due Diligence meeting. To set up this meeting, the project proponent should complete a Project Questionnaire (form NBD-058) and submit to EMWD. To download this form or for additional information, please visit our "New Development Process" web page, under the "Businesses" tab, at www.emwd.org. This meeting will offer the following benefits:

1. Describe EMWD's development work-flow process
2. Identify project scope and parameters
3. Preliminary, high level review of the project within the context of existing infrastructure
4. Discuss potential candidacy for recycled water service

Following the Due Diligence meeting, to proceed with this project, a Plan Of Service (POS) will need to be developed by the developer's engineer, and reviewed/approved by EMWD prior to submitting improvement plans for Plan Check. The POS process will provide the following:

1- Technical evaluation of the project's preliminary design
2- Defined facility requirements, i.e. approved POS
3- Exception: for feasibility evaluation of a purchase acquisition, only a conceptual facilities assessment may be developed.

2

If you have questions or concerns, please do not hesitate to contact me.

Sincerely,

for Eli Rodriguez
New Business Development Department
(951) 928-3777 x4450
rodrigue@emwd.org

Mailing Address: Post Office Box 8300 Perris, CA 92572-8300 Telephone: (951) 928-3777 Fax: (951) 928-6177
Location: 2270 Trumble Road Perris, CA 92570 Internet : www.emwd.org

2.16 RESPONSE TO LETTER G

Eastern Municipal Water District

Response to Comment G-1. The commentor has accurately summarized the general aspects of the proposed project.

Response to Comment G-2. Eastern Municipal Water District is providing information to the City and applicant that the applicant must submit a Plan of Services prior to construction of the project. The attachment letter outlines what is required of the applicant prior to construction. The comment does not directly refer to the Draft EIR but is provided for informational purposes.

From: Noelle_Ronan@fws.gov [mailto:Noelle_Ronan@fws.gov]
Sent: Monday, June 04, 2012 4:00 PM
To: Jeffrey Bradshaw
Cc: CLandry@wrcrca.org; Karin_Cleary-Rose@fws.gov
Subject: VIP Moreno Valley Draft Environmental Impact Report (DEIR) [FWS-WRIV-12B0233-12CPA0244]

Mr. Bradshaw,
The City of Moreno Valley submitted the above-mentioned DEIR to identify the proposed project's direct, indirect, and cumulative environmental impacts, to discuss alternatives, and to propose mitigation measures that avoid, minimize, or offset significant environmental impacts. The Service is providing the following comments as they relate to the project's consistency with the Western Riverside County Multiple Species Conservation Plan (MSHCP).

Focused surveys for special status plants and burrowing owls were conducted on the project site in 2009. We typically prefer that surveys for sensitive species are updated (i.e., no more than 1 year old) to demonstrate that the project is consistent with the MSHCP. However; given the disturbed condition of the project site (e.g., annual disking), we acknowledge that the focused surveys for sensitive plants and burrowing owls are sufficient. 1

We appreciate the inclusion of mitigation measures (Mitigation Measure BIO-1 through BIO-4) to avoid or minimize impacts to birds protected by the Migratory Bird Treaty Act (MBTA) and burrowing owls. Mitigation Measure BIO-3 specifies that if nesting special status avian species or burrowing owls occupy an area of disturbance, no construction activity will take place within 500 feet of an active nest/burrow until it has been determined that it is no longer active and all juveniles have fledged. In addition, we recommend that a biological monitor be present to monitor the effects of construction on any active nests and to ensure that there is no encroachment into the 500 foot nest buffer zones. 2

Thank you for the opportunity to review the DEIR. If you have any questions or comments please contact me at 760-322-2070 ext. 215.

Noelle Ronan
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Palm Springs Fish and Wildlife Office
777 E. Tahquitz Canyon Way, Suite 208
Palm Springs, CA 92262
760-322-2070 ext. 215

2.18 RESPONSE TO LETTER H

United States Fish and Wildlife Service

Response to Comment H-1. The City concurs with the United States Fish and Wildlife Service's conclusion that the site is disturbed and that updated focused surveys for sensitive plants and the burrowing owl are not necessary even if the original surveys are now 3 years old.

Response to Comment H-2. The United States Fish and Wildlife Service concurs with the mitigation in the Draft EIR for the burrowing owl and recommends that a biological monitor be present during construction to monitor any active nests to ensure that there is no encroachment into the 500 foot nest buffer zone. The City concurs with this recommendation and mitigation Measure BIO-3 has been amended as follows:

> ***Mitigation Measure BIO-3:*** *If nesting special status avian or burrowing owl species are determined to occupy a proposed area of disturbance a biological monitor will be present during construction to ensure no construction activity shall take place within 500 feet of an active nest/burrow until it has been determined by the biological monitor that the nest/burrow is no longer active, and all juveniles have fledged the nest/burrow.*

Letter I

WARREN D. WILLIAMS
General Manager-Chief Engineer

1995 MARKET STREET
RIVERSIDE, CA 92501
951.955.1200
FAX 951.788.9965
www.rcflood.org

51183

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

RECEIVED
JUN 0 6 2012
CITY OF MORENO VALLEY
Planning Division

City of Moreno Valley
Community Development Department -
Planning Division
Post Office Box 88005
Moreno Valley, California 92552-0805

Attention: JEFF BRADSHAW

Ladies and Gentlemen:

Re: PM 36162 (PA 09-0012) + PP09-0004

The District does not normally recommend conditions for land divisions or other land use cases in incorporated cities. The District also does not plan check city land use cases, or provide State Division of Real Estate letters or other flood hazard reports for such cases. District comments/recommendations for such cases are normally limited to items of specific interest to the District including District Master Drainage Plan facilities, other regional flood control and drainage facilities which could be considered a logical component or extension of a master plan system, and District Area Drainage Plan fees (development mitigation fees). In addition, information of a general nature is provided.

The District has not reviewed the proposed project in detail and the following checked comments do not in any way constitute or imply District approval or endorsement of the proposed project with respect to flood hazard, public health and safety or any other such issue:

____ No comment.

____ This project would not be impacted by District Master Drainage Plan facilities nor are other facilities of regional interest proposed.

____ This project involves District Master Plan facilities. The District will accept ownership of such facilities on written request of the City. Facilities must be constructed to District standards, and District plan check and inspection will be required for District acceptance. Plan check, inspection and administrative fees will be required.

____ This project proposes channels, storm drains 36 inches or larger in diameter or other facilities that could be considered regional in nature and/or a logical extension of the adopted _____ Master Drainage Plan. The District would consider accepting ownership of such facilities on written request of the City. Facilities must be constructed to District standards, and District plan check and inspection will be required for District acceptance. Plan check, inspection and administrative fees will be required.

____ This project is located within the limits of the District's _____ Area Drainage Plan for which drainage fees have been adopted; applicable fees should be paid by cashier's check or money order only to the Flood Control District or City prior to issuance of grading permits. Fees to be paid should be at the rate in effect at the time of issuance of the actual permit.

____ An encroachment permit shall be obtained for any construction related activities occurring within District right of way or facilities. For further information, contact the District's encroachment permit section at 951.955.1266.

__✓__ The Districts previous comments are still valid. 1

GENERAL INFORMATION

This project may require a National Pollutant Discharge Elimination System (NPDES) permit from the State Water Resources Control Board. Clearance for grading, recordation or other final approval should not be given until the City has determined that the project has been granted a permit or is shown to be exempt.

If this project involves a Federal Emergency Management Agency (FEMA) mapped flood plain, then the City should require the applicant to provide all studies, calculations, plans and other information required to meet FEMA requirements, and should further require that the applicant obtain a Conditional Letter of Map Revision (CLOMR) prior to grading, recordation or other final approval of the project, and a Letter of Map Revision (LOMR) prior to occupancy.

If a natural watercourse or mapped flood plain is impacted by this project, the City should require the applicant to obtain a Section 1602 Agreement from the California Department of Fish and Game and a Clean Water Act Section 404 Permit from the U.S. Army Corps of Engineers, or written correspondence from these agencies indicating the project is exempt from these requirements. A Clean Water Act Section 401 Water Quality Certification may be required from the local California Regional Water Quality Control Board prior to issuance of the Corps 404 permit.

Very truly yours,

MEKBIB DEGAGA
Engineering Project Manager

Date: 5/22/2012

c: Riverside County Planning Department
Attn: Kristi Lovelady

ATTACHED

5)

Letter I

WARREN D. WILLIAMS
General Manager-Chief Engineer

1995 MARKET STREET
RIVERSIDE, CA 92501
951.955.1200
FAX 951.788.9965
www.floodcontrol.co.riverside.ca.us
51183_6

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

City of Moreno Valley
Community Development Department -
Planning Division
Post Office Box 88005
Moreno Valley, California 92552-0805

Attention: JEFF Bradshaw

Ladies and Gentlemen:

Re: PA09-0004

The District does not normally recommend conditions for land divisions or other land use cases in incorporated cities. The District also does not plan check city land use cases, or provide State Division of Real Estate letters or other flood hazard reports for such cases. District comments/recommendations for such cases are normally limited to items of specific interest to the District including District Master Drainage Plan facilities, other regional flood control and drainage facilities which could be considered a logical component or extension of a master plan system, and District Area Drainage Plan fees (development mitigation fees). In addition, information of a general nature is provided.

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____ No comment.

____ This project would not be impacted by District Master Drainage Plan facilities nor are other facilities of regional interest proposed.

X This project involves District Master Plan facilities. ~~The District will accept ownership of such facilities on written request of the City. Facilities must be constructed to District standards, and District plan check and inspection will be required for District acceptance. Plan check, inspection and administrative fees will be required.~~ (drp) — 2

____ This project proposes channels, storm drains 36 inches or larger in diameter or other facilities that could be considered regional in nature and/or a logical extension of the adopted _____ Master Drainage Plan. The District would consider accepting ownership of such facilities on written request of the City. Facilities must be constructed to District standards, and District plan check and inspection will be required for District acceptance. Plan check, inspection and administrative fees will be required.

X This project is located within the limits of the District's Perris Valley Area Drainage Plan for which drainage fees have been adopted; applicable fees should be paid by cashier's check or money order only to the Flood Control District or City prior to issuance of grading permits. Fees to be paid should be at the rate in effect at the time of issuance of the actual permit. — 3

X An encroachment permit shall be obtained for any construction related activities occurring within District right of way or facilities. For further information, contact the District's encroachment permit section at 951.955.1266. — 4

GENERAL INFORMATION

This project may require a National Pollutant Discharge Elimination System (NPDES) permit from the State Water Resources Control Board. Clearance for grading, recordation or other final approval should not be given until the City has determined that the project has been granted a permit or is shown to be exempt.

If this project involves a Federal Emergency Management Agency (FEMA) mapped flood plain, then the City should require the applicant to provide all studies, calculations, plans and other information required to meet FEMA requirements, and should further require that the applicant obtain a Conditional Letter of Map Revision (CLOMR) prior to grading, recordation or other final approval of the project, and a Letter of Map Revision (LOMR) prior to occupancy.

If a natural watercourse or mapped flood plain is impacted by this project, the City should require the applicant to obtain a Section 1602 Agreement from the California Department of Fish and Game and a Clean Water Act Section 404 Permit from the U.S. Army Corps of Engineers, or written correspondence from these agencies indicating the project is exempt from these requirements. A Clean Water Act Section 401 Water Quality Certification may be required from the local California Regional Water Quality Control Board prior to issuance of the Corps 404 permit.

Very truly yours,

DALE V. ANDERSON
Engineering Project Manager

Date: 03/00/09

c: Riverside County Planning Department
Attn: Kathleen Browne

J.b.

2.20 RESPONSE TO LETTER I

Riverside County Flood Control and Water Conservation District

Response to Comment I-1. The City acknowledged that the previous comments that were provided to the City during the NOP comment period are still valid and are provided in the second page of the response letter and included in Appendix A to the Draft EIR. The comments do not reflect the analysis in the Draft EIR and provide the City with facts that relate to the construction of the project and the project's responsibility to meet the Riverside County Flood Control and Water Conservation District's requirements.

Response to Comment I-2. The City acknowledges the project involves the District's Master Plan of Facilities. Refer to Response to Comment I-1.

Response to Comment I-3. The City acknowledges the project is located in the District's Perris Valley Area Drainage Plan and fees must be paid to the District by the project proponent prior to the issuance of grading permits. Refer to Response to Comment I-1.

Response to Comment I-4. The City acknowledges the project proponent is required to obtain an encroachment permit for any construction in the District's right of way or facilities. Refer to Response to Comment I-1.

Letter J

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

STATE CLEARINGHOUSE AND PLANNING UNIT

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

June 5, 2012

RECEIVED
JUN 11 2012
CITY OF MORENO VALLEY
Planning Division

Jeff Bradshaw
City of Moreno Valley
14177 Frederick Street
Moreno Valley, CA 92552-0805

Subject: PA09-0004 (Plot Plan), PA09-0012 (Tentative Parcel Map No. 36162), and P11-020 (EIR)
SCH#: 2011081084

Dear Jeff Bradshaw:

The State Clearinghouse submitted the above named Draft EIR to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on June 4, 2012, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

J-1

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Enclosures
cc: Resources Agency

Letter J

Document Details Report
State Clearinghouse Data Base

SCH# 2011081084
Project Title PA09-0004 (Plot Plan), PA09-0012 (Tentative Parcel Map No. 36162), and P11-020 (EIR)
Lead Agency Moreno Valley, City of

Type EIR Draft EIR

Description The project is generally described as a Plot Plan for development of a 1,616,133 s.f. warehouse distribution building on a 71.13 net acre site. The building includes 268 dock high doors and 44,000 s.f. of office area in four potential office locations. Tentative Parcel Map No. 36162 is proposed to combine four existing parcels into a single parcel for development of the 1.6 million square warehouse facility.

Lead Agency Contact

Name Jeff Bradshaw
Agency City of Moreno Valley
Phone 951 413-3224 **Fax**
email
Address 14177 Frederick Street
City Moreno Valley **State** CA **Zip** 92552-0805

Project Location

County Riverside
City Moreno Valley
Region
Lat / Long 33° 51' 39.5" N / 117° 13' 49.5" W
Cross Streets Southwest corner of Grove View road and Perris Boulevard
Parcel No. 316-210-071, -073, -075, and -076
Township 3S **Range** 3W **Section** 31 **Base** SBB&M

Proximity to:

Highways I-215
Airports March Air Reserve Base
Railways B.N.S.F.
Waterways Perris Valley Storm Channel - Lateral B
Schools Rancho Verde H.S.
Land Use The current General Plan designation is Business Park and the current zoning is Industrial within SP 208.

Project Issues Aesthetic/Visual; Agricultural Land; Air Quality; Biological Resources; Noise; Traffic/Circulation; Other Issues

Reviewing Agencies Resources Agency; Department of Fish and Game, Region 6; Department of Parks and Recreation; Department of Water Resources; Caltrans, Division of Aeronautics; California Highway Patrol; Caltrans, District 8; Regional Water Quality Control Board, Region 8; Native American Heritage Commission

Date Received 04/20/2012 **Start of Review** 04/20/2012 **End of Review** 06/04/2012

Note: Blanks in data fields result from ir

nt information provided by lead agency.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton
Program Analyst

Cc: State Clearinghouse

Attachment: Native American Contact List

2.22 RESPONSE TO LETTER J

California Governor's Office of Planning and Research, State Clearinghouse

Response to Comment J-1. The City recognizes the receipt of comments from State agencies and the State Clearinghouse's acknowledgement that it has complied with review requirements for environmental documents.

3. EIR ERRATA

Any corrections to the Draft Environmental Impact Report (EIR) text and figures generated either from responses to comments or independently by the City, are stated in this section of the Final EIR. The Draft EIR text and figures have not been modified to reflect these EIR modifications.

These EIR errata are provided to clarify, refine, and provide supplemental information for the Starcrest Distribution Facility Project Draft EIR. Changes may be corrections or clarifications to the text and figures of the original Draft EIR. Other changes to the EIR clarify the analysis in the EIR based upon the information and concerns raised by commentors during the public review period. None of the information contained in these EIR modifications constitutes significant new information or changes to the analysis or conclusions of the Draft EIR.

The information included in this EIR erratum that resulted from the public comment process does not constitute substantial new information that requires recirculation of the Draft EIR. The California Environmental Quality Act (CEQA) Guidelines, Section 15088.5, states in part:

(a) A lead agency is required to recirculate an EIR when significant new information is added to the EIR after public notice is given of the availability of the draft EIR for public review under Section 15087 but before certification. As used in this section, the term "information" can include changes in the project or environmental setting as well as additional data or other information. New information added to an EIR is not "significant" unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project's proponents have declined to implement. "Significant new information" requiring recirculation includes, for example, a disclosure showing that:

    (1) A new significant environmental impact would result from the project or from a new mitigation measure proposed to be implemented.

    (2) A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance.

    (3) A feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the significant environmental impacts of the project, but the project's proponents decline to adopt it.

    (4) The draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded.

(b) Recirculation is not required where the new information added to the EIR merely clarifies or amplifies or makes insignificant modifications in an adequate EIR.

The changes to the Draft EIR included in these EIR modifications do not constitute "significant" new information because:

No new significant environmental impact would result from the project or from a new mitigation measure;

There is no substantial increase in the severity of an environmental impact that would result unless mitigation measures are adopted that reduce the identified significant impacts to a level of insignificance;

No feasible project alternative or mitigation measure considerably different from others previously analyzed has been proposed or identified that would clearly lessen the significant environmental impacts of the project; and

The Draft EIR is not fundamentally or basically inadequate or conclusory in nature such that meaningful public review and comment were precluded.

Therefore, recirculation of the Draft EIR is not required because the new information added to the EIR through these modifications clarifies or amplifies information already provided or makes insignificant modifications to the already adequate Draft EIR.

For simplicity, the EIR modifications contained in the following pages are in the same order as the information appears in the Draft EIR. Changes in text are signified by strikeouts (~~strikeouts~~) where text has been removed and by double underlining (underline) where text has been added. The applicable page numbers from the Draft EIR are also provided where necessary for easy reference.

Draft EIR, Section 1.0 Executive Summary, Table 1.B: VIP Moreno Valley - Environmental Summary, pages 1-11 through 1-41

Table 1.B: VIP Moreno Valley - Environmental Summary in the Draft EIR has been updated to be consistent with changes that have been made, as a result of the responses to comments. Changes have been made to mitigation measures for air quality, biological resources, cultural resources, geology and soils, hydrology and water quality. These changes to the Draft EIR do not result in a significant impact and has no material effect on the findings of the Draft EIR.

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
AIR QUALITY		
Construction ~~Equipment Exhaust~~ Emissions: Would the proposed project violate any AAQS or contribute to an existing or projected air quality violation; or expose sensitive receptors to pollutants? For construction operations, the applicable daily thresholds are: - 75 pounds per day of ROC; - 100 pounds per day of NO_X; - 550 pounds per day of CO; - 150 pounds per day of PM_{10}; - 150 pounds per day of SO_X; and - 55 pounds per day of $PM_{2.5}$.	**4.2.6.1B**. Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall utilize power sources (e.g., power poles) or clean-fuel (e.g., fuel other than diesel or gasoline) generators where feasible. Contract specifications shall be included in the proposed project construction documents, which shall be reviewed by the City. **4.2.6.1K** Grading plans, construction specifications and bid documents shall also include the following notations: • Off-road construction equipment shall utilize alternative fuels where feasible e.g., biodiesel fuel (a minimum of B20), natural gas (CNG), liquefied natural gas (LNG), propane, except for equipment where use of such fuels would void the equipment warranty; • Gravel pads shall be provided at all access	Significant and unavoidable

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	points to prevent tracking of mud onto public roads; • Install and maintain trackout control devices at all access points where paved and unpaved access or travel routes intersect; • The contractor or builder shall designate a person or person(s) to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust off site; • The contractor or builder shall post a publicly visible sign with the telephone number and person to contact regarding dust complaints. The contact person shall take corrective action within 24 hours; • High pressure injectors shall be provided on diesel construction equipment where feasible; • Engine size of construction equipment shall be limited to the minimum practical size; • Substitute gasoline-powered for diesel-powered construction equipment where feasible; • Use electric construction equipment where feasible; • Install catalytic converters on gasoline-powered equipment where feasible; • Ride-sharing program for the construction crew shall be encouraged and shall be supported by contractor(s) via incentives or other inducement; • Documentation shall be provided to the City of Moreno Valley indicating that construction workers have been encouraged to carpool or otherwise reduce VMT to the greatest extent practical, including providing information on available park and ride programs;	

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	• Lunch vendor services shall be ~~provided~~ permitted onsite during construction to minimize the need for offsite vehicle trips; • All forklifts used during construction and in subsequent operation of the project shall be electric or natural gas powered. • Suspend use of all construction equipment operations during second stage smog alerts. **4.2.6.1N**. When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained. **4.2.6.1O.** All streets shall be swept at least once a day using SCAQMD Rule 1186 certified street sweepers utilizing reclaimed water trucks if visible soil materials are carried to adjacent streets. **4.2.6.1P.** Any vegetative cover to be utilized onsite shall be planted as soon as possible to reduce the disturbed area subject to wind erosion. Irrigation systems required for these plants shall be installed as soon as possible to maintain good ground cover and to minimize wind erosion of the soil. **4.2.6.1Q**. Provide temporary traffic controls such as a flag person, during all phases of construction to maintain smooth traffic flow. **4.2.6.1R** All roadways, driveways, sidewalks, etc., should be completed as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used. **4.2.6.1S** Implement activity management techniques including a) development of a comprehensive construction management plan designed to minimize the number of large construction equipment operating during any given time period; b) scheduling of construction truck trips during non-peak hours to reduce peak hour emissions; c) limitation of the length of construction work-day period;	

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	and d) phasing of construction activities. **4.2.6.1T** Reroute construction trucks away from congested streets and sensitive receptor areas.	
Long-Term Operational Emissions: Would the proposed project violate any AAQS or contribute to an existing or projected air quality violation; or expose sensitive receptors to pollutants? For long-term operations, the applicable daily thresholds are: - 55 pounds of ROC; - 55 pounds of NOX; - 550 pounds of CO; - 150 pounds of PM10; - 55 pounds of PM2.5; and - 150 pounds of SOX.	**4.2.6.3A** Prior to issuance of the first building permit, building and site plan designs shall ensure that the project's energy efficiencies surpass applicable 2008 California Title 24, Part 6 Energy Efficiency Standards by a minimum of 20 percent. Verification of increased energy efficiencies shall be documented in Title 24 Compliance Reports provided by the Applicant, and reviewed and approved by the City. Any-combination of design features, including but not limited to the following list, may shall be used to fulfill this requirement provided that the total increase in energy efficiency meets or exceeds 20 percent: • Buildings shall eExceed California Title 24 Energy Efficiency performance standards for water heating and space heating and cooling, as deemed acceptable by the City. • Increase in insulation such that heat transfer and thermal bridging is minimized. • Limit air leakage through the structure or within the heating and cooling distribution system to minimize energy consumption. • Incorporate dual-paned or other energy efficient windows. • Incorporate energy efficient space heating and cooling equipment. • InteriorUse interior and exterior energy efficient lighting which exceeds the California Title 24 Energy Efficiency performance standards shall be installed, as deemed acceptable by the City. Automatic Use automatic devices to turn off lights when they are not needed shall be implemented. • To the extent that they are compatible with landscaping guidelines established by the City, use shade-producing trees, particularly those that shade paved	Significant and Unavoidable

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	surfaces such as streets and parking lots and buildings ~~shall be planted~~ at the project site. • ~~Paint~~ Use paint and a surface color palette for the project ~~shall~~ emphasizing light and off-white colors which reflect heat away from the buildings. • ~~All buildings shall be designed to accommodate renewable energy sources, such as photovoltaic solar electricity systems, appropriate to their architectural design.~~ • Install a photovoltaic array (solar panels) or other source of renewable energy generation on-site, or otherwise acquire energy from the local utility that has been generated by renewable resources, to meet the project's office electricity needs. • ~~To r~~ Reduce energy demand associated with potable water conveyance~~, the project shall implement~~ using the following: o Landscaping palette emphasizing drought-tolerant plants; o Use of water-efficient irrigation techniques; and, o U.S. EPA Certified WaterSense labeled for equivalent faucets, high-efficiency toilets (HETs), and water-conserving shower heads. • ~~The project shall p~~ Provide secure, weather-protected, on-site bicycle storage/parking. • ~~The project shall p~~ Provide on-site showers (one for males and one for females). ~~L~~ Provide lockers for employees ~~shall be provided~~. • ~~The project will e~~ Establish a Transportation Management Association (TMA). The TMA will coordinate with other TMAs within the City to encourage and coordinate carpooling among building occupants. The TMA will advertise its services to building occupants, and offer transit and/or other incentives to reduce GHG emissions. A plan will be submitted by the TMA to the City within two months	

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	of project completion that outlines the measures implemented by the TMA, as well as contact information. • ~~The project shall p~~Provide preferential parking for carpools~~ and vanpool~~, vanpools or other alternative fuel vehicles. Locations and configurations of proposed preferential parking for carpools and vanpools are subject to review and approval by the City. Prior to final site plan approval, delineate preferential parking for carpools and vanpools ~~shall be delineated~~ on the project site plan. • ~~The project shall p~~Provide at least two electric vehicle charging stations. Locations and configurations of proposed charging stations are subject to review and approval by the City. Prior to issuance of the first building permit, delineate stub outs for charging stations ~~shall be indicated~~ on the project building plans. • Implement compressed workweek schedules. • Achieve at least 20% per year (as a percentage of previous percentage, not total trips) increase in percentage of consolidated trips carried by SmartWay carriers until it reaches a minimum of 90% of all long haul trips carried by SmartWay 1.0 or greater carriers. • Achieve at least 15% per year (as a percentage of previous percentage, not total trips) increase in percentage of long haul trips carried by SmartWay carriers until it reaches a minimum of 85% of all consolidator trips carried by SmartWay 1.0 or greater carriers. • Use of fleet vehicles conforming to 2010 air quality standards or better. • Installation of catalytic converters on gasoline-powered equipment. • Inclusion of electric powered and/or compressed natural gas fueled trucks and/or vehicles in fleets. • Establishment and use of carpool/vanpool programs, complemented by parking fees	

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	for single-occupancy vehicles. • Provision of preferential parking for EV and CNG vehicles. • Use of electrical equipment (instead of gasoline-powered equipment) for landscape maintenance. • Use of electric (instead of diesel or gasoline-powered) yard trucks. • Use of SmartWay 1.25 rated trucks. • Provide a display case or kiosk displaying transportation information including the RTA bus schedule in a prominent area accessible to employees. • Use landscape maintenance companies that use battery powered or electric equipment or contract only with commercial landscapers who operate with equipment that complies with the most recent California Air Resources Board certification standards, or standards adopted no more than three years prior to date of use or any combination of these two themes. ~~• Lease/purchase documents shall identify that tenants are encouraged to promote the following:~~ ~~o Implementation of compressed workweek schedules.~~ ~~o SmartWay partnership;~~ ~~o Achievement of at least 20 percent per year (as a percentage of previous percentage, not total trips) increase in percentage of consolidated trips carried by SmartWay carriers until it reaches a minimum of 90 percent of all long haul trips carried by SmartWay 1.0 or greater carriers.~~ ~~o Achievement of at least 15 percent per year (as a percentage of previous percentage, not total trips) increase in percentage of long haul trips carried by SmartWay carriers until it reaches a minimum of 85 percent of all consolidator trips carried by SmartWay 1.0 or greater~~	

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	~~carriers.~~ ~~o Use of fleet vehicles conforming to 2010 air quality standards or better.~~ ~~o Installation of catalytic converters on gasoline-powered equipment.~~ ~~o Inclusion of electric powered and/or compressed natural gas fueled trucks and/or vehicles in fleets.~~ ~~o Establishment and use of carpool/vanpool programs, complemented by parking fees for single-occupancy vehicles.~~ ~~o Provision of preferential parking for EV and CNG vehicles.~~ ~~o Use of electrical equipment (instead of gasoline-powered equipment) for landscape maintenance.~~ ~~o Use of electric (instead of diesel or gasoline-powered) yard trucks.~~ ~~o Use of SmartWay 1.25 rated trucks.~~	
BIOLOGICAL RESOURCES (FROM THE INITIAL STUDY [APPENDIX A])		
Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service? Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan?	**Mitigation Measure BIO-3:** If nesting special status avian or burrowing owl species are determined to occupy a proposed area of disturbance a biological monitor will be present during construction to ensure no construction activity shall take place within 500 feet of an active nest/burrow until it has been determined by the biological monitor that the nest/burrow is no longer active, and all juveniles have fledged the nest/burrow.	Less Than Significant
CULTURAL RESOURCES (FROM THE INITIAL STUDY [APPENDIX A])		
Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	**Mitigation Measure CUL-1:** Prior to construction involving excavation four feet or more below existing surface grade, the construction contractor shall provide evidence that a qualified paleontologist has been retained, and that the paleontologist(s) shall be present during all grading and other significant ground-disturbing activities that	Less Than Significant

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	reach four feet or more below existing surface grade. ~~If the paleontologist(s) do not find evidence for Pleistocene-era deposits once the maximum excavation depth is reached, monitoring shall be discontinued.~~ In the event fossiliferous deposits are encountered, the following measures shall be implemented: • Monitoring shall be conducted by qualified paleontological monitor(s) of excavation in areas identified as likely to contain paleontological resources, including undisturbed older Pleistocene alluvium. Paleontological monitors shall be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors shall be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring may be reduced if the potentially fossiliferous units are determined upon exposure and examination by qualified paleontological personnel to have low potential to contain fossil resources. • Paleontological monitoring of any earthmoving will be conducted by a monitor, under direct guidance of a qualified paleontologist. Earthmoving in areas of the parcel where previously undisturbed sediments are buried, but not otherwise disturbed, will not be monitored. • ~~If too few fossil remains are found after 50 percent of the planned for earthmoving has been completed, monitoring can be reduced or discontinued in those areas at the project paleontologist's direction.~~ • Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates. • Identification and curation of specimens into a professional, fully accredited museum repository with permanent retrievable storage. The paleontologist must have a written repository agreement	

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	in hand prior to the initiation of mitigation activities. • Preparation or a report of findings with and appended itemized inventory of specimens. The report and report and inventory, when submitted to the City of Moreno Valley along with confirmation of the curation of recovered of recovered specimens into an established, accredited museum repository, will signify completion of the program to mitigate impacts to paleontological resources.	
GEOLOGY AND SOILS (FROM THE INITIAL STUDY [APPENDIX A])		
Be located on expansive soil, as defined in Table 18-a-B of the Uniform Building Code (1994), creating substantial risks to life or property?	**Mitigation Measure GEO-1:** Prior to the issuance of grading permits, any existing low density soils and/or saturated soils shall be removed to competent natural soil under the inspection of the Soils Engineering Firm. After the exposed surface has been cleansed of debris and/or vegetation, it shall be scarified until it is uniform in consistency, brought to the proper moisture content and compacted to a minimum of 90 percent relative compaction (in accordance with ASTM: D-1557). In any area where a transition between fill and native soil or between bedrock and soil are encountered, additional excavation beneath foundations and slabs will be necessary in order to provide uniform support and avoid differential settlement of the structure. The on-site soils or approved import soils may be utilized for the compacted fill, provided they are free of any deleterious materials and shall not contain any rocks, brick, asphaltic concrete, concrete, or other hard materials greater than eight inches in maximum dimensions. Any import soil must be approved by the Soils Engineering firm a minimum of 24 hours prior to importation to the site. The approved fill soils shall be placed in layers not in excess of six inches in thickness. Each lift shall be uniform in thickness and thoroughly blended. The fill soils shall be brought to within 2 percent of the optimum moisture content, unless otherwise specified by the Soils Engineering firm. Each lift shall be compacted to a minimum of 90 percent relative compaction (in accordance with ASTM: D-1557) and approved prior to the	Less Than Significant

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	placement of the next layer of soil. Compaction tests shall be obtained at the discretion of the Soils Engineering firm but to a minimum of one test for every 500 cubic yards placed and/or for every two feet of compacted fill placed. The minimum relative compaction shall be obtained in accordance with accepted methods in the construction industry. The final grade of the structural areas shall be in a dense and smooth condition prior to placement of slabs-on-grade or pavement areas. No fill soils shall be placed, spread, or compacted during unfavorable weather conditions. When the grading is interrupted by heavy rains, compaction operations shall not be resumed until approved by the Soils Engineering firm. It should be noted that the above measure may be modified by the Final Geotechnical or Soils Report. **Mitigation Measure GEO-2:** Prior the issuance of grading permits, the project proponent shall inform the project engineers, architects, owner, maintenance personnel, and other interested parties of the Expansive Soil Guidelines provided in the project's geotechnical analysis [Geotechnical Engineering Investigation Proposed Industrial Development Southwest Corner of Perris Boulevard and Grove View Road Moreno Valley, California, NorCal Engineering, March 7, 2007]. The recommendations identified in the project's Expansive Soil Guidelines shall be reviewed and considered implemented by the project engineers, architects, owner, maintenance personnel, and other interested parties to determine in the applicable design guidelines. Applicable design guidelines shall be included and implemented in the project's grading plans.	
GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE		
Would the proposed project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	**4.3.6.1A** Prior to the issuance of building permits, the project applicant shall provide evidence to the City of Moreno Valley that building features have been incorporated in building plans as required by Title 24 of the California Code of Regulations. These features include but are not limited to the	Less than Significant

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	following: • Exterior windows in the office areas shall utilize window treatments for efficient energy conservation. **4.3.6.1B** Prior to the issuance of building permits, the project applicant shall provide evidence to the City of Moreno Valley that the following measures have been be incorporated into the design and construction of the project: • Use Encourage use of locally produced and/or manufactured building materials for at least 10 percent of the construction materials used for the project. • Use Encourage use of "Green Building Materials," such as those materials that are resource efficient, and recycled and manufactured in an environmentally friendly way, for at least 10 percent of the project. • Maximize the use of electricity from the power grid by replacing diesel- or gasoline-powered equipment where feasible. This would reduce GHG emissions because electricity can be produced more efficiently at centralized power plants. • Design the project building to exceed the 2008 California Building Code's (CBC) Title 24 energy standard by 20%, including, but not limited to, any combination of the following: • Incorporate ENERGY STAR or better rated windows, space heating and cooling equipment, light fixtures, appliances, or other applicable electrical equipment in the office areas. • Provide a landscape and development plan for the project that takes advantage of shade, prevailing winds, and landscaping. The landscaping plan shall be prepared by a registered landscape architect who will consider the following:	

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	o Plant at least 50 percent low-ozone forming potential (Low-OFP) trees and shrubs, preferably native, drought-resistant species, to meet city/county landscaping requirements. o Plant Low-OFP, native, drought-resistant, tree and shrub species, 20% in excess of that already required by city or county ordinance. Consider roadside, sidewalk, and driveway shading. • Install electrical outlets on the exterior walls of the warehouse/office building (and perhaps parking lots) to promote the use of electric landscape maintenance equipment. **4.3.6.1C** Prior to the issuance of occupancy permits, the project applicant shall provide evidence to the City of Moreno Valley that the following measures have been be incorporated into the operation of the project: • The project applicant shall use less than 3,900 low Global Warming Potential (GWP) hydrofluorocarbon (HCF) refrigerants or natural refrigerants (ammonia, propane, carbon dioxide [CO2]) for refrigeration and fire suppression equipment. • Provide vegetative or man-made exterior wall shading devices for east-, south-, and west facing walls with windows in the office areas.	
HYDROLOGY AND WATER QUALITY (FROM THE INITIAL STUDY [APPENDIX A])		
Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on site or off site?	**Mitigation Measure HYD-05:** Prior to grading plan approval and the issuance of a grading permit by the City, the project proponent shall receive approval from the City of Moreno Valley, a Final Hydrologic and Hydraulic Analysis based on the City's existing drainage requirements. ~~submit a detailed grading plan and drainage report, with supporting engineering calculations, to the City Engineer for review and approval. The plan and report shall incorporate relevant requirements identified by the City and/or site-specific geotechnical investigations. The plan and~~	Less Than Significant

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	~~report shall provide evidence that the storm drainage system would be adequate to convey water for the 100-year storm event from the project site and that the post-development flows exiting the proposed project site are less than or equal to pre-development flows.~~	

Draft EIR, Section 2.2.4 Technical Reports, Page 2-4.

There was a topographical error in this section of the Draft EIR indicating the incorrect date on the air quality and noise studies. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the Draft EIR.

2.2.4 Technical Reports

Various technical reports have been prepared to assess specific issues that may result from the construction and operation of the proposed project. As relevant, information from these technical reports has been incorporated into the Draft EIR. The technical reports and other information included as appendices to this EIR include the following:

Appendix A: *Initial Study, NOP, and NOP Comment Letters*, August 2011.

Appendix B: Initial Study Technical Reports

- Appendix B-1: *General Habitat Assessment, 71± Site (APNs: 316-210-071, -073, -075, -076), Moreno Valley, Riverside County California*, Ecological Sciences, Inc., August 1, 2010.
- Appendix B-2: *Jurisdictional Survey and MSHCP Riparian/Riverine/Vernal Pools Evaluation, 71± Site (APNs: 316-210-071, -073, -075, -076), Moreno Valley, Riverside County California*, Ecological Sciences, Inc., November 1, 2009.
- Appendix B-3: *Focused Surveys for Selected Criteria Area and Narrow Endemic Plant Species, 71± Site (APNs: 316-210-071, -073, -075, -076), Moreno Valley, Riverside County California*, Ecological Sciences, Inc., November 9, 2009.
- Appendix B-4: *Focused Western Burrowing Owl Survey, 71± Site (APNs: 316-210-071, -073, -075, -076), Moreno Valley, Riverside County California*, Ecological Sciences, Inc., November 11, 2009.
    - Appendix B-5: *Phase I Cultural Resources Assessment and Paleontological Records Review Perris Boulevard Project, Moreno Valley, Riverside County, California,* Michael Brandman Associates, March 22, 2007.
    - Appendix B-6: *Geotechnical Engineering Investigation Proposed Industrial Development Southwest Corner of Perris Boulevard and Grove View Road Moreno Valley, California*, NorCal Engineering, March 7, 2007.
    - Appendix B-7: *Phase I Environmental for the Evaluation of Potentially Hazardous Materials*, Centec Engineering, February 23, 2007.

- Appendix B-8: *Preliminary Hydrology Report and Hydraulic Analysis for PA09-004, VIP Moreno Valley, SWC Perris Boulevard and Grove View Road*, Robert A. Bebensee, R.C.E., March 27, 2009.
- Appendix B-9: *Preliminary Water Quality Management Plan, for PA09-0004 VIP Moreno Valley, SWC Perris Boulevard and Grove View Road*, Robert A. Bebensee, R.C.E., July 24, 2009.
- Appendix B-10: *Water Supply Assessment for City of Moreno Valley Plot Plan Application PA09-004*, Eastern Municipal Water District, January 20, 2010.

Appendix C: *LESA Modeling Worksheets*, LSA Associates, Inc., August 2011.

Appendix D-1: *Air Quality Analysis VIP Moreno Valley*, LSA Associates, Inc., ~~August 2011~~ March 2012

Appendix D-2: *Health Risk Assessment VIP Moreno Valley*, LSA Associates, Inc., ~~August 2011~~ March 2012.

Appendix E: *Greenhouse Gas Emissions and Global Climate Change Study*, LSA Associates, Inc., ~~August 2011~~ December 2011.

Appendix F: *Noise Impact Analysis VIP Moreno Valley*, LSA Associates, Inc., ~~August 2011~~ March 2012.

Appendix G: *Traffic Study VIP Moreno Valley*, LSA Associates, Inc., ~~January~~ April 9, 2012.

Draft EIR, Section 2.5.2 Biological Resources, Page. 2-9.

The last sentence in paragraph 3 has been deleted because jurisdictional delineation was prepared for the proposed project (Jurisdictional Survey and MSHCP Riparian/Riverine/Vernal Pools Evaluation, 71± Site (APNs: 316-210-071, -073, -075, -076), Moreno Valley, Riverside County California, Ecological Sciences, Inc., November 1, 2009). Therefore the sentence was deleted because it was an error. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the EIR.

Thirty-one species in western Riverside County have special status under the Federal Endangered Species Act (FESA) and/or the California Endangered Species Act (CESA). These include species that are listed as "endangered" or "threatened" under the FESA or that have been "proposed" or are "candidates" for such listing. These also include species that are listed as "endangered," "threatened," or "rare" under the CESA or that have been petitioned (i.e., are "candidates") for listing. The Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) provides for the long-term survival of protected and sensitive species by designating a contiguous system of habitat to be added to existing public/quasi-public lands. The Plan includes an impact fee collected by the 16 member cities and other local agencies, including the City of Moreno Valley, used to acquire these lands. Depending on the location of a private or public development project, certain biological studies may be required to comply with the MSHCP. The MSHCP defines two distinct consistency processes for development projects based on their location within the MSHCP Plan Area, with separate processes for projects located outside of Criteria Areas and those within a Criteria Area. Through implementation of these requirements, development projects are found to be consistent with the MSHCP, and impacts to covered species are considered less than significant. The project site is not located within an MSHCP Criteria Area, but is located in an area requiring habitat assessments for burrowing owl (Athene cunicularia), five Narrow Endemic Plant Species (NEPS), and nine Criteria

Area Plant Species (CAPS). ~~A Jurisdictional Delineation is required to assess potential jurisdiction of the ditch running north/south through the center of the project site.~~

Draft EIR, Section 2.5.2 Biological Resources, Page. 2-10.

Consistent with the comments provided by Letter H (Fish and Wildlife Service), the text in Draft EIR of Mitigation Measure BIO-3 is amended. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the EIR

Mitigation Measure BIO-3: If nesting special status avian or burrowing owl species are determined to occupy a proposed area of disturbance a biological monitor will be present during construction to ensure no construction activity shall take place within 500 feet of an active nest/burrow until it has been determined by the biological monitor that the nest/burrow is no longer active, and all juveniles have fledged the nest/burrow.

Draft EIR, Section 2.5.3 Cultural Resources, Page 2-13.

Consistent with the comments provided by Letter D (Johnson & Sedlack), the text in Draft EIR of Mitigation Measure CUL-1 is amended. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the EIR.

Mitigation Measure CUL-1: Prior to construction involving excavation four feet or more below existing surface grade, the construction contractor shall provide evidence that a qualified paleontologist has been retained, and that the paleontologist(s) shall be present during all grading and other significant ground-disturbing activities that reach four feet or more below existing surface grade. ~~If the paleontologist(s) do not find evidence for Pleistocene-era deposits once the maximum excavation depth is reached, monitoring shall be discontinued.~~ In the event fossiliferous deposits are encountered, the following measures shall be implemented:

- Monitoring shall be conducted by qualified paleontological monitor(s) of excavation in areas identified as likely to contain paleontological resources, including undisturbed older Pleistocene alluvium. Paleontological monitors shall be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors shall be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring may be reduced if the potentially fossiliferous units are determined upon exposure and examination by qualified paleontological personnel to have low potential to contain fossil resources.
- Paleontological monitoring of any earthmoving will be conducted by a monitor, under direct guidance of a qualified paleontologist. Earthmoving in areas of the parcel where previously undisturbed sediments are buried, but not otherwise disturbed, will not be monitored.
- ~~If too few fossil remains are found after 50 percent of the planned for earthmoving has been completed, monitoring can be reduced or discontinued in those areas at the project paleontologist's direction.~~
- Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates.
- Identification and curation of specimens into a professional, fully accredited museum repository with permanent retrievable storage. The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities.

- Preparation or a report of findings with and appended itemized inventory of specimens. The report and report and inventory, when submitted to the City of Moreno Valley along with confirmation of the curation of recovered of recovered specimens into an established, accredited museum repository, will signify completion of the program to mitigate impacts to paleontological resources.

Draft EIR, Section 2.4.4 Geology and Soils, Page 2-16.

Consistent with the comments provided by Letter D (Johnson & Sedlack), the text in Draft EIR of Mitigation Measure GEO-2 is amended for clarification purposes. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the EIR.

Mitigation Measure GEO-1: Prior to the issuance of grading permits, any existing low density soils and/or saturated soils shall be removed to competent natural soil under the inspection of the Soils Engineering Firm. After the exposed surface has been cleansed of debris and/or vegetation, it shall be scarified until it is uniform in consistency, brought to the proper moisture content and compacted to a minimum of 90 percent relative compaction (in accordance with ASTM: D-1557). In any area where a transition between fill and native soil or between bedrock and soil are encountered, additional excavation beneath foundations and slabs will be necessary in order to provide uniform support and avoid differential settlement of the structure.

The on-site soils or approved import soils may be utilized for the compacted fill, provided they are free of any deleterious materials and shall not contain any rocks, brick, asphaltic concrete, concrete, or other hard materials greater than eight inches in maximum dimensions. Any import soil must be approved by the Soils Engineering firm a minimum of 24 hours prior to importation to the site.

The approved fill soils shall be placed in layers not in excess of six inches in thickness. Each lift shall be uniform in thickness and thoroughly blended. The fill soils shall be brought to within 2 percent of the optimum moisture content, unless otherwise specified by the Soils Engineering firm. Each lift shall be compacted to a minimum of 90 percent relative compaction (in accordance with ASTM: D-1557) and approved prior to the placement of the next layer of soil. Compaction tests shall be obtained at the discretion of the Soils Engineering firm but to a minimum of one test for every 500 cubic yards placed and/or for every two feet of compacted fill placed.

The minimum relative compaction shall be obtained in accordance with accepted methods in the construction industry. The final grade of the structural areas shall be in a dense and smooth condition prior to placement of slabs-on-grade or pavement areas. No fill soils shall be placed, spread, or compacted during unfavorable weather conditions. When the grading is interrupted by heavy rains, compaction operations shall not be resumed until approved by the Soils Engineering firm.

It should be noted that the above measure may be modified by the Final Geotechnical or Soils Report.

Mitigation Measure GEO-2: Prior the issuance of grading permits, the project proponent shall inform the project engineers, architects, owner, maintenance personnel, and other interested parties of the Expansive Soil Guidelines provided in the project's geotechnical analysis [Geotechnical Engineering Investigation Proposed Industrial Development Southwest Corner of Perris Boulevard and Grove View Road Moreno Valley, California, NorCal Engineering, March 7, 2007]. The recommendations identified in the project's Expansive Soil Guidelines shall be ~~reviewed and considered~~ implemented by the project engineers, architects, owner, maintenance personnel, and other interested parties ~~to determine~~ in the applicable design guidelines. Applicable design guidelines shall be included and implemented in the project's grading plans.

Draft EIR, Section 2.5.6 Hydrology and Water Quality Hydrology, Page. 2-24.

Mitigation Measure HYD-05 has been revised to clarify the finalization of the Hydrologic and Hydraulic Analysis. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the EIR.

To reduce the flows to below or equal to pre-development conditions, the anticipated on-site flows would be routed to the water quality features such as vegetated swales, clarifiers, and sand filters to reduce flows leaving the site to pre-development flow rates. While the increase in impervious surfaces attributable to the proposed project would contribute to a greater volume and higher velocity of storm water flows, the proposed project's drainage system would accept and accommodate runoff that would result from project construction at or below pre-project conditions. Therefore, the post-development flows generated on the project site would not exceed the capacity of the planned storm water drainage systems. Although adherence to the City's drainage requirements, which includes the preparation of drainage sizing calculations, is required of all applicable development within the City, the incorporation of this requirement as **Mitigation Measure HYD-05** is designed to track both standard requirements and mitigation measures as part of the project's MMRP. ~~To ensure that long-term drainage capacity issues are reduced to a less than significant level, **Mitigation Measure HYD-05** has been identified.~~ With adherence to this mitigation measure, impacts associated with this issue are less than significant.

Mitigation Measure HYD-05: Prior to grading plan approval and the issuance of a grading permit by the City, the project proponent shall receive approval from the City of Moreno Valley, a Final Hydrologic and Hydraulic Analysis based on the City's existing drainage requirements. ~~submit a detailed grading plan and drainage report, with supporting engineering calculations, to the City Engineer for review and approval. The plan and report shall incorporate relevant requirements identified by the City and/or site specific geotechnical investigations. The plan and report shall provide evidence that the storm drainage system would be adequate to convey water for the 100 year storm event from the project site and that the post development flows exiting the proposed project site are less than or equal to pre-development flows.~~

Draft EIR, Section 2.7 Cumulative Projects, Table 2.C, Page 34

There was a topographical error in Table 2.C of the Draft EIR indicating the incorrect map number. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the Draft EIR.

~~A~~M-67	Eucalyptus Industrial Park	East of Moreno Beach Drive, west of Quincy channel, south of SR-60	2,244,638 SF of high cube warehouse uses

Draft EIR Section 4.2 Air Quality, Page 4.2-1

There was a topographical error in this section of the Draft EIR indicating the incorrect date on the air quality, health risk assessment and traffic studies. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the Draft EIR.

4.2 AIR QUALITY

This section analyzes the proposed project's potential air quality impacts based on the comprehensive *Air Quality Analysis* contained in Appendix D-1 (LSA Associates, Inc. ~~December 2011~~ March 2012) and the *Health Risk Assessment* (LSA Associates, Inc. ~~December 2011~~ March 2012) contained in Appendix D-2 to this EIR. The air quality analysis evaluates potential air quality impacts and mitigation measures by examining the short-term construction and long-term operational impacts associated with the project and by evaluating the effectiveness of mitigation measures incorporated as part of the project design. Additionally, the analysis provides a discussion of the proposed project, the physical setting of the project area, and the air quality regulatory framework. Modeled air quality levels are based upon vehicle data and project trip generation included in the project's Traffic Study (LSA Associates, Inc. ~~November 2011~~ January 2012, Appendix G of EIR) and peak turn volumes generated for the proposed project combined with emission factors from the California Air Resources Board (ARB). The evaluation was prepared in accordance with appropriate standards, utilizing procedures and methodologies in the South Coast Air Quality Management District (SCAQMD) *CEQA Air Quality Handbook* (SCAQMD 1993). Air quality data posted by the ARB and the U.S. Environmental Protection Agency (EPA) Web sites are included to document the local air quality environment.

Draft EIR Section 4.2.5.5, Operational-Acute Health Risk Impacts Page 4.2-18

Consistent with the comments provided by Letter D (Johnson & Sedlack), the text in Draft EIR Section 4.2.5.5, Page 4.2-18 is amended to refer the reader back to the previous section (4.2.5.4) to further substantiate the conclusions identified in Section 4.2.5.5. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the EIR.

4.2.5.5 Operational-Acute Health Risk Impacts

Threshold Would the proposed project expose sensitive receptors to substantial pollutant concentrations?

Exposure to diesel exhaust can have immediate health effects, such as irritation of the eyes, nose, throat, and lungs, and it can cause coughs, headaches, light headedness, and nausea. In studies with human volunteers, diesel exhaust particles made people with allergies more susceptible to the materials to which they are allergic, such as dust and pollen. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks. However, according to the rulemaking on *Identifying Particulate Emissions from Diesel-Fueled Engines as a Toxic Air Contaminant* (ARB 1998), the available data from studies of humans exposed to diesel exhaust are not sufficient for deriving an acute non-cancer health risk guidance value. While the lung is a major target organ for diesel exhaust, studies of the gross respiratory effects of diesel exhaust in exposed workers have not provided sufficient exposure information to establish a short-term non-cancer health risk guidance value for respiratory effects. As previously identified in Section 4.2.5.4, none of the criteria pollutant emissions would exceed localized thresholds during the operation of the proposed project. Therefore, the proposed project would not have a significant impact on localized operational pollutant levels and no mitigation measures would be required. Similarly ~~Therefore,~~ the potential for short-term acute exposure from diesel exhaust are considered to be less than significant and no mitigation is required.

Draft EIR Section 4.2.6.1 Construction Emissions, Page 4.2-19

Consistent with the comments provided by Letter D (Johnson & Sedlack), the text at Draft EIR Section 4.2.6.1, Page 4.2-19 is amended to clarify that the proceeding analysis evaluates all construction emissions. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the EIR.

4.2.6.1 Construction ~~Equipment Exhaust~~ Emissions

Draft EIR Section 4.2.6.1 Construction Emissions, Table 4.2.I, Page 4.2-20.

Consistent with the comments provided by Letter D (Johnson & Sedlack), the data in Table 4.2.I in Draft EIR Section 4.2.6.1, Page 4.2-20 is amended to correct typographical errors in the Draft EIR. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the EIR.

Table 4.2.I: Short-Term Regional Construction Emissions

Construction Phase	Pollutant Emissions (lbs/day)							
	ROG	**NO_X**	**CO**	**SO_2**	**Fugitive PM_{10}**	**Exhaust PM_{10}**	**Fugitive $PM_{2.5}$**	**Exhaust $PM_{2.5}$**
Site Preparation	40	386	212	0.53	329	17	4.4	16
Grading	29	272	149	0.36	325	12	1.6	12
Building Construction	13	82	94	0.18	~~1.8~~ 11	~~0.33~~ 4.1	~~0.02~~ 0.18	~~0.32~~ 3.9
Architectural Coating	72	3.7	11	0.01	~~0.2~~ 1.8	~~2.9~~ 0.33	~~0~~ 0.02	~~2.9~~ 0.32
Paving	~~5.95.9~~ 5.9	~~3434~~ 34	22	0.03	~~329~~ 0.2	~~17~~ 2.9	~~4.4~~ 0	~~16~~ 2.9
Peak Day (Phase Overlap)	90	390	210	0.53	329	17	4.4	16
SCAQMD Threshold	**75**	**100**	**550**	**150**	**150**		**55**	
Exceeds Threshold?	**Yes**	**Yes**	**No**	**No**	**Yes**		**No**	

CO = carbon monoxide
CO_2 = carbon dioxide
lbs/day = pounds per day
NO_x = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
ROG = reactive organic compounds
SO_x = sulfur oxides
SCAQMD = South Coast Air Quality Management District

Source: LSA Associates, Inc., December 2011.

Draft EIR Section 4.2.6.1, Construction Emissions Page 4.2-21.

Consistent with the comments provided by Letter D (Johnson & Sedlack), the text at Mitigation Measure 4.2.6.1B in Draft EIR Section 4.2.6.1, Page 4.2-21 is amended to clarify that clean-fuel means fuel other than diesel or gasoline. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the EIR.

4.2.6.1B. Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall utilize power sources (e.g., power poles) or clean-fuel (e.g., fuel other than diesel or gasoline) generators where feasible. Contract specifications shall be included in the proposed project construction documents, which shall be reviewed by the City.

Draft EIR Section 4.2.6.1, Construction Emissions Page 4.2-23.

Consistent with the comments provided by Letter D (Johnson & Sedlack), the Mitigation Measures have been added to Draft EIR Section 4.2.6.1, Page 4.2-23 to further reduce construction air quality impacts. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the EIR.

4.2.6.1K Grading plans, construction specifications and bid documents shall also include the following notations:

- Off-road construction equipment shall utilize alternative fuels where feasible e.g., biodiesel fuel (a minimum of B20), natural gas (CNG), liquefied natural gas (LNG), propane, except for equipment where use of such fuels would void the equipment warranty;
- Gravel pads shall be provided at all access points to prevent tracking of mud onto public roads;
- Install and maintain trackout control devices at all access points where paved and unpaved access or travel routes intersect;
- The contractor or builder shall designate a person or person(s) to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust off site;
- The contractor or builder shall post a publicly visible sign with the telephone number and person to contact regarding dust complaints. The contact person shall take corrective action within 24 hours;
- High pressure injectors shall be provided on diesel construction equipment where feasible;
- Engine size of construction equipment shall be limited to the minimum practical size;
- Substitute gasoline-powered for diesel-powered construction equipment where feasible;
- Use electric construction equipment where feasible;
- Install catalytic converters on gasoline-powered equipment where feasible;
- Ride-sharing program for the construction crew shall be encouraged and shall be supported by contractor(s) via incentives or other inducement;

- Documentation shall be provided to the City of Moreno Valley indicating that construction workers have been encouraged to carpool or otherwise reduce VMT to the greatest extent practical, including providing information on available park and ride programs;

- Lunch vendor services shall be ~~provided~~ permitted onsite during construction to minimize the need for offsite vehicle trips;

- All forklifts used during construction and in subsequent operation of the project shall be electric or natural gas powered.

- Suspend use of all construction equipment operations during second stage smog alerts.

4.2.6.1N. When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.

4.2.6.1O. All streets shall be swept at least once a day using SCAQMD Rule 1186 certified street sweepers utilizing reclaimed water trucks if visible soil materials are carried to adjacent streets.

4.2.6.1P. Any vegetative cover to be utilized onsite shall be planted as soon as possible to reduce the disturbed area subject to wind erosion. Irrigation systems required for these plants shall be installed as soon as possible to maintain good ground cover and to minimize wind erosion of the soil.

4.2.6.1Q. Provide temporary traffic controls such as a flag person, during all phases of construction to maintain smooth traffic flow.

4.2.6.1R All roadways, driveways, sidewalks, etc., should be completed as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.

4.2.6.1S Implement activity management techniques including a) development of a comprehensive construction management plan designed to minimize the number of large construction equipment operating during any given time period; b) scheduling of construction truck trips during non-peak hours to reduce peak hour emissions; c) limitation of the length of construction work-day period; and d) phasing of construction activities.

4.2.6.1T Reroute construction trucks away from congested streets and sensitive receptor areas.

Draft EIR Section 4.2.6.3 Long Term Operation Omissions, Page 4.2-25

Consistent with the comments provided by Letter D (Johnson & Sedlack), the text in Impact 4.2.6.1 in Draft EIR Section 4.2.6.3, Page 4.2-25 is amended to clarify the impact statement. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the EIR.

> **Impact 4.2.6.3:** *Implementation of the proposed project may ~~occur~~ have the potential to exceed applicable daily thresholds for operational activities.*

Draft EIR Section 4.2.6.3 Long Term Operation Omissions, Page 4.2-27

Consistent with the comments provided by Letter D (Johnson & Sedlack), the Mitigation Measures have been amended and added to Draft EIR Section 4.2.6.3, Page 4.2-27 to further reduce construction air quality impacts. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the EIR.

4.2.6.3A Prior to issuance of the first building permit, building and site plan designs shall ensure that the project's energy efficiencies surpass applicable 2008 California Title 24, Part 6 Energy Efficiency Standards by a minimum of 20 percent. Verification of increased energy efficiencies shall be documented in Title 24 Compliance Reports provided by the Applicant, and reviewed and approved by the City. Any combination of design features, including but not limited to the following list, may be used to fulfill this requirement provided that the total increase in energy efficiency meets or exceeds 20 percent:

- ~~Buildings shall e~~ Exceed California Title 24 Energy Efficiency performance standards for water heating and space heating and cooling, as deemed acceptable by the City.
- Increase in insulation such that heat transfer and thermal bridging is minimized.
- Limit air leakage through the structure or within the heating and cooling distribution system to minimize energy consumption.
- Incorporate dual-paned or other energy efficient windows.
- Incorporate energy efficient space heating and cooling equipment.
- ~~Interior~~ Use interior and exterior energy efficient lighting which exceeds the California Title 24 Energy Efficiency performance standards ~~shall be installed~~, as deemed acceptable by the City. ~~Automatic~~ Use automatic devices to turn off lights when they are not needed ~~shall be implemented~~.
- To the extent that they are compatible with landscaping guidelines established by the City, use shade-producing trees, particularly those that shade paved surfaces such as streets and parking lots and buildings ~~shall be planted~~ at the project site.
- ~~Paint~~ Use paint and a surface color palette for the project ~~shall~~ emphasizinge light and off-white colors which reflect heat away from the buildings.
- ~~All buildings shall be designed to accommodate renewable energy sources, such as photovoltaic solar electricity systems, appropriate to their architectural design.~~
- Install a photovoltaic array (solar panels) or other source of renewable energy generation on-site, or otherwise acquire energy from the local utility that has been generated by renewable resources, to meet the project's office electricity needs.
- ~~To r~~Reduce energy demand associated with potable water conveyance~~, the project shall implement~~ using the following:
    - Landscaping palette emphasizing drought-tolerant plants;
    - Use of water-efficient irrigation techniques; and,
    - U.S. EPA Certified WaterSense labeled for equivalent faucets, high-efficiency toilets (HETs), and water-conserving shower heads.
- ~~The project shall p~~ Provide secure, weather-protected, on-site bicycle storage/parking.
- ~~The project shall p~~ Provide on-site showers (one for males and one for females). ~~L~~Provide lockers for employees ~~shall be provided~~.

- ~~The project will e~~ Establish a Transportation Management Association (TMA). The TMA will coordinate with other TMAs within the City to encourage and coordinate carpooling among building occupants. The TMA will advertise its services to building occupants, and offer transit and/or other incentives to reduce GHG emissions. A plan will be submitted by the TMA to the City within two months of project completion that outlines the measures implemented by the TMA, as well as contact information.
- ~~The project shall p~~ Provide preferential parking for carpools ~~and vanpool~~, vanpools or other alternative fuel vehicles. Locations and configurations of proposed preferential parking for carpools and vanpools are subject to review and approval by the City. Prior to final site plan approval, delineate preferential parking for carpools and vanpools ~~shall be delineated~~ on the project site plan.
- ~~The project shall p~~ Provide at least two electric vehicle charging stations. Locations and configurations of proposed charging stations are subject to review and approval by the City. Prior to issuance of the first building permit, delineate stub outs for charging stations ~~shall be indicated~~ on the project building plans.
- Implement compressed workweek schedules;
- Achieve at least 20% per year (as a percentage of previous percentage, not total trips) increase in percentage of consolidated trips carried by SmartWay carriers until it reaches a minimum of 90% of all long haul trips carried by SmartWay 1.0 or greater carriers.
- Achieve at least 15% per year (as a percentage of previous percentage, not total trips) increase in percentage of long haul trips carried by SmartWay carriers until it reaches a minimum of 85% of all consolidator trips carried by SmartWay 1.0 or greater carriers.
- Use of fleet vehicles conforming to 2010 air quality standards or better.
- Installation of catalytic converters on gasoline-powered equipment.
- Inclusion of electric powered and/or compressed natural gas fueled trucks and/or vehicles in fleets;
- Establishment and use of carpool/vanpool programs, complemented by parking fees for single-occupancy vehicles;
- Provision of preferential parking for EV and CNG vehicles;
- Use of electrical equipment (instead of gasoline-powered equipment) for landscape maintenance;
- Use of electric (instead of diesel or gasoline-powered) yard trucks;
- Use of SmartWay 1.25 rated trucks.
- Provide a display case or kiosk displaying transportation information including the RTA bus schedule in a prominent area accessible to employees.
- Use landscape maintenance companies that use battery powered or electric equipment or contract only with commercial landscapers who operate with equipment that complies with the most recent California Air Resources Board certification standards, or standards adopted no more than three years prior to date of use or any combination of these two themes.

~~• Lease/purchase documents shall identify that tenants are encouraged to promote the following:~~

~~o Implementation of compressed workweek schedules.~~

~~o SmartWay partnership;~~

- ~~Achievement of at least 20 percent per year (as a percentage of previous percentage, not total trips) increase in percentage of consolidated trips carried by SmartWay carriers until it reaches a minimum of 90 percent of all long haul trips carried by SmartWay 1.0 or greater carriers.~~
- ~~Achievement of at least 15 percent per year (as a percentage of previous percentage, not total trips) increase in percentage of long haul trips carried by SmartWay carriers until it reaches a minimum of 85 percent of all consolidator trips carried by SmartWay 1.0 or greater carriers.~~
- ~~Use of fleet vehicles conforming to 2010 air quality standards or better.~~
- ~~Installation of catalytic converters on gasoline-powered equipment.~~
- ~~Inclusion of electric powered and/or compressed natural gas fueled trucks and/or vehicles in fleets.~~
- ~~Establishment and use of carpool/vanpool programs, complemented by parking fees for single-occupancy vehicles.~~
- ~~Provision of preferential parking for EV and CNG vehicles.~~
- ~~Use of electrical equipment (instead of gasoline-powered equipment) for landscape maintenance.~~
- ~~Use of electric (instead of diesel or gasoline-powered) yard trucks.~~
- ~~Use of SmartWay 1.25 rated trucks.~~

Draft EIR, Section 4.2.7.1 Short-Term Air Quality Impacts, Page 4.2-25

Consistent with the comments provided by Letter D (Johnson & Sedlack), the text in Draft EIR Section 4.2.7.1, Page 4.2-25 is amended to clarify that the short-term and long-term air quality impacts are cumulative. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the EIR.

4.2.7.1 Short-Term Air Quality Impacts

The cumulative area for air quality impacts is the Basin. The implementation of the project would contribute criteria pollutants to the area during project construction. A number of individual projects in the area may be under construction simultaneously with the proposed project. Depending on construction schedules and actual implementation of projects in the area, generation of fugitive dust and pollutant emissions during construction would result in substantial short-term increases in air pollutants. However, each project would be required to comply with the SCAQMD's standard construction measures. In addition, implementation of the AQMP will result in improved air quality levels in the future and full attainment of national and state ambient air quality standards, resulting in less than significant cumulative impacts from all short-term and long-term air pollution sources. Therefore, cumulative impacts associated with short-term air quality impacts would be less than significant.

Draft EIR Section 4.3.6.1 Greenhouse Gas Emissions and Climate Change, Page 4.3-24 and 25

The Mitigation Measures in the Draft EIR Section 4.3.6.1, Page 4.3-24 and 25 have been clarified. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the EIR.

4.3.6.1A Prior to the issuance of building permits, the project applicant shall provide evidence to the City of Moreno Valley that building features have been incorporated in building plans as required by Title 24 of the California Code of Regulations. These features include but are not limited to the following:

- Exterior windows in the office areas shall utilize window treatments for efficient energy conservation.

Draft EIR Section 4.3.6.1 Greenhouse Gas Emissions and Climate Change, Page 4.3-25

Consistent with the comments provided by Letter D (Johnson & Sedlack), the Mitigation Measures have been added to Draft EIR Section 4.3.6.1, Page 4.2-25 to further reduce greenhouse gas emissions. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the EIR.

4.3.6.1B Prior to the issuance of building permits, the project applicant shall provide evidence to the City of Moreno Valley that the following measures have been be incorporated into the design and construction of the project:

- ~~Use~~ Encourage use of locally produced and/or manufactured building materials for at least 10 percent of the construction materials used for the project.
- ~~Use~~ Encourage use of "Green Building Materials," such as those materials that are resource efficient, and recycled and manufactured in an environmentally friendly way, for at least 10 percent of the project.
- Maximize the use of electricity from the power grid by replacing diesel- or gasoline-powered equipment where feasible. This would reduce GHG emissions because electricity can be produced more efficiently at centralized power plants.
- Design the project building to exceed the 2008 California Building Code's (CBC) Title 24 energy standard by 20%, including, but not limited to, any combination of the following:
- Incorporate ENERGY STAR or better rated windows, space heating and cooling equipment, light fixtures, appliances, or other applicable electrical equipment in the office areas.

- Provide a landscape and development plan for the project that takes advantage of shade, prevailing winds, and landscaping. The landscaping plan shall be prepared by a registered landscape architect who will consider the following:
    - Plant at least 50 percent low-ozone forming potential (Low-OFP) trees and shrubs, preferably native, drought-resistant species, to meet city/county landscaping requirements.

- o Plant Low-OFP, native, drought-resistant, tree and shrub species, 20% in excess of that already required by city or county ordinance. Consider roadside, sidewalk, and driveway shading.

- Install electrical outlets on the exterior walls of the warehouse/office building (and perhaps parking lots) to promote the use of electric landscape maintenance equipment.

Draft EIR, Section 4.3.6.1 Greenhouse Gas Emissions and Climate Change, Page 4.3-26, Mitigation Measure 4.3.6.1C

Consistent with the comments provided by Letter D (Johnson & Sedlack), the text for the conclusion of Impact 4.3.6.1 in Draft EIR Section 4.2.6.3, Page 4.3-16 is amended to clarify the impact statement. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the EIR.

4.3.6.1C Prior to the issuance of occupancy permits, the project applicant shall provide evidence to the City of Moreno Valley that the following measures have been be incorporated into the operation of the project:

- The project applicant shall use ~~less than 3,900~~ low Global Warming ~~Potential (GWP) hydrofluorocarbon (HCF)~~ refrigerants or natural refrigerants (ammonia, propane, carbon dioxide [CO2]) for refrigeration and fire suppression equipment.

- Provide vegetative or man-made exterior wall shading devices for east-, south-, and west facing walls with windows in the office areas.

Level of Significance After Mitigation. The mitigation measures identified above would contribute to a reduction in GHG emissions from energy, mobile, and water usage sources. With implementation of the identified mitigation measures, the proposed project's GHG emissions are reduced. As described above, project-related GHG emissions are not confined to a particular air basin but are dispersed worldwide. Consequently, it is speculative to determine how project-related GHG emissions would contribute to global climate change and how global climate change may impact the State. Therefore, project-related GHG emissions are not project-specific impacts to global warming but are instead the project's contribution to this cumulative impact. As stated previously, project-related GHG emissions and their contribution to global climate change impacts in the State are less than significant ~~and less than cumulatively considerable~~ on a project specific basis because: (1) the project's impacts alone would not cause or significantly contribute to global climate change, and (2) the project has no substantial effect on consumption of fuels or other energy resources, especially fossil fuels that contribute to GHG emissions when consumed. However, project-related GHG emissions and their contribution to global climate change impacts are considered to be cumulatively considerable.

Draft EIR Section 4.4 Noise, Page 4.4-1

There was a topographical error in this section of the Draft EIR indicating the incorrect date on the noise study. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the Draft EIR.

4.4 NOISE

This analysis is intended to satisfy the City's requirements for a project-specific noise impact analysis by examining the short-term and long-term noise impacts of the proposed project on sensitive uses adjacent to the proposed project site and by evaluating the effectiveness of mitigation measures incorporated as part of the project design. This includes the potential for the proposed project to result in impacts associated with a substantial temporary and/or permanent increase in ambient noise levels in the vicinity of the project area; exposure of people to excessive noise levels, groundborne vibration, or groundborne noise levels. The analysis contained in this section is based on a comprehensive *Noise Impact Analysis* contained in Appendix E (LSA Associates, Inc., ~~December 2011~~ March 2012), which examines existing ambient noise conditions and project-related impacts.

Draft EIR, Section 5.4 Consistency With Local And Regional Plans, Page 5-12

A new table (Table 5.D: Compass Growth Vision Report Consistency) has been added as a response to a comment received on the Draft EIR. This change to the Draft EIR does not result in a significant impact and has no material effect on the findings of the EIR.

Compass Growth Vision. The Compass Growth Vision plan provides a framework for local and regional decision-making regarding growth, transportation, land use, and economic development. The framework includes principles and a specific set of strategies intended to achieve and improve a quality of life that promotes and sustains for future generations the region's mobility, livability, and prosperity. The main objective of the Compass Growth Vision is to manage the forecast growth while improving future living conditions for all people within the SCAG area, including live, work, and play activities. The following discussion includes the principles within the Compass Growth Vision plan and their association to the proposed project.

Principle 1: Improve mobility for all residents.

Principle 2: Foster livability in all communities.

Principle 3: Enable prosperity for all people.

Principle 4: Promote sustainability for future generations.

The proposed project is consistent with the four principles identified above (refer to Table 5.D). ~~The nature of the proposed project allows the transport of commodities from a single area rather than multiple areas, minimizing vehicle trip generation. The proposed project supports the prosperity for all people by providing employment opportunities close to existing housing within the City of Moreno Valley. The proposed project is located in an area that is already developed with urban uses and where existing infrastructure (freeway, sewer, electrical, water, etc.) is accessible. During the construction of the project and as needed throughout the process, necessary utility and roadway improvements will be installed or extended to the project site from adjacent existing facilities. The utility and roadway improvements will facilitate future growth in the surrounding area. The development of the proposed project is consistent with the land use vision for the site and will augment existing services available in the City and region.~~

Table 5.D: Compass Growth Vision Report Consistency

Policy	Consistency Analysis
Principle 1: Improve mobility for all residents. • Encourage transportation investments and land use decisions that are mutually supportive. • Locate new housing near existing jobs and new jobs near existing housing. • Promote a variety of travel choices.	The project is consistent with this principle. The actions associated with implementation of the proposed project would allow for warehousing uses to be clustered around other industrial and commercial uses and would encourage a reduction of vehicle miles traveled within the City. Implementation of the project would create approximately 646 jobs. Existing housing is located approximately 1 mile to the north and 2 miles to the south of the project site. The project is consistent with this portion of Principle 1. There are a number of transit-oriented strategies that could be implemented by the proposed project to encourage alternate modes of travel, including informational strategies, incentives, and services. (Refer to Mitigation Measure 4.2.6.3A).
Principle 2: Foster livability in all communities. • Promote developments which provide a mix of uses. • Promote "people scaled, "walkable communities. • Support the preservation of stable, single-family neighborhoods.	The project is consistent with the applicable portions of this principle. The proposed project is a warehousing project and does not include any residential uses. Therefore, the project is not considered to be a mixed use project and this portion of Principle 2 is not applicable to the project. The project site is located in an industrial warehouse area. The project would include sidewalks so that the opportunity of being walkable within this warehouse area is possible. Therefore, the project is consistent with this portion of Principle 2. The proposed project is a warehousing project and does not include any residential uses. Therefore this portion of Principle 2 is not applicable to the project.
Principle 3: Enable prosperity for all people. • Provide in each community a variety of housing types to meet the housing needs of all income levels. • Support educational opportunities that promote balanced growth. • Ensure environmental justice regardless of race, ethnicity, or income class. • Support local and state fiscal policies that	Based on the information provided below, this principle is not applicable to the project. The proposed project is a warehousing project and does not include any residential or educational uses. Therefore this portion of Principle 3 is not applicable to the project. The project site is vacant and the project located in an area identified for industrial and commercial uses. Therefore, this issue not applicable to the project. The supporting of local and state fiscal policies and the encouragement of civic engagement is at the City level not the

Table 5.D: Compass Growth Vision Report Consistency

Policy	Consistency Analysis
encourage balanced growth. • Encourage civic engagement.	project level. Therefore, this portion of the principle is not applicable to the project.
Principle 4: Promote sustainability for future generations. • Focus development in urban centers and existing cities. • Develop strategies to accommodate growth that uses resources efficiently, eliminate pollution and significantly reduce waste. • Utilize "green" development techniques.	The project is consistent with this principle. The proposed project is located in an area that is already developed with urban uses and where existing infrastructure (freeway, sewer, electrical, water, etc.) is accessible. Mitigation Measure 4.3.1.6B requires the project to implement various sustainability strategies and "green" development techniques that uses resources efficiently, eliminates pollution, and reduces waste.

4. MITIGATION MONITORING AND REPORTING PROGRAM

4.1 INTRODUCTION

This Mitigation Monitoring and Reporting Program has been prepared for use in implementing mitigation for the:

VIP Moreno Valley Project

The program has been prepared in compliance with State law and the Environmental Impact Report (EIR) (State Clearinghouse No. 2011081084) prepared for the project by the City of Moreno Valley.

The California Environmental Quality Act (CEQA) requires adoption of a reporting or monitoring program for those measures placed on a project to mitigate or avoid adverse effects on the environment (Public Resource Code Section 21081.6). The law states that the reporting or monitoring program shall be designed to ensure compliance during project implementation.

The monitoring program contains the following elements:

1) The mitigation measures are recorded with the action and procedure necessary to ensure compliance. In some instances, one action may be used to verify implementation of several mitigation measures.
2) A procedure for compliance and verification has been outlined for each action necessary. This procedure designates who will take action, what action will be taken and when, and to whom and when compliance will be reported.
3) The program has been designed to be flexible. As monitoring progresses, changes to compliance procedures may be necessary based upon recommendations by those responsible for the program. As changes are made, new monitoring compliance procedures and records will be developed and incorporated into the program.

This Mitigation Monitoring and Reporting Program includes mitigation identified in the Initial Study and the Final EIR.

4.2 MITIGATION MONITORING AND RESPONSIBILITIES

As the Lead Agency, the City of Moreno Valley is responsible for ensuring full compliance with the mitigation measures adopted for the proposed project. The City will monitor and report on all mitigation activities. Mitigation measures will be implemented at different stages of development throughout the project area. In this regard, the responsibilities for implementation have been assigned to the Applicant, Contractor, or a combination thereof. If during the course of project implementation, any of the mitigation measures identified herein cannot be successfully implemented, the City shall be immediately informed, and the City will then inform any affected responsible agencies. The City, in conjunction with any affected responsible agencies, will then determine if modification to the project is required and/or whether alternative mitigation is appropriate.

4.3 MITIGATION MONITORING AND REPORTING PROGRAM CHECKLIST

Project File Name: VIP Moreno Valley Project **Applicant: Vogel Engineers, Inc.**

Date: June 2012

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
AIR QUALITY						
4.2.6.1A Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall place construction equipment staging areas at least 200 feet away from sensitive receptors. Contract specifications shall be included in the proposed project construction documents, which shall be reviewed by the City.	City of Moreno Valley Engineering and Building and Safety Planning Division	Prior to Grading and during grading operations.	Prior to Issuance of Grading Permit	Review of construction documents and on-site inspection		Withhold Grading Permit or Issuance of a Stop Work Order
4.2.6.1B Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall utilize power sources (e.g., power poles) or clean-fuel (e.g., fuel other than diesel or gasoline) generators where feasible. Contract specifications shall be included in the proposed project construction documents, which shall be reviewed by the City.	City of Moreno Valley Engineering and Building and Safety Planning Division	Prior to Grading	Prior to Issuance of Grading Permit	Review of construction documents and on-site inspection		Withhold Grading Permit or Issuance of a Stop Work Order
4.2.6.1C Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall utilize California Air Resources Board (CARB) Tier II Certified equipment or better during the rough/mass grading phase for the following pieces of equipment: rubber-tired dozers and scrapers. Contract	City of Moreno Valley Engineering and Building and Safety Planning Division	Prior to Grading	Prior to Issuance of Grading Permit	Review of construction documents and on-site inspection		Withhold Grading Permit

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
specifications shall be included in the proposed project construction documents, which shall be reviewed by the City.						
4.2.6.1D All clearing, grading, earthmoving, or excavation activities shall cease when winds exceed 25 mph per SCAQMD guidelines in order to limit fugitive dust emissions.	City of Moreno Valley Engineering and Building and Safety Planning Division	Throughout construction	During grading	Review of construction documents and on-site inspection		Issuance of a Stop Work Order
4.2.6.1E The contractor shall ensure that all disturbed unpaved roads and disturbed areas within the project are watered at least three times daily during dry weather. Watering, with complete coverage of disturbed areas, shall occur at least three times a day, preferably in the mid-morning, afternoon, and after work is done for the day.	City of Moreno Valley Engineering and Building and Safety Planning Division	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1F The contractor shall ensure that traffic speeds on unpaved roads and project site areas are reduced to 15 miles per hour or less to reduce PM10 and PM2.5 fugitive dust haul road emissions. Speed limit signs (15 mph maximum) shall be posted at entry points to the project site, and along any unpaved roads providing access to or within the project site and/or any unpaved designated on-site travel routes.	City of Moreno Valley Engineering and Building and Safety Planning Division	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1G Groundcover shall be replaced, and/or non-toxic soil stabilizers shall be applied (according to manufacturers' specifications) to any inactive	City of Moreno Valley Engineering and Building and Safety	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
construction areas (previously graded areas inactive for ten days or more).	Planning Division					
4.2.6.1H The contractor shall minimize pollutant emissions by maintaining equipment engines in good condition and in proper tune according to manufacturer's specifications and during smog season (May through October) by not allowing construction equipment to be left idling for more than five minutes (per California law).	City of Moreno Valley Engineering and Building and Safety	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1I The contractor shall ensure use of low-sulfur diesel fuel in construction equipment as required by the California Air Resources Board (CARB) (diesel fuel with sulfur content of 15 ppm by weight or less).	City of Moreno Valley Engineering and Building and Safety	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1J If available, the project applicant shall use "Low-Volatile Organic Compounds" paints, coatings, and solvents with a VOC content lower than required under Rule 1113 (not to exceed 150 grams/liter; 1.25 pounds/gallon). High Pressure Low Volume (HPLV) applications of paints, coatings, and solvents shall be consistent with South Coast Air Quality Management District Rule 1113. Alternatively, the project applicant shall use materials that do not require painting or are pre-painted.	City of Moreno Valley Engineering and Building and Safety Planning Division	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1K Grading plans, construction specifications and bid documents shall	City of Moreno Valley Engineering	Prior to Grading and during	Prior to Issuance of Grading Permit	Review of construction		Withhold Grading Permit

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
also include the following notations: • Off-road construction equipment shall utilize alternative fuels where feasible e.g., biodiesel fuel (a minimum of B20), natural gas (CNG), liquefied natural gas (LNG), propane, except for equipment where use of such fuels would void the equipment warranty; • Gravel pads shall be provided at all access points to prevent tracking of mud onto public roads; • Install and maintain trackout control devices at all access points where paved and unpaved access or travel routes intersect; • The contractor or builder shall designate a person or person(s) to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust off site; • The contractor or builder shall post a publicly visible sign with the telephone number and person to contact regarding dust complaints. The contact person shall take corrective action within 24 hours; • High pressure injectors shall be provided on diesel construction equipment where feasible; • Engine size of construction	and Building and Safety Planning Division	grading operations.		documents and on-site inspection		or Issuance of a Stop Work Order

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
equipment shall be limited to the minimum practical size; • Substitute gasoline-powered for diesel-powered construction equipment where feasible; • Use electric construction equipment where feasible; • Install catalytic converters on gasoline-powered equipment where feasible; • Ride-sharing program for the construction crew shall be encouraged and shall be supported by contractor(s) via incentives or other inducement; • Documentation shall be provided to the City of Moreno Valley indicating that construction workers have been encouraged to carpool or otherwise reduce VMT to the greatest extent practical, including providing information on available park and ride programs; • Lunch vendor services shall be permitted onsite during construction to minimize the need for offsite vehicle trips; • All forklifts used during construction and in subsequent operation of the project shall be electric or natural gas powered.						

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
• Suspend use of all construction equipment operations during second stage smog alerts.						
4.2.6.1L Throughout project construction, a construction relations officer/community liaison, appointed by the Applicant, shall be retained on-site. In coordination and cooperation with the City, the construction relations officer/community liaison shall respond to any concerns related to PM10 (fugitive dust) generation or other construction-related air quality issues.	City of Moreno Valley Engineering and Building and Safety	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1M All project entrances shall be posted with signs which state: • Truck drivers shall turn off engines when not in use; • Diesel delivery trucks servicing the project shall not idle for more than three (3) minutes; and • Telephone numbers of the building facilities manager and CARB, to report violations.	City of Moreno Valley Engineering and Building and Safety	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1N When materials are transported off-site, all material shall be covered, effectively wetted to limit visible dust emissions, and at least six inches of freeboard space from the top of the container shall be maintained.	City of Moreno Valley Engineering and Building and Safety	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1O All streets shall be swept at least	City of Moreno	Throughout	During	On-site inspection		Issuance of a

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
once a day using SCAQMD Rule 1186 certified street sweepers utilizing reclaimed water trucks if visible soil materials are carried to adjacent streets.	Valley Engineering and Building and Safety	construction	Construction			Stop Work Order
4.2.6.1P Any vegetative cover to be utilized onsite shall be planted as soon as possible to reduce the disturbed area subject to wind erosion. Irrigation systems required for these plants shall be installed as soon as possible to maintain good ground cover and to minimize wind erosion of the soil.	City of Moreno Valley Engineering and Building and Safety Planning Division	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1Q. Provide temporary traffic controls such as a flag person, during all phases of construction to maintain smooth traffic flow.	City of Moreno Valley Engineering and Building and Safety	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1R All roadways, driveways, sidewalks, etc., should be completed as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.	City of Moreno Valley Engineering and Building and Safety	Throughout construction	During Construction	On-site inspection		Issuance of a Stop Work Order
4.2.6.1S Implement activity management techniques including a) development of a comprehensive construction management plan designed to minimize the number of large construction equipment operating during any given time period; b) scheduling of construction truck trips during non-peak hours to reduce peak hour emissions; c) limitation of the length of construction work-day period; and d) phasing of construction activities.	City of Moreno Valley Engineering and Building and Safety and Planning Division	Prior to Grading and during grading and construction operations.	Prior to Issuance of Grading Permit	Review of construction documents and on-site inspection		Withhold Grading Permit or Issuance of a Stop Work Order
4.2.6.1T Reroute construction trucks	City of Moreno	Prior to Grading	Prior to Issuance	Review of		Withhold

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
away from congested streets and sensitive receptor areas.	Valley Engineering and Building and Safety and Planning Division	and during grading and construction operations.	of Grading Permit	construction documents and on-site inspection		Grading Permit or Issuance of a Stop Work Order
4.2.6.3A Prior to issuance of the first building permit, building and site plan designs shall ensure that the project's energy efficiencies surpass applicable 2008 California Title 24, Part 6 Energy Efficiency Standards by a minimum of 20 percent. Verification of increased energy efficiencies shall be documented in Title 24 Compliance Reports provided by the Applicant, and reviewed and approved by the City. Any combination of design features, including but not limited to the following list, may be used to fulfill this requirement provided that the total increase in energy efficiency meets or exceeds 20 percent: • Exceed California Title 24 Energy Efficiency performance standards for water heating and space heating and cooling, as deemed acceptable by the City. • Increase in insulation such that heat transfer and thermal bridging is minimized. • Limit air leakage through the structure or within the heating and cooling distribution system to	City of Moreno Valley Building and Safety Planning Division	Prior to Construction (once)	Prior to Issuance of Building Permits	Review of building plans and on-site inspection		Withhold Building Permits

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
minimize energy consumption. • Incorporate dual-paned or other energy efficient windows. • Incorporate energy efficient space heating and cooling equipment. • Use interior and exterior energy efficient lighting which exceeds the California Title 24 Energy Efficiency performance standards, as deemed acceptable by the City. Use automatic devices to turn off lights when they are not needed. • To the extent that they are compatible with landscaping guidelines established by the City, use shade-producing trees, particularly those that shade paved surfaces such as streets and parking lots and buildings at the project site. • Use paints and a surface color palette for the project emphasizing light and off-white colors which reflect heat away from the buildings. • Install a photovoltaic array (solar panels) or other source of renewable energy generation on-site, or otherwise acquire energy from the local utility that has been generated by renewable resources, to meet the project's office electricity needs. • Reduce energy demand associated with potable water conveyance using						

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
the following: o Landscaping palette emphasizing drought-tolerant plants; o Use of water-efficient irrigation techniques; and, o U.S. EPA Certified WaterSense labeled for equivalent faucets, high-efficiency toilets (HETs), and water-conserving shower heads. • Provide on-site bicycle storage/parking consistent with City of Moreno Valley requirements. • Provide on-site showers (one for males and one for females). Provide lockers for employees. • Establish a Transportation Management Association (TMA). The TMA will coordinate with other TMAs within the City to encourage and coordinate carpooling among building occupants. The TMA will advertise its services to building occupants, and offer transit and/or other incentives to reduce GHG emissions. A plan will be submitted by the TMA to the City within two months of project completion that outlines the measures implemented by the TMA, as well as contact information. • Provide preferential parking for carpools, vanpools or other						

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
alternative fuel vehicles. Locations and configurations of proposed preferential parking for carpools and vanpools are subject to review and approval by the City. Prior to final site plan approval, delineate preferential parking for carpools and vanpools on the project site plan. • Provide at least two electric vehicle charging stations. Locations and configurations of proposed charging stations are subject to review and approval by the City. Prior to issuance of the first building permit, delineate stub outs for charging stations on the project building plans. • Implement compressed workweek schedules; • Achieve at least 20% per year (as a percentage of previous percentage, not total trips) increase in percentage of consolidated trips carried by SmartWay carriers until it reaches a minimum of 90% of all long haul trips carried by SmartWay 1.0 or greater carriers. • Achieve at least 15% per year (as a percentage of previous percentage, not total trips) increase in percentage of long haul trips carried by SmartWay carriers until it reaches a minimum of 85% of all consolidator trips carried by SmartWay 1.0 or greater carriers.						

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
• Use of fleet vehicles conforming to 2010 air quality standards or better. • Installation of catalytic converters on gasoline-powered equipment. • Inclusion of electric powered and/or compressed natural gas fueled trucks and/or vehicles in fleets; • Establishment and use of carpool/vanpool programs, complemented by parking fees for single-occupancy vehicles; • Provision of preferential parking for EV and CNG vehicles; • Use of electrical equipment (instead of gasoline-powered equipment) for landscape maintenance; • Use of electric (instead of diesel or gasoline-powered) yard trucks; • Use of SmartWay 1.25 rated trucks. • Provide a display case or kiosk displaying transportation information including the RTA bus schedule in a prominent area accessible to employees. • Use landscape maintenance companies that use battery powered or electric equipment or contract only with commercial landscapers who operate with equipment that complies with the most recent California Air Resources Board certification standards, or standards adopted no						

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
more than three years prior to date of use or any combination of these two themes.						
4.2.6.3B The project shall be designed to facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills by providing easily accessible areas that are dedicated to the collection and storage of recyclable materials including: paper, cardboard, glass, plastics, and metals. Locations of proposed recyclable materials collection areas are subject to review and approval by the City. Prior to Final Site Plan approval, locations of proposed recyclable materials collection areas shall be delineated on the project site plan.	City of Moreno Valley Building and Safety	Prior to Construction (once)	Prior to Issuance of Building Permits and Final Site Plan Approval	Review of final site plan and building plans and on-site inspection		Withhold Building Permits
BIOLOGICAL RESOURCES						
Mitigation Measure BIO-1: No more than 72 hours prior to initiation of ground-disturbing activities, a pre-construction survey shall be completed by a qualified biologist. The survey will identify special status avian species (if any) within the area of intended disturbance. In the event no special status avian species are identified within the limits of disturbance, no further mitigation is required. In the event such species are identified within the limits of ground disturbance,	City of Moreno Valley Planning Division	Prior to Grading	Prior to Issuance of Grading Permit	Submittal of Evidence that the pre-construction survey has been completed.		Withhold Grading Permit

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
Mitigation Measure BIO-3 shall apply.						
Mitigation Measure BIO-2: No more than 72 hours prior to initiation of ground-disturbing activities, a pre-construction burrowing owl survey shall be completed by a qualified biologist for the planned disturbance area. The pre-construction burrowing owl surveys may be conducted as part of the survey required in **Mitigation Measure BIO-1**. A report detailing the findings of the pre-construction survey shall be submitted to the City prior to the initiation of ground-disturbing activities. In the event no burrowing owls are identified within the limits of ground disturbance, no further mitigation is required. In the event burrowing owls are identified within the limits of ground disturbance, **Mitigation Measures BIO-3** and **BIO-4** shall apply.	City of Moreno Valley Planning Division	Prior to grading	Prior to Issuance of Grading Permit	Submittal of Evidence that a qualified biologist has been hired and the pre-construction survey has been completed. Submittal of a report of the survey findings.		Withhold Grading Permit
Mitigation Measures BIO-3. If nesting special status avian or burrowing owl species are determined to occupy a proposed area of disturbance a biological monitor will be present during construction to ensure no construction activity shall take place within 500 feet of an active nest/burrow until it has been determined by the biological monitor that the nest/burrow is no longer active, and all juveniles have fledged the nest/burrow.	City of Moreno Valley Planning Division	Prior to grading	Prior to Issuance of Grading Permit			Withhold Grading Permit
Mitigation Measure BIO-4: If active burrowing owl burrows are detected outside the breeding season, then	City of Moreno Valley Planning Division	Prior to grading	Prior to Issuance of Grading Permit	Provide evidence to the City that the passive relocation		Withhold Grading Permit

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
passive and/or active relocation may be approved following consultation with the CDFG and/or USFWS. One-way doors may be installed as part of a passive relocation program. Burrowing owl burrows shall be excavated with hand tools by a qualified biologist when determined to be unoccupied, and backfilled to ensure that animals do not re-enter the holes/dens.				plan has been approved by CDFG and USFWS.		
CULTURAL RESOURCES						
Mitigation Measure CUL-1: Prior to construction involving excavation four feet or more below existing surface grade, the construction contractor shall provide evidence that a qualified paleontologist has been retained, and that the paleontologist(s) shall be present during all grading and other significant ground-disturbing activities that reach four feet or more below existing surface grade. If the paleontologist(s) do not find evidence for Pleistocene-era deposits once the maximum excavation depth is reached, monitoring shall be discontinued. In the event fossiliferous deposits are encountered, the following measures shall be implemented: • Monitoring shall be conducted by qualified paleontological monitor(s) of excavation in areas identified as likely to contain paleontological resources, including undisturbed older Pleistocene alluvium. Paleontological monitors shall be	City of Moreno Valley Planning Division	Prior to grading and on-going during ground disturbing activities.	Prior to Issuance of Grading Permit	Provide evidence to the City that a qualified paleontologist has been retained, and that the paleontologist(s) will be present during all grading and other significant ground-disturbing activities that reach four feet or more below existing surface grade. A report of findings shall be submitted to the City after the finalization of construction.		Withhold Grading Permit/ Issuance of a Stop Work Order

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors shall be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring may be reduced if the potentially fossiliferous units are determined upon exposure and examination by qualified paleontological personnel to have low potential to contain fossil resources. • Paleontological monitoring of any earthmoving will be conducted by a monitor, under direct guidance of a qualified paleontologist. Earthmoving in areas of the parcel where previously undisturbed sediments are buried, but not otherwise disturbed, will not be monitored. • Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates. • Identification and curation of specimens into a professional, fully accredited museum repository with permanent retrievable storage. The paleontologist must have a written						

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
repository agreement in hand prior to the initiation of mitigation activities. • Preparation or a report of findings with and appended itemized inventory of specimens. The report and report and inventory, when submitted to the City of Moreno Valley along with confirmation of the curation of recovered of recovered specimens into an established, accredited museum repository, will signify completion of the program to mitigate impacts to paleontological resources						
GEOLOGY AND SOILS						
Mitigation Measure GEO-1: Prior to the issuance of grading permits, any existing low density soils and/or saturated soils shall be removed to competent natural soil under the inspection of the Soils Engineering Firm. After the exposed surface has been cleansed of debris and/or vegetation, it shall be scarified until it is uniform in consistency, brought to the proper moisture content and compacted to a minimum of 90 percent relative compaction (in accordance with ASTM: D-1557). In any area where a transition between fill and native soil or between bedrock and soil are encountered, additional excavation beneath foundations and slabs will be necessary in order to provide uniform support and	City of Moreno Valley Planning Division Engineering	Prior to grading	Prior to Issuance of Grading Permit	Review of construction documents and on-site inspection		Withhold Grading Permit

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
avoid differential settlement of the structure. The on-site soils or approved import soils may be utilized for the compacted fill, provided they are free of any deleterious materials and shall not contain any rocks, brick, asphaltic concrete, concrete, or other hard materials greater than eight inches in maximum dimensions. Any import soil must be approved by the Soils Engineering firm a minimum of 24 hours prior to importation to the site. The approved fill soils shall be placed in layers not in excess of six inches in thickness. Each lift shall be uniform in thickness and thoroughly blended. The fill soils shall be brought to within 2 percent of the optimum moisture content, unless otherwise specified by the Soils Engineering firm. Each lift shall be compacted to a minimum of 90 percent relative compaction (in accordance with ASTM: D-1557) and approved prior to the placement of the next layer of soil. Compaction tests shall be obtained at the discretion of the Soils Engineering firm but to a minimum of one test for every 500 cubic yards placed and/or for every two feet of compacted fill placed. The minimum relative compaction shall be obtained in accordance with accepted methods in the construction industry. The final grade of the structural areas shall be in a dense and smooth condition prior to						

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
placement of slabs-on-grade or pavement areas. No fill soils shall be placed, spread, or compacted during unfavorable weather conditions. When the grading is interrupted by heavy rains, compaction operations shall not be resumed until approved by the Soils Engineering firm. It should be noted that the above measure may be modified by the Final Geotechnical or Soils Report.						
Mitigation Measure GEO-2: Prior the issuance of grading permits, the project proponent shall inform the project engineers, architects, owner, maintenance personnel, and other interested parties of the Expansive Soil Guidelines provided in the project's geotechnical analysis [Geotechnical Engineering Investigation Proposed Industrial Development Southwest Corner of Perris Boulevard and Grove View Road Moreno Valley, California, NorCal Engineering, March 7, 2007]. The recommendations identified in the project's Expansive Soil Guidelines shall be implemented by the project engineers, architects, owner, maintenance personnel, and other interested parties in the applicable design guidelines. Applicable design guidelines shall be included and implemented in the project's grading plans.	City of Moreno Valley Planning Division Building and Safety Engineering	Prior to grading	Prior to Issuance of Grading Permit	Review of grading and construction documents and on-site inspection		Withhold Grading Permit

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
GREENHOUSE GASES AND GLOBAL CLIMATE CHANGE						
4.3.6.1A Prior to the issuance of building permits, the project applicant shall provide evidence to the City of Moreno Valley that building features have been incorporated in building plans as required by Title 24 of the California Code of Regulations. These features include but are not limited to the following: • Exterior windows in the office areas shall utilize window treatments for efficient energy conservation. • Per CALGreen Code requirements, water-efficient fixtures and appliances, including but not limited to low-flow faucets, dual-flush toilets minimizing water consumption by 20 percent from the Building Standards Code baseline water consumption shall be used. • Per CALGreen Code requirements, a Commissioning Plan shall be prepared and all building systems (e.g., heating, ventilation, and air-conditioning [HVAC], irrigation systems, lighting, water heating) shall be commissioned by the Commissioning Authority. • Per CALGreen Code, restrict watering methods (e.g., prohibit systems that apply water to non-vegetated surfaces) and control	City of Moreno Valley Building and Safety Planning Division	Prior to construction	Prior to issuance of building permits	Review of construction documents and on-site inspection		Withhold Building Permit

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
runoff.						
4.3.6.1B Prior to the issuance of building permits, the project applicant shall provide evidence to the City of Moreno Valley that the following measures have been be incorporated into the design and construction of the project: • Encourage use of locally produced and/or manufactured building materials for at least 10 percent of the construction materials used for the project. • Encourage use of "Green Building Materials," such as those materials that are resource efficient, and recycled and manufactured in an environmentally friendly way, for at least 10 percent of the project. • Limit unnecessary idling of construction equipment. A reduction in equipment idling would reduce fuel consumption, and therefore, GHG emissions. • Maximize the use of electricity from the power grid by replacing diesel- or gasoline-powered equipment where feasible. This would reduce GHG emissions because electricity can be produced more efficiently at centralized power plants. • Design the project building to exceed	City of Moreno Valley Building and Safety Planning Division	Prior to construction	Prior to issuance of building permits	Review of construction documents/building plans and on-site inspection		Withhold Building Permit

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
the California Building Code's (CBC) 2008 Title 24 energy standard by 20%, including, but not limited to, any combination of the following: o Increase insulation such that heat transfer and thermal bridging is minimized. o Limit air leakage through the structure or within the heating and cooling distribution system to minimize energy consumption. o Incorporate ENERGY STAR or better rated windows in the office area, space heating and cooling equipment, light fixtures, appliances, or other applicable electrical equipment. • Provide a landscape and development plan for the project that takes advantage of shade, prevailing winds, and landscaping. The landscaping plan shall be prepared by a registered landscape architect who will consider the following: o Plant at least 50 percent low-ozone forming potential (Low-OFP) trees and shrubs, preferably native, drought-resistant species, to meet city/county landscaping requirements. o Plant Low-OFP, native, drought-						

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
resistant, tree and shrub species, 20% in excess of that already required by city or county ordinance. Consider roadside, sidewalk, and driveway shading. • Install efficient lighting and lighting control systems. Use daylight as an integral part of the lighting systems in buildings. • Install light-colored "cool" roof and cool pavements. • Install energy-efficient heating and cooling systems, appliances and equipment, and control systems. • Install solar or light-emitting diodes (LEDs) for outdoor lighting. • Install electrical outlets on the exterior walls of the warehouse/office building (and perhaps parking lots) to promote the use of electric landscape maintenance equipment.						
4.3.6.1C Prior to the issuance of occupancy permits, the project applicant shall provide evidence to the City of Moreno Valley that the following measures have been incorporated into the operation of the project: • The project applicant shall use low	City of Moreno Valley Building and Safety Planning Division	Prior to building permit and occupancy	Prior to issuance of occupancy permit	Review of construction documents and on-site inspection		Withhold Occupancy Permit

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
Global Warming refrigerants or natural refrigerants (ammonia, propane, carbon dioxide [CO_2]) for refrigeration and fire suppression equipment. • Provide vegetative or man-made exterior wall shading devices for east-, south-, and west facing walls with windows in the office areas. • Devise a comprehensive water conservation strategy appropriate for the project and its location. The strategy may include the following, plus other innovative measures that may be appropriate: • Install drought tolerant plants for landscaping. • Use reclaimed water for landscape irrigation within the project. Install the infrastructure to deliver and use reclaimed water. • Install water-efficient irrigations systems, such as weather-based and soil-moisture-based irrigation controllers and sensors for landscaping according to the California Department of Water Resources Model Efficient Landscape Ordinance. • Provide employee education about reducing waste and available recycling services.						

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
HYDROLOGY AND WATER QUALITY						
Mitigation Measure HYD-01: Prior to grading plan approval and the issuance of a grading permit by the City, the project proponent shall provide evidence to the City that a Notice of Intent (NOI) with the Regional Water Quality Control Board has been filed to be covered under the State NPDES General Construction Permit for discharge of stormwater associated with construction activities.	City of Moreno Engineering	Prior to grading	Prior to the Issuance of Grading Permits	Submittal of copy of Notice of Intent to City filed with the RWQCB		Withhold Grading Permits
Mitigation Measure HYD-02: Prior to grading plan approval and the issuance of a grading permit by the City, the project proponent shall submit to the State Water Quality Control Board, a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP shall include a surface water control plan and erosion control plan citing specific measures to control on-site and off-site erosion during the entire grading and construction period. Additionally, the SWPPP shall identify structural and nonstructural BMPs to control sediment and non-visible discharges from the site. BMPs to be implemented in the SWPPP may include but shall not be limited to the following: Sediment discharges from the site may be controlled by the following: gravel bags, silt fences, straw wattles and temporary debris basins (if deemed necessary), and other discharge	City of Moreno Engineering	Prior to grading	Prior to the Issuance of Grading Permits	Review and approval of SWPPP		Withhold Grading Permits

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
control devices. The construction and condition of the BMPs will be periodically inspected during construction, and repairs will be made when necessary as required by the SWPPP. Materials that have the potential to contribute non-visible pollutants to stormwater must not be placed in drainage ways and must be contained, elevated, and placed in temporary storage containment areas. All loose piles of soil, silt, clay, sand, debris, and other earthen material shall be protected in a reasonable manner to eliminate any discharge from the site. Stockpiles will be surrounded by silt fences. The SWPPP will include inspection forms for routine monitoring of the site during the construction phase to ensure NPDES compliance. Additional BMPs and erosion control measures will be documented in the SWPPP and utilized if necessary. The SWPPP will be kept on site for the entire duration of project construction and will also be available to the local RWQCB for inspection at any time. In the event that it is not feasible to implement the above BMPs, the City of Moreno Valley can make a determination						

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
that other BMPs will provide equivalent or superior treatment either on or off site.						
Mitigation Measure HYD-03: Prior to the issuance of grading permits, the project proponent shall provide evidence to the City that the following provisions have been added to construction contracts for the project: • The Construction Contractor shall be responsible for performing and documenting the application of BMPs identified in the SWPPP. Weekly inspections shall be performed on sediment control measures called for in the SWPPP. Monthly reports shall be maintained by the Contractor and submitted to the City for inspection. In addition, the Contractor will also be required to maintain an inspection log and have the log on site to be reviewed by the City of Moreno Valley and the representatives of the Regional Water Quality Control Board.	City of Moreno Engineering	During grading and construction	Prior to Grading	Review of construction documents and on-site inspection		Withhold Grading Permit
Mitigation Measure HYD-04: Prior to grading plan approval and the issuance of a grading permit by the City, the project proponent shall receive approval from the City of Moreno Valley for a Final Water Quality Management Plan (F-WQMP). The F-WQMP shall specifically identify pollutants of concern, site design, source control, and treatment control BMPs that	City of Moreno Engineering	Prior to grading	Prior to Issuance of Grading Permit	Submittal of WQMP to City for review and approval		Withhold Grading Permit

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
shall be used on site to control predictable pollutant runoff in order to reduce impacts to water quality to the maximum extent practicable.						
Mitigation Measure HYD-05: Prior to grading plan approval and the issuance of a grading permit, the project proponent shall submit a detailed grading plan and drainage report, with supporting engineering calculations, to the City Engineer for review and approval. The plan and report shall incorporate relevant requirements identified by the City and/or site-specific geotechnical investigations. The plan and report shall provide evidence that the storm drainage system would be adequate to convey water for the 100-year storm event from the project site and that the post-development flows exiting the proposed project site are less than or equal to pre-development flows.	City of Moreno Engineering	Prior to grading	Prior to Issuance of Grading Permits	Submittal of evidence that all requirements are fulfilled		Withhold Grading Permit
NOISE						
4.4.6.1A During all project site excavation and grading on site, the project contractor shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.	City of Moreno Valley Building and Safety Engineering Planning Division	Throughout construction	Prior to Issuance of Grading Permit	Review of construction documents and on-site inspection		Withhold Grading Permit
4.4.6.1B The project contractor shall place all stationary construction equipment so that emitted noise is	City of Moreno Valley Building and Safety	Throughout construction /on-site inspection	Prior to Issuance of Grading Permit	Review of construction documents and on-		Withhold Grading Permit or Stop Work

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
directed away from sensitive receptors nearest to the project site.	Engineering Planning Division			site inspection		Order
4.4.6.1C The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receptors nearest to the project site during all project construction.	City of Moreno Valley Building and Safety Engineering Planning Division	Throughout construction /on-site inspection	Prior to Issuance of Grading Permit	Review of construction documents and on-site inspection		Withhold Grading Permit or Stop Work Order
4.9.6.1D During all project site construction activities, the construction contractor shall limit all construction-related activities that would result in high noise levels to between the hours of 6:00 a.m. and 8:00 p.m. on weekdays and between the hours of 7:00 a.m. to 8:00 p.m. on weekends and holidays, unless written approval is obtained from the City Building Official or City Engineer. For grading activity, the hours are limited to between 7 am and 6 pm weekdays and 8 am to 4 pm on weekends and holidays.	City of Moreno Valley Building and Safety Engineering Planning Division	Throughout construction /on-site inspection	Prior to Issuance of Grading Permit	Review of construction documents and on-site inspection		Withhold Grading Permit or Stop Work Order
TRANSPORTATION						
4.5.6.1A. Prior to the issuance of building permits, the project applicant shall participate in the City of Moreno Valley Development Impact (DIF) Fee Program and pay the project's fair share for local	City of Moreno Valley Building and Safety Engineering	Once after construction	Prior to the Issuance of Certificate of Occupancy	Evidence of Payment of City DIF fees		Withhold Certificate of Occupancy

Mitigation Measure No. / Implementing Action	Responsible for Monitoring	Monitoring Frequency	Timing of Verification	Method of Verification	Verified Date/ Initials	Sanctions for Non-Compliance
circulation improvements as outlined in the VIP Moreno Valley Project Traffic Study. The City shall ensure that the intersection and street improvements outlined in the VIP Moreno Valley Project Traffic Study will be constructed pursuant to the timeframes established by the City of Moreno Valley Development Impact Fee Program.	Planning Division					
4.5.6.1B. Prior to the issuance of building permits, the project applicant shall participate in the County of Riverside Transportation Uniform Mitigation Fee (TUMF) Program and pay the project's fair share for regional circulation improvements. The City shall ensure that the intersection and street improvements outlined in the VIP Moreno Valley Project Traffic Study will be constructed pursuant to the timeframe established by the County of Riverside TUMF Program.	City of Moreno Valley Building and Safety Engineering	Once after construction	Prior to the Issuance of Certificate of Occupancy	Evidence of Payment of Riverside County TUMF fees		Withhold Certificate of Occupancy
4.5.6.2A. Prior to the issuance of occupancy permits, the project applicant shall have constructed the site access roadway improvements outlined below. • Indian Street/South Project Driveway: Restripe to convert center turn lane on Indian Street to a two-way left-turn lane. This location does not meet a peak hour signal warrant. This is a site-adjacent improvement to be constructed by the project applicant.	City of Moreno Valley Engineering	Once after construction	Prior to the Issuance of Occupancy Permits	Review of construction documents and on-site inspection		Withhold Occupancy Permits

APPENDIX A:

ATTACHMENTS TO JOHNSON & SEDLACK COMMENT LETTER DATED JUNE 1, 2012

Contruction Noise Handbook

3.0 Effects of Construction Noise

3.1 Introduction

Construction noise in the community may not pose a health risk or damage peoples' sense of hearing, but it can adversely affect peoples' quality of life. To some degree, construction noise can be a contributing factor to the degradation of someone's health in that it can cause people to be irritated and stressed and can interrupt their ability to sleep - all of which may lead to higher blood pressure, anxiety, and feelings of animosity toward the people or agencies responsible for producing the noise.

In fact, several of the traditional definitions of "noise" (i.e. unwanted or undesirable sound) can be associated with construction noise. Construction noise can be considered to:

- be too loud;
- be impulsive;
- contain annoying pure tones;
- occur unexpectedly;
- occur at undesirable times of day; and/or
- interrupt people's activities.

Construction noise has the potential to disturb people at home in their residences, in office buildings or retail businesses, in public institutional buildings, at locations of religious services, while attending sporting events, or when on vacation.

Contacts

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Resource Center

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2012 Central Zone 5-Year Transportation Improvement Program

Fiscal Year				FY11-12	FY12-13	FY13/14	FY14/15	FY15/16	Current Obligated Phase Balance	Total Phase Payments/ Expenditures	Original Obligated Phase Cost
Forecast Revenues				**$ 1,096,752**	**$ 1,096,752**	**$ 1,118,687**	**$ 1,141,061**	**$ 1,163,882**	**$ 30,277,463**	**$ (25,912,959)**	**$ 64,184,922**
Carryover Revenues (As of 6/30/2011)				**$ 24,353,353**	**$ 12,846,128**	**$ 50,044**	**$ (943,137)**	**$ (916,182)**	Adopted March 2011 TIP		
									5-Year Avail Forecast/Cash	*5-Year Programmed*	*5-Year Balance*
									$ 37,248,244	*$ 35,878,869*	*$ 1,369,375*
Availiable Revenue				**$ 25,450,105**	**$ 13,942,881**	**$ 1,168,732**	**$ 197,924**	**$ 247,700**			
Funded Expenditures		***Status****	***Phase***								
County of Riverside											
06-CN-RCY-1103	Cajalco Rd, Alexander St to I-215 (3.280 mi. 2 to 4 lanes)	STD	PA&ED	$ 0					$ 0	$ (259,263)	$ 259,263
		PLN	ENG			$ 1,000,000			$ 1,000,000	$ -	$ 1,000,000
05-CN-RCY-1006	Pigeon Pass Rd.(Cantarini), Hidden Springs Dr to Center St.(4.213 mi. 0 to 4 lanes)	STD	PA&ED	$ (0)					$ (0)	$ (649,865)	$ 649,865
05-CN-RCY-1007	Reche Canyon Rd./Reche Vista Dr., Heacock St.to S.B.C. (4.757 mi. 2 to 4 lanes)	STD	PA&ED	$ 905,260	$ 314,000				$ 1,219,260	$ (415,050)	$ 1,634,310
		STD	ROW	$ (0)					$ (0)	$ (661,119)	$ 661,118
City of Menifee/County of Riverside											
-CN-RCY-1003	Murrieta Rd, Ethanac Rd to McCall Blvd (1.982 mi. 2 to 4 lanes)	CPL	PA&ED	$ 0					$ 0	$ (599,406)	$ 599,406
		CPL	ENG	$ 0					$ 0	$ (398,938)	$ 398,938
-CN-RCY-1004	Newport Road/I-215 Interchange (CFD)	STD	PA&ED	$ 1,604,317					$ 1,604,317	$ (1,234,012)	$ 2,838,329
		PLN	ENG		$ 1,440,340				$ 1,440,340	$ -	$ 1,440,340
08-SW-RCY-1128	Newport Road, Murrieta Rd to Goetz Rd North (2.06 mi. 0 to 4 lanes)	STD	CON	$ 856,511					$ 856,511	$ (3,023,489)	$ 3,880,000

2012 Central Zone 5-Year Transportation Improvement Program

Fiscal Year				FY11-12	FY12-13	FY13/14	FY14/15	FY15/16	Current Obligated Phase Balance	Total Phase Payments/ Expenditures	Original Obligated Phase Cost
Forecast Revenues				$ 1,096,752	$ 1,096,752	$ 1,118,687	$ 1,141,061	$ 1,163,882	$ 30,277,463	$ (25,912,959)	$ 64,184,922
Carryover Revenues (As of 6/30/2011)				$ 24,353,353	$ 12,846,128	$ 50,044	$ (943,137)	$ (916,182)	Adopted March 2011 TIP		
									5-Year Avail Forecast/Cash	*5-Year Programmed*	*5-Year Balance*
									$ 37,248,244	*$ 35,878,869*	*$ 1,369,375*
Availiable Revenue				$ 25,450,105	$ 13,942,881	$ 1,168,732	$ 197,924	$ 247,700			
Funded Expenditures, continued											
City of Moreno Valley											
06-CN-MOR-1107	Ironwood Ave(Seg A), Heacock St to Perris Blvd. (0.980 mi. 2 to 4 lanes)	CPL	PA&ED	$ -					$ -	$ (124,000)	$ 124,000
		CPL	ENG	$ 21,378					$ 21,378	$ (232,322)	$ 253,700
		CPL	ROW	$ 176,512					$ 176,512	$ (1,480,610)	$ 1,657,122
06-CN-MOR-1113	Ironwood Ave (Seg B), Perris Blvd to Nason St. (2.130 mi. 2 to 4 lanes)	CPL	PA&ED	$ (0)					$ (0)	$ (511,833)	$ 511,833
05-CN-MOR-1012	Moreno Beach/SR-60 Interchange Phase I	CPL	PA&ED	$ 0					$ 0	$ (500,000)	$ 500,000
		PND	ENG	$ 505,141					$ 505,141	$ (2,227,339)	$ 2,732,480
		STD	ROW	$ 2,413,708	$ 1,000,000				$ 3,413,708	$ (2,212,292)	$ 5,626,000
		PLN	CON		$ 3,500,000				$ 3,500,000	$ -	$ 3,500,000
[1] 5-CN-MOR-1013	Nason/SR-60 Interchange w/Bridge	CPL	PA&ED	$ -					$ -	$ (500,000)	$ 500,000
		PND	ENG	$ 138,145					$ 138,145	$ (1,243,306)	$ 1,381,451
		PND	ROW	$ 59,619					$ 59,619	$ (881)	$ 60,500
		PLN	CON	$ 133,500		$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 3,133,500	$ -	$ 11,128,000
City of Perris											
05-CN-PER-1015	Evans Rd, 700' N/of Placentia Ave to Nuevo Rd.(Phasel&II) (1.655 mi. 0 to 4 lanes)	CPL	PA&ED	$ 71,132					$ 71,132	$ (60,559)	$ 131,691
		STD	ENG	$ 523,636					$ 523,636	$ (72,131)	$ 595,767
		STD	CON		$ 879,015				$ 879,015	$ (1,205,799)	$ 2,084,814
05-CN-PER-1019	Nuevo, Murrieta Rd. to Dunlap (0.979 mi. 2 to 4 lanes)	PLN	PA&ED	$ -	$ 50,000				$ 50,000	$ -	$ 50,000
05-CN-PER-1072	Ramona Expressway, I-215 to Evans Road (1.505 mi. 4 to 6 lanes)	CPL	PA&ED	$ 0					$ 0	$ (63,133)	$ 63,133
		CPL	ENG	$ (0)					$ (0)	$ (324,045)	$ 324,045
		CPL	CON	$ -	$ 199,806				$ 199,806	$ (1,742,550)	$ 1,942,356
City of Perris/ City of Menifee											
05-CN-PER-1001	Ethanac Road, Goetz Rd to I-215 (1.936 mi. 2 to 4 lanes)	PLN	PA&ED	$ -	$ 50,000				$ 50,000	$ -	$ 50,000
City of Moreno Valley/ March JPA											
05-CN-JPA-1021	Heacock Ave, Perris Valley Drain to San Michele Rd, Phase I (0.890 mi. 2 to 4 lanes)	CPL	PA&ED	$ -					$ -	$ (65,600)	$ 65,600
		CPL	ENG	$ -					$ -	$ (91,167)	$ 91,167
		CPL	ROW	$ (0)					$ (0)	$ (32,959)	$ 32,959
		STD	CON	$ 229,676					$ 229,676	$ (7,526)	$ 237,202

[1] ***Nason/SR-60 CON funding in FY13/14, FY14/15, FY15/16 are illustrative only and not actual commitment.***

2012 Central Zone 5-Year Transportation Improvement Program

Fiscal Year				FY11-12	FY12-13	FY13/14	FY14/15	FY15/16	Current Obligated Phase Balance	Total Phase Payments/ Expenditures	Original Obligated Phase Cost
Forecast Revenues				$ 1,096,752	$ 1,096,752	$ 1,118,687	$ 1,141,061	$ 1,163,882	$ 30,277,463	$ (25,912,959)	$ 64,184,922
Carryover Revenues (As of 6/30/2011)				$ 24,353,353	$ 12,846,128	$ 50,044	$ (943,137)	$ (916,182)	Adopted March 2011 TIP		
									5-Year Avail Forecast/Cash	*5-Year Programmed*	*5-Year Balance*
									$ 37,248,244	*$ 35,878,869*	*$ 1,369,375*
Availiable Revenue				$ 25,450,105	$ 13,942,881	$ 1,168,732	$ 197,924	$ 247,700			
Funded Expenditures, continued											
RCTC/City of Perris											
05-CN-PER-1018	SR-74 (4th)/I-215 Interchange	CPL	PA&ED						$ -	$ (1,050,000)	$ 1,050,000
		PND	ENG	$ 72,345					$ 72,345	$ (648,953)	$ 721,298
		PND	ROW	$ 456,429					$ 456,429	$ (1,656,847)	$ 2,113,276
		STD	CON	$ 2,229,993	$ 2,850,000				$ 5,079,993	$ (1,720,007)	$ 6,800,000
County of Riverside/City of Perris											
07-CN-PER-1120	Ramona Expressway/I-215 Interchange	STD	ENG	$ 97,000					$ 97,000	$ (897,959)	$ 994,959
		STD	CON	$ 2,000,000	$ 3,500,000				$ 5,500,000	$ -	$ 5,500,000
Reimbursements (10% of revenue)***				$ 109,675	$ 109,675	$ 111,869	$ 114,106	$ 116,388			
Total Funded Capital Expenditures				$ 12,603,977	$ 13,892,837	$ 2,111,869	$ 1,114,106	$ 1,116,388			
Total Funded Balance Carryover*				$ 12,846,128	$ 50,044	$ (943,137)	$ (916,182)	$ (868,688)			

Summary Table

Fiscal Year	FY11/12	FY12/13	FY13/14	FY14/15	FY15/16	*5-Year Total Available Forecast/Cash*	*5-Year Total Programmed plus 10%*	*5-Year Balance*
Available Revenue	$ 25,450,105	$ 13,942,881	$ 1,168,732	$ 197,924	$ 247,700			
Total Funded/Obligated Expenditures	$ 12,603,977	$ 13,892,837	$ 2,111,869	$ 1,114,106	$ 1,116,388	$ 30,793,842	$ 31,902,557	$ (1,108,715)
Carryover Balance	$ 12,846,128	$ 50,044	$ (943,137)	$ (916,182)	$ (868,688)			
10 % Reimbursement Tracking Summary								
Available 10% Reimbursements	$ 933,029	$ 745,401	$ 559,967	$ 376,771	$ 195,856	*10% Programmed*	*10% Payments*	*10% Balance after Payments*
Programmed Reimbursements	$ 297,303	$ 297,303	$ 297,303	$ 297,303	$ 435,883	$ 1,625,094	$ -	$ 1,625,094
Reimbursement Carryover Balance	$ 635,726	$ 448,098	$ 262,664	$ 79,468	$ (240,027)			

NOTES:

Total Funded Carryover Balance does not reflect total available cash - October 29 Zone TAC approved reducing each funded phase of each funded project by 3% on TIP.
Phase: planning=PA&ED, engineering=ENG, right-of-way=ROW,construction=CON.
Status: PLN=planned, STD=started, PND=pending final invoice, CPL=completed, TER=terminated.
10% Reimbursement Reimbursement Detail Tracked on Separate Spreadsheet.
Actual Forecasts, Carryover, and Payments thru 6/30/11.
Yellow highlight = obligated funds and over-program alert.

Technical Support Document for Cancer Potency Factors:

Methodologies for derivation, listing of available values, and adjustments to allow for early life stage exposures.

April 2009

California Environmental Protection Agency

Office of Environmental Health Hazard Assessment

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EXECUTIVE SUMMARY

The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, Connelly) was enacted in September 1987. Under this Act, stationary sources of air pollution are required to report the types and quantities of certain substances their facilities routinely release into the air. The goals of the Air Toxics "Hot Spots" Act are to collect emission data, identify facilities having localized impacts, ascertain health risks posed by those facilities, notify nearby residents of significant risks and reduce emissions from significant sources.

The Technical Support Document for Cancer Potency Factors (TSD) contains cancer unit risks and potency factors for 107 of the 201 carcinogenic substances or groups of substances for which emissions must be quantified in the Air Toxics Hot Spots program. These unit risks are used in the cancer risk assessment of facility emissions.

The purposes of this revision to the TSD is to provide updated calculation procedures used to derive the estimated unit risk and cancer potency factors, and to describe the procedures used to consider the increased susceptibility of infants and children compared to adults to carcinogens. This updates cancer risk assessment methods originally laid out in the California Department of Health Services' Guidelines for Chemical Carcinogen Risk Assessment (CDHS, 1985), and more recently summarized in the previous Hot Spots technical support document Part II (OEHHA, 2005a). Summaries of cancer potency factors and the underlying data are provided in Appendix A and B. [these did not undergo revision and are not included in this review package.]

The procedures used to consider the increased susceptibility to carcinogens of infants and children as compared to adults include the use of age-specific weighting factors in calculating cancer risks from exposures of infants, children and adolescents, to reflect their anticipated special sensitivity to carcinogens

This document is one part of the Air Toxics Hot Spots Program Risk Assessment Guidelines. The other documents originally included in the Guidelines are Part I: Technical Support Document for the Determination of Acute Toxicity Reference Exposure Levels for Airborne Toxicants; Part III: Technical Support Document for Determination of Noncancer Chronic Reference Exposure Levels; Part IV: Technical Support Document for Exposure Assessment and Stochastic Analysis; Part V: Air Toxic Hot Spots Program Risk Assessment Guidelines. As a part of the same revision process which led to production of this revised TSD on cancer potencies, the original TSDs for Acute and Chronic Reference Exposure Levels have been replaced with a new unified TSD for Acute, 8-hour and Chronic Reference Exposure Levels.

The major changes to the TSD include the following:

- Based on the OEHHA analysis of the potency by lifestage at exposure, OEHHA proposes weighting cancer risk by a factor of 10 for exposures that occur from birth to 2 years of age, and by a factor of 3 for exposures that occur from 2 years through 15 years of age. We propose to apply this weighting factor to all carcinogens, regardless of purported mechanism of action, unless chemical-specific data exist to the contrary. In cases where

there are adequate data for a specific carcinogen of potency by age, we would use the data to make any adjustments to risk.

- OEHHA proposes to use the Benchmark Dose method to compute potency factors rather than the more traditional linearized multistage model (LMS), although the LMS will still be used in some instances. The BMDL model essentially uses an empirical fit to the data (usually best with the multistage model), and then extrapolates with a straight line from the 95 % lower confidence limit of the BMD (BMDL) to zero. This method is simpler and does not assume any underlying theoretical mechanisms at the low dose range. The BMDL method results in very similar estimates of potency as the LMS method.

- OEHHA will use scaling based on body weight to the ¾ power, rather than to the 2/3 power.

- OEHHA's evaluations of the carcinogenicity of chemicals generally follow the guidelines laid out by IARC for identification and classification of potential human carcinogens, which are described in detail in the most recent revision of the *Preamble* to the IARC monographs series (IARC, 2006).

PREFACE

The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, Connelly) was enacted in September 1987. Under this Act, stationary sources are required to report the types and quantities of certain substances their facilities routinely release into the air. The goals of the Air Toxics "Hot Spots" Act are to collect emission data, identify facilities having localized impacts, ascertain health risks posed by those facilities, notify nearby residents of significant risks and reduce emissions from significant sources.

The Technical Support Document for Cancer Potency Factors (TSD) contains cancer unit risks and potency factors for 107 of the 201 carcinogenic substances or groups of substances for which emissions must be quantified in the Air Toxics Hot Spots program. These unit risks are used in risk assessment of facility emissions. The TSD provides updated calculation procedures used to derive the estimated unit risk and cancer potency factors, and procedures to consider early-life susceptibility to carcinogens. Summaries of cancer potency factors and the underlying data are provided in Appendix A and B. [these did not undergo revision and are not included in this review package.]

In this document, OEHHA is responding to the requirements of the 1999 Children's Environmental Health Protection Act, (SB25, Escutia) by revising the procedures for derivation and application of cancer potency factors to take account of general or chemical-specific information which suggests that children may be especially susceptible to certain carcinogens (OEHHA, 2001a). The revised cancer potency derivation procedures described will not be used to impose any overall revisions of the existing cancer potencies, although they do reflect updated methods of derivation. However, individual cancer potency values will be reviewed as part of the ongoing re-evaluation of health values mandated by SB 25, and revised values will be listed in updated versions of the appendices to this document as necessary. The revisions also include the use of weighting factors in calculating cancer risks from exposures of infants, children and adolescents, to reflect their anticipated special sensitivity to carcinogens. Similar legal mandates to update risk assessment methodology and cancer potencies apply to the OEHHA program for development of Public Health Goals (PHGs) for chemicals in drinking water, and Proposition 65 No Significant Risk Levels (NSRLs). The NSRLs may also be revised to reflect concerns for children's health. Revising these numbers will require the originating program to reconsider the value in an open public process. For example, OEHHA would need to release any revised potency factors for public comment and review by the Scientific Review Panel on Toxic Air Contaminants (SRP) prior to adoption under the TAC program. The procedures for outside parties to request reevaluation of cancer potency values by the programs which originated those values are listed in Appendix G.

Appendices A and B provide previously adopted Cal/EPA values which were included in the previous version of the TSD for Cancer Potency Factors (OEHHA, 2005a). Cal/EPA values were developed under the Toxic Air Contaminant (TAC) program, the PHG program, the Proposition 65 program, or in some cases specifically for the Air Toxics Hot Spots program. All the Cal/EPA values are submitted for public comments and external peer review prior to adoption by the program of origin. In the future, new values developed by the Toxic Air

Contaminants or Hot Spots programs or other suitable sources will be added as these are approved.

Some U.S. EPA IRIS cancer unit risk values were adopted under the previous versions of these guidelines, and these values will continue to be used unless and until revised by Cal/EPA. U.S. EPA has recently revised its cancer risk assessment guidelines (U.S. EPA, 2005a). Some of the recommended changes in methodology could result in slightly different potency values compared to those calculated by the previous methodology, although in practice a number of the recommendations (for example, the use of ¾ power of the body weight ratio rather than ⅔ power for interspecies scaling) have been available in draft versions of the revised policy for some time and appear in many more recent assessments. U.S. EPA has stated that cancer potency values listed in IRIS will not be revisited solely for the purpose of incorporating changes in cancer potency value calculation methods contained in the revised cancer risk assessment guidelines. U.S. EPA has also issued supplementary guidelines on assessing cancer risk from early-life exposure (U.S. EPA, 2005b).

OEHHA uses a toxic equivalency factor procedure for dioxin-like compounds, including polychlorinated dibenzo-*p*-dioxins, dibenzofurans and polychlorinated biphenyls (PCBs). The Toxicity Equivalency Factor scheme (TEF_{WHO-97}) developed by the World Health Organization/European Center for Environmental Health (WHO-ECEH) is used for determining cancer unit risk and potency values for these chemicals where individual congener emissions are available (Appendix C).

This document is one part of the Air Toxics Hot Spots Program Risk Assessment Guidelines. The other documents originally included in the Guidelines are Part I: Technical Support Document for the Determination of Acute Toxicity Reference Exposure Levels for Airborne Toxicants; Part III: Technical Support Document for Determination of Noncancer Chronic Reference Exposure Levels; Part IV: Technical Support Document for Exposure Assessment and Stochastic Analysis; Part V: Air Toxic Hot Spots Program Risk Assessment Guidelines. As a part of the same revision process which led to production of this revised TSD on cancer potencies, the original TSDs for Acute and Chronic Reference Exposure Levels have been replaced with a new unified TSD for Acute, 8-hour and Chronic Reference Exposure Levels.

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Appendix A. A lookup table containing unit risk and cancer potency values.

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Appendix D. A listing of Toxic Air Contaminants identified by the California Air Resources Board.

Appendix E. Descriptions of the International Agency for Research on Cancer (IARC) and U.S. Environmental Protection Agency (U.S. EPA) carcinogen classifications.

Appendix F. An asbestos quantity conversion factor for calculating asbestos concentrations expressed as 100 fibers/m^3 from asbestos concentrations expressed as µg/m^3.

Appendix G. Procedures for revisiting or delisting cancer potency factors by the program of origin.

Appendix H. Exposure routes and studies used to derive cancer unit risks and slope factors.

Appendix I. "Assessing susceptibility from early-life exposure to carcinogens": Barton *et al*., 2005 (from *Environmental Health Perspectives)*.

Appendix J. "In Utero and Early Life Susceptibility to Carcinogens: The Derivation of Age-at-Exposure Sensitivity Measures" – conducted by OEHHA's Reproductive and Cancer Hazard Assessment Branch.

Appendix K. Additions and corrections from prior document versions.

INTRODUCTION

The Technical Support Document (TSD) for Describing Available Cancer Potency Factors provides technical information support for the Air Toxics Hot Spots Program Risk Assessment Guidelines. The TSD consists of 12 sections:

1. The TSD introduction.

2. A description of the methodologies used to derive the unit risk and cancer potency values listed in the lookup table.

3. A lookup table containing unit risk and cancer potency values. (Appendix A)

4. Chemical-specific summaries of the information used to derive unit risk and cancer potency values. (Appendix B).

5. A description of the use of toxicity equivalency factors for determining unit risk and cancer potency factors for polychlorinated dibenzo-*p*-dioxins, dibenzofurans and dioxin-like polychlorinated biphenyls (Appendix C).

6. A listing of Toxic Air Contaminants identified by the California Air Resources Board (Appendix D).

7. Descriptions of the International Agency for Research on Cancer (IARC) and U.S. Environmental Protection Agency (U.S. EPA) carcinogen classifications (Appendix E).

8. An asbestos quantity conversion factor for calculating asbestos concentrations expressed as 100 fibers/m^3 from asbestos concentrations expressed as µg/m^3 (Appendix F).

9. Procedures for revisiting or delisting cancer potency factors by the program of origin (Appendix G).

10. Exposure routes and studies used to derive cancer unit risks and slope factors (Appendix H).

11. "Assessing susceptibility from early-life exposure to carcinogens": Barton *et al*., 2005 (from *Environmental Health Perspectives)* (Appendix I).

12. "In Utero and Early Life Susceptibility to Carcinogens: The Derivation of Age-at-Exposure Sensitivity Measures" – conducted by OEHHA's Reproductive and Cancer Hazard Assessment Branch (Appendix J)

SELECTION OF CANCER POTENCY VALUES

The Office of Environmental Health Hazard Assessment (OEHHA) has developed a number of cancer potencies for use in the Toxic Air Contaminants and Air Toxics Hot Spots programs. This document also provides summaries of cancer potency factors which were originally developed for other California Environmental Protection Agency (Cal/EPA) programs, or by the U.S. EPA. These were reviewed for accuracy, reliance on up-to-date data and methodology, and applicability in the context of the Air Toxics Hot Spots program. Values found appropriate were adopted after public and peer review rather than devoting the resources necessary for a full *de novo* assessment. Thus, cancer potency values (CPF) included in the Technical Support Document (TSD) for Cancer Potency Factors were from the following sources:

1. Toxic Air Contaminant documents

2. Standard Proposition 65 documents

3. U.S.EPA Integrated Risk Information Systems (Office of Health and Environmental Assessment, U.S.EPA)

4. Expedited Proposition 65 documents

5. Other OEHHA assessments , for example for the drinking water program.

All the cancer potency value sources used generally follow the recommendations of the National Research Council on cancer risk assessment (NRC, 1983, 1994). All Cal/EPA program documents undergo a process of public comment and scientific peer review prior to adoption, although the procedures used vary according to the program. The publication procedure for Toxic Air Contaminant documents includes a public comment period and review by the Scientific Review Panel on Toxic Air Contaminants (SRP) before identification of a Toxic Air Contaminant by the Air Resources Board of the California Environmental Protection Agency (Cal/EPA). Furthermore, a petition procedure is available to initiate TAC document review and revision if appropriate because of new toxicity data. Documents developed for the Air Toxics Hot Spots program similarly undergo public comment and peer review by the SRP before adoption by the Director of OEHHA. The standard Proposition 65 document adoption procedure includes a public comment and external peer review by the Proposition 65 Carcinogen Identification Committee. The expedited Proposition 65 document adoption procedure included a public comment period. Risk assessments prepared for development of Public Health Goals (PHGs) for chemicals in drinking water are subject to two public comment periods before the final versions and responses to comments are published on the OEHHA Web site. PHG documents may also receive external peer review. Documents from U.S. EPA's Integrated Risk Information System (IRIS) receive external peer review and are posted on the Internet for public viewing during the external peer review period, and any public comments submitted are considered by the originating office. Additionally, public comment may be solicited during the document posting period. Future preference for use of developed cancer potency factors/unit risks will be done on a case by case basis. Preference will be given to those assessments most relevant to inhalation exposures of the California population, to the most recent derivations using the latest data sets and scientific methodology, and to those having undergone the most open and extensive peer review process.

CANCER RISK ASSESSMENT METHODOLOGIES

This section describes in general the methodologies used to derive the cancer unit risk and potency factors listed in this document. As noted in the Preface to this document, no new cancer unit risks or potency factors were developed for this document. All of the values contained here were previously developed in documents by Cal/EPA or U.S. EPA. Following the recommendations of the National Academy of Sciences (NRC, 1983), Cal/EPA and U.S. EPA have both used formalized cancer risk assessment guidelines, the original versions of which (California Department of Health Services, 1985; U.S. EPA, 1986) were published some time ago. Both these guidelines followed similar methodologies.

In the twenty years since these original guidelines were published there have been a number of advances in the methodology of cancer risk assessment. There have additionally been considerable advances in the quantity of data available not only from animal carcinogenesis bioassays and epidemiological studies, but also from mechanistic studies of carcinogenesis and related phenomena. Some of these advances have been incorporated into newer risk assessments by both agencies on a more or less *ad hoc* basis. There has also been an ongoing effort to provide updated risk assessment guidance documents. In 1995, U.S. EPA released for public comment the "Proposed and Interim Guidelines for Carcinogen Risk Assessment", which was the first of several drafts released for public comment. Many risk assessments appearing since then have used elements of the recommendations contained in that document, in spite of its draft status. A final version of the U.S. EPA's revised cancer risk assessment guidelines has now been released (U.S. EPA, 2005a). Although these new guidelines incorporate a number of substantial changes from their predecessors (U.S. EPA, 1986; 1995), U.S. EPA has stated that cancer potency values listed in IRIS will not be revisited solely for the purpose of incorporating changes in cancer potency value calculation methods.

Cal/EPA has not produced a revised cancer risk assessment guideline document to replace the original version (DHS, 1985). Rather, Cal/EPA has relied on incorporating new data and methodologies as these became available, and described the methods used on a case by case basis in the individual risk assessment documents where these went beyond the original guidance. However, this revision of the TSD for cancer potencies provides a convenient opportunity to summarize the current status of the methodology used by OEHHA for the air toxics programs, and also to highlight points of similarity to, and difference from, the recommendations of U.S. EPA (2005a).

In this document, OEHHA intends to follow the recommendations of the NRC (1994) in describing a set of clear and consistent principles for choosing and departing from default cancer risk assessment options. NRC identified a number of objectives that should be taken into account when considering principles for choosing and departing from default options. These include, "protecting the public health, ensuring scientific validity, minimizing serious errors in estimating risks, maximizing incentives for research, creating an orderly and predictable process, and fostering openness and trustworthiness". The OEHHA cancer risk methodologies discussed in this document are intended to generally meet those objectives cited above.

Hazard Identification

This section will describe: 1) how weight of evidence evaluations are used in hazard evaluation; 2) guidelines for inferring causality of effect; 3) the use of human and animal carcinogenicity data, as well as supporting evidence (e.g. genetic toxicity and mechanistic data); 4) examples of carcinogen identification schemes.

Evaluation of Weight of Evidence

In evaluating the range of evidence on the toxicity and carcinogenicity of a compound, mixture or other agent, a "weight-of-evidence" approach is generally used to describe the body of evidence on whether or not exposure to the agent causes a particular effect. Under this approach, the number and quality of toxicological and epidemiological studies, as well as the consistency of study results and other sources of data on biological plausibility, are considered. Diverse and sometimes conflicting data need to be evaluated with respect to possible explanations of differing results. Consideration of methodological issues in the review of the toxicological and epidemiological literature is important in evaluating associations between exposure to an agent and animal or human health effects. This aspect of the evaluation process has received particular emphasis with respect to epidemiological data, where concerns as to the statistical and biological significance and reliability of the data and the impacts of confounding and misclassification are pressing. Such concerns are also relevant to some extent in the interpretation of animal bioassay data and mechanistic studies. Although the test animals, laboratory environment and characterization of the test agent are usually much better controlled than the equivalent parameters in an epidemiological study, the small sample size can be problematic. In addition, there are uncertainties associated with extrapolation of biological responses from test animal species to humans.

Criteria for Causality

There has been extensive discussion over the last two centuries on causal inference. This has been particularly with regard to epidemiological data, but is also relevant to interpretation of animal studies. Most epidemiologists utilize causal inference guidelines based on those proposed by Bradford Hill (1971). OEHHA has relied on these and on recommendations by IARC (2006), the Institute of Medicine (2004), the Surgeon General's Reports on Smoking (U.S. DHHS, 2004) and standard epidemiologic texts (*e.g.* Lilienfeld and Lilienfeld, 1980; Rothman and Greenland, 1998). The criteria for determination of causality used by OEHHA have been laid out in various risk assessment documents. The summary below is adapted from the Health Effects section of the document prepared to support the identification of environmental tobacco smoke (ETS) as a Toxic Air Contaminant (OEHHA, 2005b).

1. *Strength of Association*. A statistically significant strong association, which is easier to detect if there is a high relative risk, between a factor and a disease is often viewed as an important criterion for inferring causality because, all other things being equal, a strong and statistically significant association makes alternative explanations for the disease less likely. However, as discussed in Rothman and Greenland (1998), the fact that a relative risk is small in magnitude does not exclude a casual association between the risk factor

and the outcome in question. Since it is more difficult to detect (i.e., reach statistical significance) a small magnitude risk, ~~they are~~it is just as likely to ~~be causal~~indicate causality as a larger magnitude risk~~s~~.

When assessing all evidence, it is important to consider the strength of the study design (particularly controlling for confounding variables, obtaining an unbiased sample, measurement error) and the level of statistical significance (i.e., the ability to exclude a Type I [false positive] error). The power of the study to detect biologically meaningful effects (i.e., the risk of a Type II [false negative] error) is important in considering studies that do not reach traditional (i.e., P<.05) statistical significance, particularly if the biological endpoint is serious. If the outcome is serious and the study small (i.e., low power), a larger P value (e.g., P<.10) may be adequate evidence for identifying an effect.

There are a number of examples of statistically significant, small magnitude associations that are widely accepted as causal, such as causal links between air pollution and cardiovascular/pulmonary mortality and between second-hand smoke exposure and various cancers and heart disease. From a public health perspective, even a small magnitude increase in risk for a common disease can mean large numbers of people affected by the health outcome when exposure is frequent and widespread, as measured by the population attributable risk or attributable fraction. Small magnitude of association must not be confused with statistical significance, which is much more important.

2. *Consistency of Association.* If several investigations find an association between a factor and a disease across a range of populations, geographic locations, times, and under different circumstances, then the factor is more likely to be causal. Consistency argues against hypotheses that the association is caused by some other factor(s) that varies across studies. Unmeasured confounding is an unlikely explanation when the effect is observed consistently across a number of studies in different populations.

   Associations that are replicated in several studies of the same design or using different epidemiological approaches or considering different sources of exposure and in a number of geographical regions are more likely to represent a causal relationship than isolated observations from single studies (IARC, 2006). If there are inconsistent results among investigations, possible reasons are sought, such as adequacy of sample size or control group, methods used to assess exposure, or range in levels of exposure. The results of studies judged to be rigorous are emphasized over those of studies judged to be methodologically less rigorous. For example, studies with the best exposure assessment are more informative for assessing the association between ETS and breast cancer than studies with limited exposure assessment, all else being equal.

3. *Temporality.* Temporality means that the factor associated with causing the disease occurs in time prior to development of the disease. The adverse health effect should occur at a time following exposure that is consistent with the nature of the effect. For example, respiratory irritation immediately following exposure to an irritant vapor is temporally consistent, whereas ~~effects~~ irritation noted only years later may not be. On the other hand, tumors, noted immediately following exposure, might be temporally

inconsistent with a causal relationship, but tumors arising after a latency period of months (in rodents) or years (in rodents or humans) would be temporally consistent.

4. *Coherence and Biological Plausibility.* A causal interpretation cannot conflict with what is known about the biology of the disease. The availability of experimental data or mechanistic theories consistent with epidemiological observations strengthens conclusions of causation. For example, the presence of known carcinogens in tobacco smoke supports the concept that exposure to tobacco smoke could cause increased cancer risk. Similarly, if the mechanism of action for a toxicant is consistent with development of a specific disease, then coherence and biological plausibility can be invoked. It should be noted that our understanding of the biology of disease, and therefore biological plausibility, changes in light of new information which is constantly emerging from molecular biology (including epigenetics), and from new clinical and epidemiological investigations revealing effects influenced by genetic polymorphisms, pre-existing disease, and so forth.

5. *Dose-Response.* A basic tenet of toxicology is that increasing exposure or dose generally increases the response to the toxicant. While dose-response curves vary in shape and are not necessarily always monotonic, an increased gradient of response with increased exposure makes it difficult to argue that the factor is not associated with the disease. To argue otherwise necessitates that an unknown factor varies consistently with the dose of the substance and the response under question. While increased risk with increasing levels of exposure is considered to be a strong indication of causality, absence of a graded response does not exclude a causal relationship (IARC, 2006).

   The dose-response curves for specific toxic effects may be non-monotonic. Under appropriate circumstances, where the dose response shows saturation, the effect of exposures could be nearly maximal, with any additional exposure having little or no effect. In some instances, a response is seen strongly in susceptible subpopulations, and the dose-response is masked by mixing susceptible and non-susceptible individuals in a sample. Further, there are examples of U-shaped or inverted U-shaped dose-response curves, (e.g., for endocrine disrupters) (Almstrup et al., 2002; Lehmann et al., 2004). Finally, timing of exposure during development may mask an overall increase in risk with increasing dose.

6. *Specificity.* Specificity is generally interpreted to mean that a single cause is associated with a single effect. It may be useful for determining which microorganism is responsible for a particular disease, or associating a single carcinogenic chemical with a rare and characteristic tumor (e.g., liver angiosarcoma and vinyl chloride, or mesothelioma and asbestos). However, the concept of specificity is not helpful when studying diseases that are multifactorial, or toxic substances that contain a number of individual constituents, each of which may have several effects and/or target sites.

7. *Experimental evidence.* While experiments are often conducted over a short period of time or under artificial conditions (compared to real-life exposures), experiments offer the opportunity to collect data under highly controlled conditions that allow strong causal conclusions to be drawn. Experimental data that are consistent with epidemiological

results strongly support conclusions of causality. There are also "natural experiments" that can be studied with epidemiological methods, such as when exposure of a human population to a substance declines or ceases; if the effect attributed to that exposure decreases, then there is evidence of causality. One example of this is the drop in heart disease death and lung cancer risk after smoking cessation.

It should be noted that the causal criteria are guidelines for judging whether a causal association exists between a factor and a disease, rather than hard-and-fast rules. Lilienfeld and Lilienfeld (1980) note that "*In medicine and public health, it would appear reasonable to adopt a pragmatic concept of causality. A causal relationship would be recognized to exist whenever evidence indicates that the factors form part of the complex of circumstances that increases the probability of the occurrence of disease and that a diminution of one or more of these factors decreases the frequency of that disease. After all, the reason for determining the etiological factors of a disease is to apply this knowledge to prevent the disease.*" Rothman and Greenland (2005) discuss the complexities of causation and the use of rules and deductive methods in causal inference. They also concur with Bradford Hill and others that a determination of causality is a pragmatic conclusion rather than an absolute verdict, and advocate that these criteria should be seen as "*deductive tests of causal hypotheses".*

Data sources

Human studies: epidemiology, ecological studies and case reports

The aim of a risk assessment for the California Air Toxics programs is to determine potential impact on human health. Ideally therefore, the hazard identification would rely on studies in humans to demonstrate the nature and extent of the hazard. However, apart from clinical trials of drugs, experimental studies of toxic effects in human subjects are rarely undertaken or justifiable. Pharmacokinetic studies using doses below the threshold for any toxic effect have been undertaken for various environmental and occupational agents, but are not usually regarded as appropriate for suspected carcinogens.

The human data on carcinogens available to the risk assessor therefore mostly consist of epidemiological studies of existing occupational or environmental exposures. It is easier to draw reliable inferences in situations where both the exposures and the population are substantial and well-defined, and accessible to direct measurement rather than recall. Thus, many important findings of carcinogenicity to humans are based on analysis of occupational exposures. Problems in interpretation of occupational epidemiological data include simultaneous exposure to several different known or suspected carcinogens, imprecise quantification of exposures and confounding exposures such as active or passive tobacco smoking. The historical database of occupational data has a bias towards healthy white adult males. Thus, the hazard analysis of these studies may not accurately characterize effects on women, infants, children or the elderly, or on members of minority ethnic groups. Nevertheless, the analysis of occupational epidemiological studies, including meta-analyses, has proved an important source for unequivocal identification of human carcinogens.

Epidemiological evidence may also be obtained where a substantial segment of a general population is exposed to the material of interest in air, drinking water or food sources. Rigorous

cohort and case-control studies may sometimes be possible, in which exposed individuals are identified, their exposure and morbidity or mortality evaluated, and compared to less exposed but otherwise similar controls. More often at least the initial investigation is a cross-sectional study, where prevalence of exposures and outcomes is compared in relatively unexposed and exposed populations. Such studies are hypothesis-generating, but are important sources of information nevertheless, and can often also justify more costly and labor-intensive follow-up cohort and/or case-control studies.

The clinical medical literature contains many case reports where a particular health outcome is reported along with unusual exposures that might have contributed to its occurrence. These reports typically describe a single patient or a small group, and have no statistical significance. They are nevertheless useful as indications of possible associations that deserve follow-up using epidemiological methods, and as supporting evidence, addressing the plausibility of associations measured in larger studies.

Animal studies

Although the observation of human disease in an exposed population can provide definitive hazard identification, adequate data of this type are not always available. More often, risk estimates have to be based on studies in experimental animals, and extrapolation of these results to predict human toxicity. The animals used are mostly rodents, typically the common laboratory strains of rat and mouse.

Rats and mice have many similarities to humans. Physiology and biochemistry are similar for all mammals, especially at the fundamental levels of xenobiotic metabolism, DNA replication and DNA repair that are of concern in identifying carcinogens. However, there are also several important differences between rodents and humans. Rodents, with a short life span, have differences in cell growth regulation compared to longer-lived species such as the human. For instance, whereas laboratory investigations have suggested that mutations in two regulatory genes (*e.g.* H-ras and p-53) are sometimes sufficient to convert a rodent cell to a tumorigenic state, many human cancers observed clinically have seven or eight such mutations. In addition, cultured normal human cells have a very stable karyotype, whereas cultured rodent cells facilely undergo tetraploidization and then aneuploidization in cell culture. Further, cultured human cells senesce and rarely undergo spontaneous immortalization (frequency is 10^{-7} or less), whereas cultured rodent cells facilely undergo immortalization at frequencies on the order of 10^{-3}. The use of genomics to study chemical carcinogenesis is relatively new, but the differences at present appear to be a matter of degree rather than kind.

Differences in regulation of cell division are another likely reason for variation between species in the site of action of a carcinogen, or its potency at a particular site. A finding of carcinogenesis in the mouse liver, for instance, is a reasonably good indicator of potential for carcinogenesis at some site in the human, but not usually in human liver (Huff, 1999). The mouse liver (and to a lesser extent that of the rat) is a common site of spontaneous tumors. It is also relatively sensitive to chemical carcinogenesis. The human liver is apparently more resistant to carcinogenesis; human liver tumors are unusual except when associated with additional predisposing disease, such as hepatitis B or alcoholic cirrhosis, or exposure to aflatoxin B1, or simultaneous exposure to hepatitis B virus and aflatoxin B1. Conversely, other

tumor sites are more sensitive in the human than in experimental animals. Interspecies variation in site and sensitivity to carcinogenesis may also arise from differences in pharmacokinetics and metabolism, especially for carcinogens where metabolic activation or detoxification is important. This variability may cause important differences in sensitivity between individuals in a diverse population such as humans. Variability between individuals in both susceptibility and pharmacokinetics or metabolism is probably less in experimental animal strains that are bred for genetic homogeneity.

Animal carcinogenesis studies are often designed to maximize the chances of detecting a positive effect, and do not necessarily mimic realistic human exposure scenarios. Thus extrapolation from an experimentally accessible route to that of interest for a risk assessment may be necessary. Even for studies by realistic routes such as oral or inhalation, doses may be large compared to those commonly encountered in the environment, in order to counter the limitation in statistical power caused by the relatively small size of an animal experiment. Whereas the exposed population of an epidemiological study might number in the thousands, a typical animal study might have fifty individuals per exposure group. With this group size any phenomenon with an incidence of less than about 5% is likely to be undetectable. Statistically significant results may be obtained even with groups as small as ten animals per dose group, when incidence of a tumor that is rare in the controls approached 100% in a treated group. The consensus experimental design for animal carcinogenesis studies, which has evolved over the last 50 years of investigation, is represented by the protocol used by the U.S. National Toxicology Program (NTP) for studies using oral routes (diet, gavage or drinking water) or inhalation. These carcinogenesis bioassays usually involve both sexes of an experimental species, and most often two species. NTP has standardized the use of the C57BlxC3H F_1 hybrid mouse, and the Fischer 344 rat as the standard test species, although NTP has announced plans to substitute use of the Wistar Han rat for the Fisher 344 rat. There is now an extensive database of background tumor incidences, normal physiology, biochemistry, histology and anatomy for these strains, which aids in the interpretation of pathological changes observed in experiments. Nevertheless, there is enough variation in background rates of common tumors that the use of concurrent controls is essential for hazard identification or dose-response assessment. "Historical control" data are mainly used to reveal anomalous outcomes in the concurrent controls. The fact that a significantly elevated incidence of a tumor relative to the concurrent control group is within the range of historical controls at that site for the test sex and strain is not necessarily grounds for dismissing the biological significance of the finding.

Groups of fifty animals of each sex and species are used, with control groups, and several dose groups, the highest receiving the maximum tolerated dose (MTD). Recent study designs have emphasized the desirability of at least three dose levels covering a decade with "logarithmic" spacing (*i.e.* MTD, 1/2 MTD or 1/3 MTD, and 1/10 MTD). This extended design is aimed at providing better dose-response information, and may contribute important additional information, such as mechanistic insights, for the hazard identification phase.

Supporting evidence: genetic toxicity, mechanistic studies

Investigators have developed additional data sources that can support or modify the conclusions of animal carcinogenesis bioassays, and provide information on mechanisms of action of agents suspected of being carcinogenic based on epidemiological studies or animal bioassays.

Genetic damage in exposed organisms includes both gene mutations (point or frameshift), and larger scale effects such as deletions, gene amplification, sister-chromatid exchanges, translocations and loss or duplication of segments or whole chromosomes. These genetic effects of chemical exposures are deleterious in their own right. In addition, since carcinogenesis results from somatic mutations and similar genetic alterations, agents that cause genetic damage generally have carcinogenic potential. Conversely, many known carcinogens are also known to be genotoxic, although there is also a significant class of carcinogens that are not directly genotoxic according to the usual tests. These latter agents presumably work by some other mechanism, such as methylation of tumor suppressor genes or demethylation of cellular proto-oncogenes, although recent genetic studies have shown that even tumors induced by these agents may show mutations, deletions or amplification of growth regulatory genes.

Experimental procedures to demonstrate and measure genetic toxicity may involve exposure of intact animals, and examination of genetic changes in, for example, bone marrow cells (or cells descended from these e.g. the micronucleus test, which detects remnants of chromosomal fragments in immature erythrocytes), mutations in flies (*Drosophila)*, or appearance of color spots in the coat of mice. However, many tests have employed single celled organisms or mammalian cells in culture. The best known of these tests is the *Salmonella* reverse mutation assay, popularly known as the Ames test after its inventor. This is representative of a larger class of tests for mutagenic activity in prokaryotic organisms (bacteria), which necessarily only look at gene-level mutations. Similar tests in eukaryotic microorganisms (yeasts, *Aspergillus*) and cultured mammalian cells also detect chromosomal effects. Many tests using microorganisms *in vitro* involve addition of activating enzymes (*e.g.* liver postmitochondrial supernatant – "S9") to mimic the metabolism of promutagenic chemicals *in vivo*. Another type of test examines the induction in mammalian cells of morphological transformation or anchorage-independent growth. These two chemically induced, *in vitro* changes are considered two of the many changes that fibroblastic cells must undergo on their route to neoplastic transformation (tumorigenicity). These various genetic tests contribute different information, which may be used to amplify and confirm conclusions drawn from human studies or animal bioassays, or to draw conclusions in the absence of epidemiological or bioassay data. In the latter case they have also been used in prioritizing agents for further evaluation by means of bioassays.

Carcinogen Identification schemes

Some regulatory programs, such as California's Safe Drinking Water and Toxics Enforcement Act ("Proposition 65") and various activities of the U.S. EPA, require that explicit lists of substances having the potential to act as human carcinogens be maintained. Other such lists are developed by non-regulatory research organizations, such as the U.S. National Toxicology Program and the International Agency for Research on Cancer (IARC), an international program of the World Health Organization. The California air toxics programs do not have any statutory requirement to "identify" carcinogens. The requirement instead is to identify hazardous substances as Toxic Air Contaminants, and to determine whether or not a threshold concentration, below which no adverse effects are expected, is likely to exist:

HEALTH AND SAFETY CODE, Division 26 (Air Resources), § 39660.

(2) The evaluation shall also contain an estimate of the levels of exposure that may cause or contribute to adverse health effects. If it can be established that a threshold of adverse health effects exists, the estimate shall include both of the following factors:

(A) The exposure level below which no adverse health effects are anticipated.

(B) An ample margin of safety that accounts for the variable effects that heterogeneous human populations exposed to the substance under evaluation may experience, the uncertainties associated with the applicability of the data to human beings, and the completeness and quality of the information available on potential human exposure to the substance. In cases in which there is no threshold of significant adverse health effects, the office shall determine the range of risk to humans resulting from current or anticipated exposure to the substance.

In practice however this requirement amounts to the need to establish whether or not a substance is carcinogenic. Any such effects are clearly harmful. Whereas the great majority of non-cancer health effects of chemicals are regarded as having a threshold, the default assumption for carcinogens is that there is no threshold (as described below). OEHHA follows the guidelines laid out by IARC for identification and classification of potential human carcinogens, which are described in detail in the most recent revision of the *Preamble* to the IARC monographs series (IARC, 2006). The IARC Monograph series provides evaluations of the carcinogenicity of individual substances or commonly occurring mixtures. The evaluation guidelines used are similar to those used by other scientific or regulatory authorities, including U.S.EPA.

The data inputs to hazard identification for carcinogens are human epidemiological studies, animal bioassays, along with supporting evidence such as mechanistic and genotoxicity data and structure-activity comparisons. IARC also assembles data on the structure and identity of the agent. The list of agents considered includes specific chemicals and also complex mixtures, occupational and lifestyle factors, physical and biological agents, and other potentially carcinogenic exposures.

IARC evaluations determine the quality of evidence for both animal and human evidence as falling into one of four categories: sufficient evidence of carcinogenicity, limited evidence of carcinogenicity, inadequate evidence of carcinogenicity and evidence suggesting lack of carcinogenicity. Stringent requirements for data quality are imposed. In view of their crucial importance, these definitions are quoted directly from the *Preamble* (IARC 2006):

"(a) Carcinogenicity in humans

Sufficient evidence of carcinogenicity: The Working Group considers that a causal relationship has been established between exposure to the agent and human cancer. That is, a positive relationship has been observed between the exposure and cancer in studies in which chance, bias and confounding could be ruled out with reasonable confidence. A statement that there is *sufficient evidence* is followed by a separate sentence that identifies the target organ(s) or tissue(s) where an increased risk of cancer was observed in humans. Identification of a specific target organ or tissue does not preclude the possibility that the agent may cause cancer at other sites.

***Limited evidence of carcinogenicity*:** A positive association has been observed between exposure to the agent and cancer for which a causal interpretation is considered by the Working Group to be credible, but chance, bias or confounding could not be ruled out with reasonable confidence.

Inadequate evidence of carcinogenicity: The available studies are of insufficient quality, consistency or statistical power to permit a conclusion regarding the presence or absence of a causal association between exposure and cancer, or no data on cancer in humans are available.

Evidence suggesting lack of carcinogenicity: There are several adequate studies covering the full range of levels of exposure that humans are known to encounter, which are mutually consistent in not showing a positive association between exposure to the agent and any studied cancer at any observed level of exposure. The results from these studies alone or combined should have narrow confidence intervals with an upper limit close to the null value (e.g. a relative risk of 1.0). Bias and confounding should be ruled out with reasonable confidence, and the studies should have an adequate length of follow-up. A conclusion of *evidence suggesting lack of carcinogenicity* is inevitably limited to the cancer sites, conditions and levels of exposure, and length of observation covered by the available studies. In addition, the possibility of a very small risk at the levels of exposure studied can never be excluded.

(b) Carcinogenicity in experimental animals

Carcinogenicity in experimental animals can be evaluated using conventional bioassays, bioassays that employ genetically modified animals, and other in-vivo bioassays that focus on one or more of the critical stages of carcinogenesis. In the absence of data from conventional long-term bioassays or from assays with neoplasia as the end-point, consistently positive results in several models that address several stages in the multistage process of carcinogenesis should be considered in evaluating the degree of evidence of carcinogenicity in experimental animals.

The evidence relevant to carcinogenicity in experimental animals is classified into one of the following categories:

***Sufficient evidence of carcinogenicity*:** The Working Group considers that a causal relationship has been established between the agent and an increased incidence of malignant neoplasms or of an appropriate combination of benign and malignant neoplasms in (a) two or more species of animals or (b) two or more independent studies in one species carried out at different times or in different laboratories or under different protocols. An increased incidence of tumours in both sexes of a single species in a well-conducted study, ideally conducted under Good Laboratory Practices, can also provide *sufficient evidence*.

A single study in one species and sex might be considered to provide *sufficient evidence of carcinogenicity* when malignant neoplasms occur to an unusual degree with regard to incidence, site, type of tumour or age at onset, or when there are strong findings of tumours at multiple sites.

***Limited evidence of carcinogenicity*:** The data suggest a carcinogenic effect but are limited for making a definitive evaluation because, e.g. (a) the evidence of carcinogenicity is

restricted to a single experiment; (b) there are unresolved questions regarding the adequacy of the design, conduct or interpretation of the studies; (c) the agent increases the incidence only of benign neoplasms or lesions of uncertain neoplastic potential; or (d) the evidence of carcinogenicity is restricted to studies that demonstrate only promoting activity in a narrow range of tissues or organs.

***Inadequate evidence of carcinogenicity*:** The studies cannot be interpreted as showing either the presence or absence of a carcinogenic effect because of major qualitative or quantitative limitations, or no data on cancer in experimental animals are available.

***Evidence suggesting lack of carcinogenicity*:** Adequate studies involving at least two species are available which show that, within the limits of the tests used, the agent is not carcinogenic. A conclusion of *evidence suggesting lack of carcinogenicity* is inevitably limited to the species, tumour sites, age at exposure, and conditions and levels of exposure studied."

IARC utilizes the evaluations of animal and human data, along with supporting evidence including genotoxicity, structure-activity relationships, and identified mechanisms, to reach an overall evaluation of the potential for carcinogenicity in humans. The revised *Preamble* (IARC, 2006) includes a description of the data evaluation criteria for this supporting evidence, and indications as to the situations where the availability of supporting evidence may be used to modify the overall conclusion from that which would be reached on the basis of bioassay and/or epidemiological evidence alone. The overall evaluation is expressed as a numerical grouping, the categories of which are described below, as before by directly quoting IARC (2006):

"Group 1: The agent is *carcinogenic to humans*.

This category is used when there is *sufficient evidence of carcinogenicity* in humans. Exceptionally, an agent may be placed in this category when evidence of carcinogenicity in humans is less than *sufficient* but there is *sufficient evidence of carcinogenicity* in experimental animals and strong evidence in exposed humans that the agent acts through a relevant mechanism of carcinogenicity.

Group 2.

This category includes agents for which, at one extreme, the degree of evidence of carcinogenicity in humans is almost *sufficient*, as well as those for which, at the other extreme, there are no human data but for which there is evidence of carcinogenicity in experimental animals. Agents are assigned to either Group 2A (*probably carcinogenic to humans*) or Group 2B (*possibly carcinogenic to humans*) on the basis of epidemiological and experimental evidence of carcinogenicity and mechanistic and other relevant data. The terms *probably carcinogenic* and *possibly carcinogenic* have no quantitative significance and are used simply as descriptors of different levels of evidence of human carcinogenicity, with *probably carcinogenic* signifying a higher level of evidence than *possibly carcinogenic*.

Group 2A: The agent is *probably carcinogenic to humans*.

This category is used when there is *limited evidence of carcinogenicity* in humans and *sufficient evidence of carcinogenicity* in experimental animals. In some cases, an agent may be classified in this category when there is *inadequate evidence of carcinogenicity* in humans and *sufficient evidence of carcinogenicity* in experimental animals and strong evidence that the carcinogenesis is mediated by a mechanism that also operates in humans. Exceptionally, an agent may be classified in this category solely on the basis of *limited evidence of carcinogenicity* in humans. An agent may be assigned to this category if it clearly belongs, based on mechanistic considerations, to a class of agents for which one or more members have been classified in Group 1 or Group 2A.

Group 2B: The agent is *possibly carcinogenic to humans*.

This category is used for agents for which there is *limited evidence of carcinogenicity* in humans and less than *sufficient evidence of carcinogenicity* in experimental animals. It may also be used when there is *inadequate evidence of carcinogenicity* in humans but there is *sufficient evidence of carcinogenicity* in experimental animals. In some instances, an agent for which there is *inadequate evidence of carcinogenicity* in humans and less than *sufficient evidence of carcinogenicity* in experimental animals together with supporting evidence from mechanistic and other relevant data may be placed in this group. An agent may be classified in this category solely on the basis of strong evidence from mechanistic and other relevant data.

Group 3: The agent is *not classifiable as to its carcinogenicity to humans*.

This category is used most commonly for agents for which the evidence of carcinogenicity is *inadequate* in humans and *inadequate* or *limited* in experimental animals.

Exceptionally, agents for which the evidence of carcinogenicity is *inadequate* in humans but *sufficient* in experimental animals may be placed in this category when there is strong evidence that the mechanism of carcinogenicity in experimental animals does not operate in humans.

Agents that do not fall into any other group are also placed in this category.

An evaluation in Group 3 is not a determination of non-carcinogenicity or overall safety. It often means that further research is needed, especially when exposures are widespread or the cancer data are consistent with differing interpretations.

Group 4: The agent is *probably not carcinogenic to humans*.

This category is used for agents for which there is *evidence suggesting lack of carcinogenicity* in humans and in experimental animals. In some instances, agents for which there is *inadequate evidence of carcinogenicity* in humans but *evidence suggesting lack of carcinogenicity* in experimental animals, consistently and strongly supported by a broad range of mechanistic and other relevant data, may be classified in this group."

The IARC hazard evaluation system provides a detailed and generally accepted scheme to classify the strength of evidence as to the possible human carcinogenicity of chemicals and other agents. This includes careful consideration of mechanistic data and other supporting evidence, the evaluation of which is also important to inform selection of models or defaults used in dose response assessment, as is described below. The extended consideration of supporting evidence is in fact the primary difference between more recent versions of the guidance from IARC, and also by other organizations including U.S. EPA, and the original versions of that guidance. In fact, the basic criteria for hazard identification based on bioassay and epidemiological data have not changed substantially in other respects from earlier guidance documents, including that originally published by California (DHS, 1985). Although as noted earlier the California Air Toxics programs do not categorize identified carcinogens, it has generally been the practice to regard any agent with an IARC overall classification in Group 1 or Group 2 as a known or potential human carcinogen. This implies the selection of various policy-based default options, including absence of a threshold in the dose-response curve, unless specific data are available to indicate otherwise. The same basic identification criteria are used by OEHHA scientific staff to determine the appropriate treatment of agents not evaluated by IARC, or for which newer data or revised interpretations suggest that an earlier IARC determination is no longer appropriate.

U.S. EPA has also proposed a scheme for carcinogen hazard identification and strength of evidence classification in their recently finalized Guidelines for Carcinogen Risk Assessment (U.S. EPA, 2005). These principally differ from the IARC guidance in recommending a more extensive narrative description rather than simply a numerical identifier for the identified level of evidence, and also to some degree in the weight accorded to various types of supporting evidence. However, for most purposes they may be regarded as broadly equivalent to the scheme used by IARC, and OEHHA has chosen to cite the IARC (2006) *Preamble* as representing the most up-to-date and generally accepted guidance on this issue.

Dose Response Assessment

The dose-response phase of a cancer risk assessment aims to characterize the relationship between an applied dose of a carcinogen and the risk of tumor appearance in a human. This is usually expressed as a cancer slope factor ["potency" – in units of reciprocal dose - usually $(mg/kg\text{-}body\ weight.day)^{-1}$ or "unit risk" – reciprocal air concentration – usually $(\mu g/m^3)^{-1}$] for the lifetime tumor risk associated with lifetime continuous exposure to the carcinogen at low doses. Cancer potency factors may also be referred to as "cancer slope factors". (As will be described later, additional algorithms may need to be applied to determine risk for specific age groups, or at higher doses where toxicokinetic factors have significant effect.) The basic methodologies recommended in this document are similar to those described by U.S. EPA (2005a) in their Carcinogen Risk Assessment Guidelines. This document therefore refers to U.S. EPA (2005a) for explanation of detailed procedures, and will provide only a brief summary except in cases where OEHHA recommendations are different from or more explicit than those of U.S. EPA.

The following descriptions of methods for dose response assessment, and considerations in their application, apply in principle to the analysis of both animal and human (epidemiological) cancer incidence data. Indeed, the original formulation of the multistage model (Armitage and Doll, 1954) described below was developed based on human cancer incidence. Nevertheless, the

number and quality of human cancer incidence datasets is limited. The more complex analyses have usually only been possible for animal experimental data, where the interindividual variability and the exposure conditions can be both measured and controlled. Most commonly, epidemiological studies have necessarily used a form of multivariate analysis to separate the effects of several different variables relating to exposure, demographics and behaviors (e.g. smoking). In these analyses it is usually assumed that the effect measure(s) vary linearly with the exposure: any more complex variance assumptions might exceed the power of the data to determine the required model parameters. However, there are exceptions, especially for occupational studies where the critical exposure is measured as a continuous variable (rather than just categorical) and where the effect of this exposure is substantial relative to other confounding factors. For example, OEHHA (1998) used a multistage model dealing with both exposure intensity and duration in the analysis of cancer incidence in railroad workers exposure to diesel exhaust (Garshick et al., 1988)

Interspecies Extrapolation

The procedures used to extrapolate low-dose human cancer risk from epidemiological or animal carcinogenicity data are generally health-protective in that they determine an upper confidence bound on the risk experienced by an exposed population. As statistical estimates they cannot be regarded as definite predictions of the risk faced by any one specific individual, who might for a variety of reasons, including individual exposure and susceptibility, experience a risk different from the estimate. The risk assessment procedures used aim to include the majority of variability in the general human population within the confidence bound of the estimate, although the possibility that some individuals might experience either lower or even no risk, or a considerably higher risk, cannot be excluded. Additionally, differences may exist between the characteristics of the general public and those of studied populations. For example, healthy workers, the subject of most epidemiological studies, are often found to have lower rates of morbidity and mortality than the general population (Wen et al., 1983; Monson, 1986; Rothman and Greenland, 1998). Most human data are derived from studies of largely male adult workers and risk estimates cannot take into account specific physiological factors of women, children, and older populations that may affect the potency of a carcinogen, including early age-at-exposure.

Dose-response assessment based on environmental epidemiological studies may involve evaluation of health impacts at exposure levels within the range of those measured in the study population. However, more usually the source data are studies of occupationally exposed humans or of animals, in which case the exposures in the study are likely to be much higher than those of concern for risk assessments relating to community or ambient exposures. Further, even when extrapolation from animal species to humans is not required, the general population to which the URF is applied may differ in characteristics relative to the occupational population studied. It is therefore necessary to extrapolate from the available data to the population and exposure range of concern, which is done by using a dose-response model derived from the source data. The models used fall into three main classes; mechanistically based models, empirical models and (where data are lacking to support a true data-based model) default assumptions. The factors affecting the dose-response relationships for carcinogenesis may also be divided into those relating to absorption, distribution, metabolism and excretion on the one hand (*i.e.* toxicokinetics), and those relating to the underlying dose-response characteristics of carcinogenesis at the tissue or cellular level (*i.e.* toxicodynamics). In this sense the problem of

dose response assessment for carcinogens is similar to that for non-cancer toxic effects. The toxicokinetic models used may in fact be similar for both situations, but the toxicodynamic models are generally different.

Intraspecies Extrapolation and Inter-individual Variability

In estimating the impact of a particular level of exposure to a carcinogen on a target human population, it is necessary to consider the range of susceptibility in the target population. In the present case this is typically defined as the general population of the State of California, including of course women (some of whom are pregnant), infants and children, the elderly, the sick, and those with genetic polymorphisms or acquired differences which affect their susceptibility to carcinogens. In general it has been assumed that the upper-bound risk estimates obtained from the standard toxicodynamic models described below are sufficiently health-protective to cover the intrinsic variability of the adult human target population, in spite of the fact that these models do not explicitly address this type of variability, except in the few cases where an estimate is based on epidemiological data from a large and unselected study group (U.S. EPA, 2005a). However, various analyses (Drew et al., 1983; Barton et al., 2005; Appendix J) have suggested that this assumption is inadequate to cover the expected variability within a human population that includes infants and children. Accordingly both U.S. EPA (2005b) and this document ~~(page 30 *et seq.)*~~ now offer guidance on the use of age-specific adjustment factors to allow for the potentially greater sensitivity of infants and children to chemical carcinogenesis.

The ability to accommodate human variability with regard to the toxicokinetic factors affecting susceptibility to carcinogens varies with the level of detail used in the particular assessment. If the generic interspecies extrapolation approach based on body weight is used without any explicit toxicokinetic model then the assumption is made, as in the case of toxicodynamic variability, that the overall health-protective assumptions made are sufficient to cover the toxicokinetic variability. On the other hand if explicit models such as those referenced in the following paragraph are used, this variability may be more explicitly accommodated by using parameter values which are taken as point estimates from measured distributions of population values, or by using Monte Carlo techniques to include those distributions in the model (Bois et al., 1996; OEHHA, 1992; 2001b).

Toxicokinetic Models

Considerable literature exists showing the importance of understanding the toxicokinetics of carcinogens in understanding their mechanism of action, sites of impact and dose-response relationships. U.S. EPA (2005) in Section 3.1 refers to the importance of identifying an appropriate dose metric for the dose-response analysis. Early cancer risk assessments typically used applied dose as the dose metric, which is adequate in simple cases provided appropriate correction factors are applied for interspecies extrapolation. However, it is often observed that the uptake, metabolism and elimination of the carcinogenic substance (and/or a procarcinogen and metabolites) is non-linear, especially at the higher doses employed in experimental animal studies (Hoel *et al*., 1983, Gaylor *et al*., 1994). Extrapolation to lower doses where such relationships tend to linearity (Hattis, 1990) is aided by the use of toxicokinetic models. These may be relatively simple compartment models, or sophisticated "physiologically based pharmacokinetic (PBPK) models" which to a greater or lesser degree model the actual

biochemical and physiological events of toxicokinetic importance. Applications of both types of model may be found in various risk assessment documents prepared for the Toxic Air Contaminants program (and other OEHHA risk assessments). Since the details vary widely according to the nature of the chemical and the availability of appropriate kinetic data these general guidelines will defer to those examples rather than attempt a fuller exposition here. Further analysis of the use of toxicokinetic modeling in extrapolation from animals to humans, and in accounting for interindividual variability among adult humans, infants and children is presented in the Air Toxics Hot Spots *Technical Support Document for the Derivation of Noncancer Reference Exposure Levels* (OEHHA, ~~2007: Public Review Draft~~2008). Although this refers to the use of toxicokinetic modeling in non-cancer risk assessment, the primary considerations are similar for cancer risk assessment.

Toxicodynamic Models

An early use of mechanistic analysis to support risk assessment was the development of the Armitage-Doll multistage model of dose-response for carcinogenesis. The multistage model was initially developed on theoretical grounds, and by examination of epidemiological and animal data on time to tumor incidence. Subsequent discovery of the molecular biology of proto-oncogenes has provided a basis for explaining the model in terms of actual biological events and systems (Barrett and Wiseman, 1987). This model was developed by Crump and others into the "linearized multistage model", which has been extensively used for carcinogen risk assessment. It leads to a number of partially verifiable predictions, including linearity of the dose-response relationship at low doses, which is observed for many genotoxic carcinogens. It also predicts the form of the dose-response relationship at higher doses, which generally follow a polynomial form (subject to sampling and background corrections) except where other identifiable factors such as pharmacokinetics intervene.

It has been argued that the simple linearized form of the multistage model has limitations as a description of carcinogenic mechanisms, which detract from its usefulness and generality. Cell proliferation is known to be important in the progression of cancer. It may actually be the primary mechanism of action for a few carcinogens, as opposed to the direct modification of DNA by the carcinogen or a metabolite which is assumed to cause the mutational event at each stage in the original multistage description. A cell proliferation model has been developed (Moolgavkar and Knudson, 1981), which retains the concept of an initiating mutational event (in most cases caused by interaction of the chemical with DNA, although it could also be a spontaneous mutation) as in the original multistage model, but also considers proliferation, death or terminal differentiation of both normal and initiated cells. This model is thought to better describe the biological events in carcinogenesis. However, it has not been used extensively in risk assessment because it requires many parameters that are difficult to define and measure (such as proliferation and death rates for various classes of cell). If these cannot be accurately determined, the model has too many free parameters and is not helpful in defining extrapolated values for risk assessment purposes. This highlights a general problem in using mechanistic models in carcinogen risk assessment, which is that the carcinogenesis data themselves are generally insufficient to define fully the dose response curve shape at low doses or provide much mechanistic information. The analysis is therefore supplemented with policy-based assumptions (such as the expectation of linearity at low doses) and, wherever possible, additional

experimental measurements relating to the mechanism of action, in order to make meaningful prediction of risk from environmental exposures to humans.

Because of the difficulties in validating simplified mechanistic models such as the basic multistage model, and the additional difficulty of parameter estimation with more complex mechanistic models, the new U.S. EPA guidelines (U.S. EPA, 2005a) and some recent California risk assessments have chosen instead to use a less overtly mechanistic approach. This approach combines benchmark dose methodology (described below) with an explicit choice of the method for low-dose extrapolation, either assuming low-dose linearity or, for certain carcinogens where data indicate that this is appropriate, a "margin of exposure" or safety/uncertainty factor based approach. This benchmark method is now normally recommended for carcinogen dose response analysis, and the results generally differ little from those derived by the linearized multistage model. Although the linearized multistage method is no longer recommended as the default approach for cancer potency estimation it remains a plausible alternative in many cases, and still has useful applications, such as for time-to-tumor analyses for which benchmark methods are not yet widely available. Additionally, a considerable number of existing cancer potencies in Appendices A and B, and used in the Air Toxics Hot Spots program were derived by this method. Many of these would not be significantly different if calculated by the benchmark approach, and are unlikely to be replaced soon by newly calculated values. The linearized multistage method will therefore also be briefly described here.

Benchmark dose methodologies

The use of benchmark dose methodology has been explored by various investigators [including Gaylor et al. (1998); van Landingham et al. (2001) and Crump (1984, 1995, 2002)] as a tool for dose response extrapolation. This has been recommended in regulatory guidelines for both carcinogenic (U.S. EPA, 2005a) and non-carcinogenic (U.S. EPA, 1995) endpoints. The basic approach is to fit an arbitrary function to the observed incidence data, and to select a "point of departure" (POD) (benchmark dose) *within the range of the observed data.* From this a low dose risk estimate or assumed safe level may be obtained by extrapolation, using an assumed function (usually linear) or by application of uncertainty factors. The critical issue here is that no assumptions are made about the nature of the underlying process in fitting the data. The assumptions about the shape of the dose response curve (linear, threshold, etc.) are explicitly confined to the second step of the estimation process, and are chosen on the basis of policy, mechanistic evidence or other supporting considerations. The benchmark chosen is a point at the low end of the observable dose-response curve. Usually a dose at which the incidence of the tumor is 10% is chosen for animal studies, although lower effect levels may be appropriate for large epidemiological data sets. Because real experimental data include variability in the response of individual subjects, and measurement errors, likelihood methodology is applied in fitting the data. A lower confidence bound (usually 95%) of the effective dose (LED_{10}), rather than its maximum likelihood estimate (MLE), is used as the point of departure. This properly reflects the uncertainty in the estimate, taking a cautious interpretation of highly variable or error-prone data. It also reflects the instability of MLE values from complex curve-fitting routines, which has been recognized as a problem also with the linearized multistage model.

For cancer dose-response estimation using the benchmark dose method, either animal bioassay data or epidemiological data provide a suitable basis. In the absence of a pharmacokinetic model

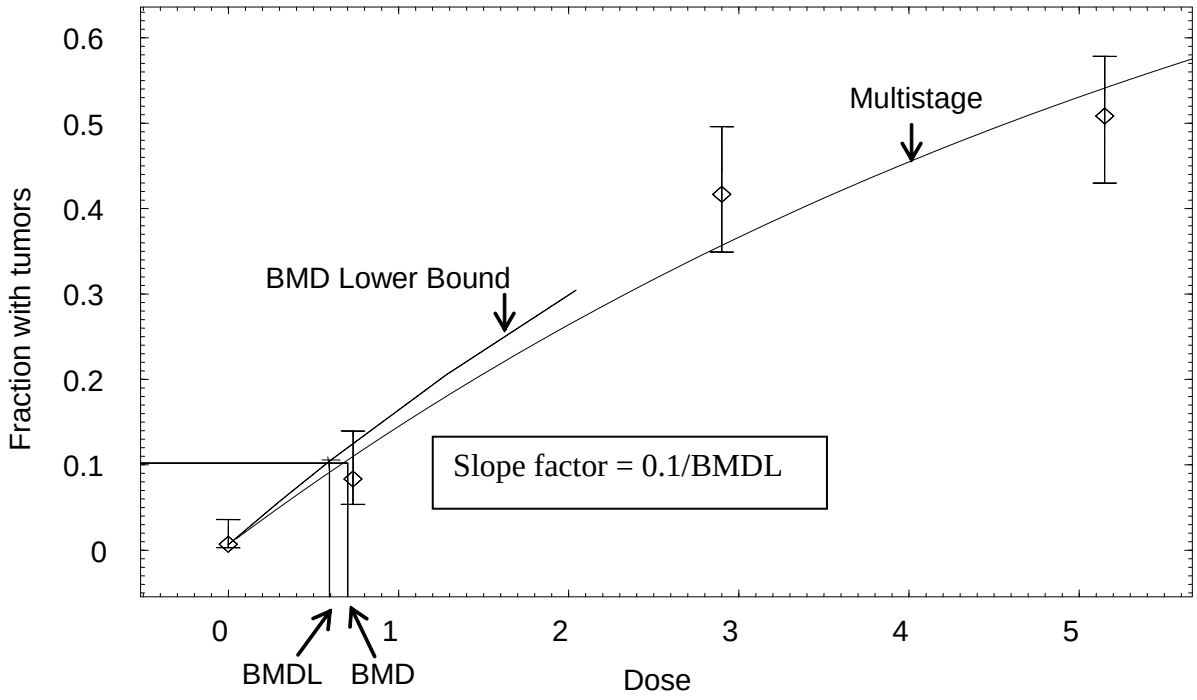
(which could provide tissue-specific dose metrics), the potency would ordinarily be based on the time-weighted average exposure during the exposure or dosing period. The model used to fit the data can be chosen from a range of available alternative quantal models, depending on which provides the best fit to the data in the observable range. In practice, the multistage polynomial fit developed for the linearized multistage model works well for most tumor data sets. Here it is being used merely as a mathematical curve-fitting tool, where the model well fits the data set, without making assumptions about its validity as a biological model of carcinogenesis.

Suitable polynomial fits and estimates of the benchmark may be obtained using U.S. EPA's BMDS software. The benchmark often used is the 95% lower confidence bound on the dose producing 10% tumor incidence. However, if data are available which include a significant dose-response at less than 10% tumor incidence, then that lower benchmark should be used (e.g. LED_{05} or LED_{01}). Other software such as Tox_Risk, which was used for the linearized multistage model, has been used successfully, although the earlier GLOBAL program and its relatives are less suitable as curve-fitting tools for benchmark dose analysis.

Since it is usually assumed in cancer risk estimation that the low-dose response relationship is linear, risk estimates and a potency value (slope factor) may be obtained by linear extrapolation from an appropriate benchmark dose. The potency is the slope of that line ($0.1/LED_{10}$). The low dose linearity assumption is a general default for any carcinogen, and it is unlikely to be altered for genotoxic carcinogens.

A calculation using the benchmark dose approach (using a polynomial model with exponents restricted to zero or positive values), and linear extrapolation from the LED_{10} to obtain a potency estimate is shown in Figure 1 (the figure was generated by the U.S. EPA's BMDS program). This is based on tumor incidence data from an actual experiment with vinyl bromide in rats (Benya *et al*., 1982), with metabolized dose calculated by means of a pharmacokinetic model (Salmon *et al.*, 1992). The value of q_1* obtained by this calculation would then be corrected for the duration of the experiment if it had lasted for less than the standard rat lifetime, and for bodyweight and route-specific pharmacokinetic factors as described below. This is in addition to the correction for exposure duration that would be necessary if the study had not lasted for 105 weeks, and the interspecies correction, both of which are described below.

Figure 1. Benchmark dose calculation for tumor data in rats exposed to vinyl bromide



From Salmon *et al*. (1992), based on data from Benya *et al*. (1982)

Linearized Multistage Model

Quantal analyses

A "multistage" polynomial (U.S. EPA, 1986, 2005a; Anderson *et al.*, 1983), based on the mechanistic insights of the original Armitage and Doll model of cancer induction and progression, has been used extensively by U.S. EPA, OEHHA and other risk assessors to model the dose response for lifetime risk of cancer. It usually is used for analysis of animal bioassay data, although related approaches have occasionally been used with epidemiological data. In mathematical terms, the probability of dying with a tumor (P) induced by an average daily dose (d) is:

$$P(d) = 1 - \exp[-(q_0 + q_1 d + q_2 d^2 + ... + q_j d^j)]$$

with constraints

$$q_i \geq 0 \text{ for all i.}$$

Equivalently, $A(d) = 1 - \exp[-(q_1 d + q_2 d^2 + \cdots + q_k d^k)]$,

where $A(d) = \dfrac{P(d) - P(0)}{1 - P(0)}$ is the extra risk over background at dose d.

The q_i model parameters are constants that can be estimated by fitting the polynomial to the data from the bioassay, *i.e.* the number of tumor bearing animals (as a fraction of the total at risk) at each dose level, including the controls. The fit is optimized using likelihood methodology, assuming that the deviations from expected values follow a χ^2 distribution, with the number of degrees of freedom (and hence the maximum number of terms allowed in the polynomial) determined by the number of points in the data set. All the coefficients of the terms are constrained to be zero or positive, so the curve is required to be straight or upward curving, with no maxima, minima or other points of inflection. In addition to the maximum likelihood estimates of the parameters, the upper 95% confidence ~~bounds~~ limits on these parameters are calculated.

The parameter q_0 represents the background lifetime incidence of the tumor. The 95% upper confidence limit of the slope factor q_1~~, or more usually its upper bound~~ (q_1^*), is termed the cancer potency. The maximum likelihood estimate (MLE) of q_1 is not usually regarded as a reliable estimate for several reasons. First, it fails to reflect the uncertainty and variability in the data which affect the value of the estimate. This is an important issue for protection of public health, which is emphasized by current regulatory guidelines. Secondly, due to the variable order of the polynomial and the effect of some terms being zero as opposed to having a small but finite value, the MLE is unstable, and may show large and unpredictable changes in response to very slight changes in the input data. It may also erratically have a zero value, even when the data imply a significant positive dose-response relationship. The MLE is not a measure of central tendency for this estimate distribution (which is always asymmetrical and often multi-peaked). For small doses, the cancer potency is the ratio of excess lifetime cancer risk to the average daily dose received. Details of the estimation procedure are given in Crump (1981) and Crump, Guess, and Deal (1977). Several software programs are available to perform the necessary calculations, including U.S. EPA's BMDS, Tox_Risk and the earlier GLOBAL programs by Crump and colleagues, and Mstage, written by Crouch (1987).

When dose is expressed in units of mg/kg-d, the potency is given in units of $(\text{mg/kg-d})^{-1}$. Likewise, when the model input is in units of concentration (µg/m^3, ppb), the potency is given in units of $(\mu\text{g/m}^3)^{-1}$ pr $(\text{ppb})^{-1}$. As in the case of potencies obtained by the benchmark approach, the experiment-based potency value needs to be corrected for less-than lifetime or intermittent exposure, and extrapolated from the test species to humans. Risk calculations using potency value estimated using the linearized multistage model predict the cancer risk at low doses only, with the higher order terms of the fitted polynomial being ignored since their contribution is negligible at low doses.

Selection of Site and Tumor Type

In developing cancer potency estimates from animal data, standard practice has been to use dose-response data for the most sensitive tumor site as the basis of the estimate (CDHS, 1985). Where tumors of more than one histological type (e.g. adenomas and carcinomas) are observed at a single site, the combined incidence, i.e. proportion of animals affected with at least one tumor of

any of the relevant types, is used for dose-response assessment. The same rules for combining tumor types are generally applied in determining statistical significance for carcinogen identification (IARC, 2006). Tumor types considered to represent different stages of progression following initiation of a common original normal cell type are combined, whereas tumor types having different cellular origins are generally not combined by this procedure. Other considerations that may influence choice of site for dose response estimation include the quality of the data (especially, the statistical impact of a high or variable rate of a particular tumor type and site in control animals), and biological relevance to humans. However, it is an important principle that, just as for the hazard identification phase, concordance of site or tumor type between animal models and human health effects may occur but is not assumed or required.

Carcinogens inducing tumors at multiple sites

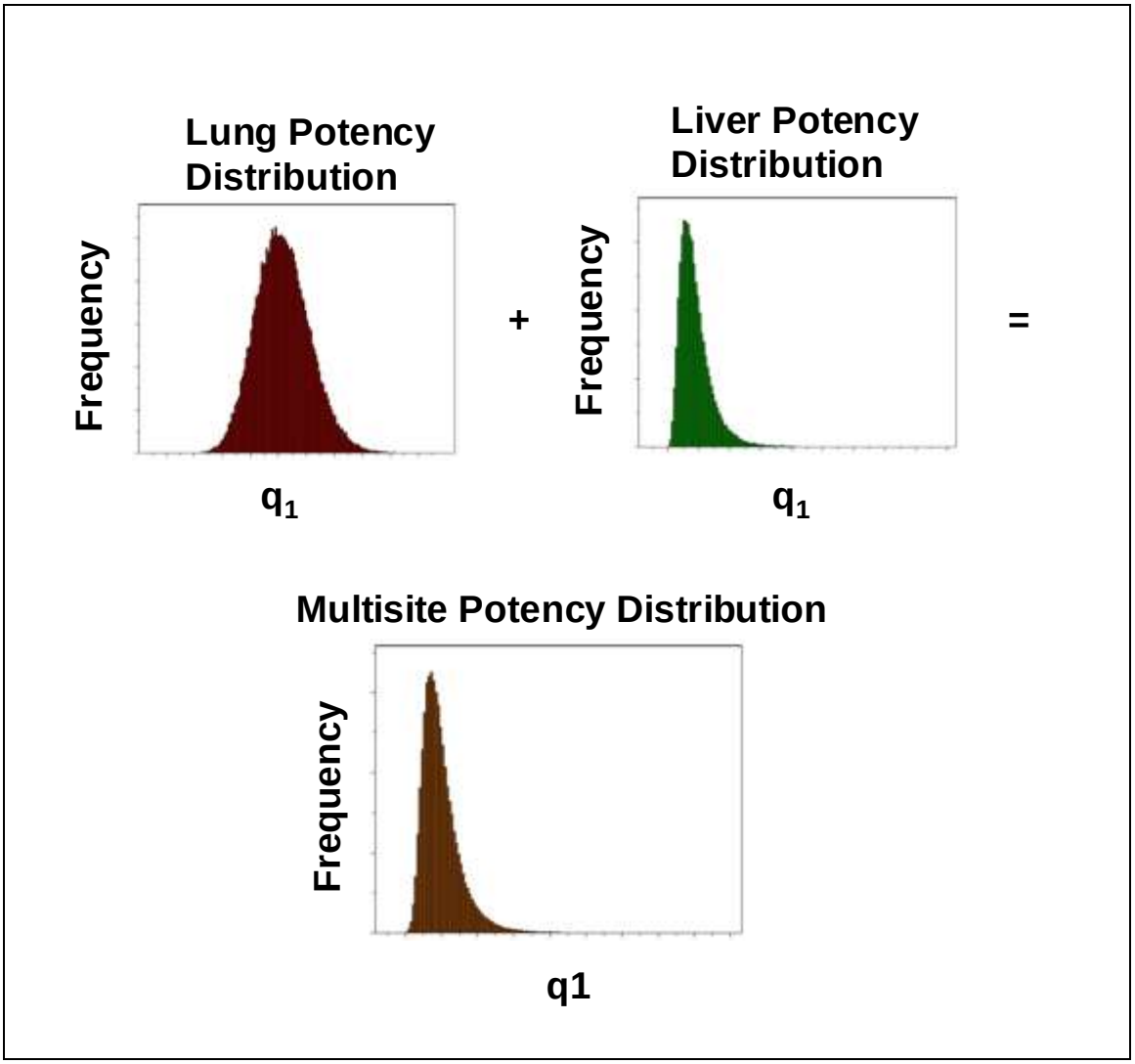
For most carcinogens, the selection of the most sensitive site in the animal studies is recognized as providing a risk estimate which is appropriate to protect human health. However, for chemicals that induce tumors at multiple sites, the single-site approach may underestimate the true carcinogenic potential. For example, the overall assessment of cancer risk from cigarette smoking (U.S. DHHS, 1982) or ionizing radiation (NRC, 1990) is not based on risk at one site, such as lung cancer. Instead, total cancer risk is estimated from all the sites at which agent-induced tumors are observed (lung, bladder, leukemia, etc), combined.

For carcinogens that induce tumors at multiple sites and/or with different cell types in a particular species and sex, OEHHA derives the animal cancer potency by probabilistically summing the potencies from the different sites and/or cell types. Using the combined potency distribution takes into account the multisite tumorigenicity and provides a basis for estimating the cumulative risk of all treatment-related tumors.

The linear term (q_1) of either the multistage model or the multistage-in-dose, Weibull-in-time model is first estimated based on the dose-response data for each of the treatment-related tumor sites. Statistical distributions, rather than point estimates, are generated at each site by tracing the profile likelihood of the linear term (q_1) (Zeise et al., 1991). The distributions of q_1 for each of the treatment-related sites are then statistically summed using a Monte Carlo approach and assuming independence (Figure 2). The sum is created by adding the linear term for each tumor site, according to its distribution, through random sampling. The upper 95 percent confidence limit on the summed distribution is taken as the multisite animal cancer potency estimate (McDonald et al., 2003, McDonald and Komulainen, 2005).

OEHHA has applied this approach in several recent dose-response analyses, including that for naphthalene presented in Appendix B of this document.

Figure 2. Addition of potency distributions for multi-site cancer potency derivations.



Early-Lifestage Cancer Potency Adjustments

In recent years, there have been growing concerns regarding the exposure of children to environmental chemicals, including the possibility that they may be more susceptible than adults to injury caused by those chemicals. The California Legislature passed the Children's Environmental Health Protection Act (Senate Bill 25, Escutia; Chapter 731, Statutes of 1999; "SB 25") to help address these concerns. Under SB25, OEHHA is mandated to consider infants and children specifically, where data permit, in evaluating the health effects of Toxic Air Contaminants (TACs).

The development of cancer is one of the adverse health effects that may occur in children as a result of exposure to environmental chemicals. The document "Prioritization of Toxic Air Contaminants under the Children's Environmental Health Protection Act" (OEHHA, 2001a) noted that risks of cancer from exposures to carcinogens occurring from conception through puberty can be different than those from exposures occurring in adulthood. Exposure to a carcinogen early in life may result in a greater lifetime risk of cancer for several reasons:

1. Cancer is a multistage process and the occurrence of the first stages in childhood increases the chance that the entire process will be completed, and a cancer produced, within an individual's lifetime.
2. Tissues undergoing rapid growth and development may be especially vulnerable to carcinogenic agents. During periods of increased cell proliferation there is rapid turnover of DNA, and more opportunity for misrepair of damage (e.g., DNA breaks, crosslinks, adducts) or alterations to result in permanent changes to the DNA (e.g., mutations, altered DNA methylation) that may ultimately lead to cancer.
3. During early development, a greater proportion of the body's cells are relatively undifferentiated stem cells, and as such represent a large target population of somatic cells capable of passing along permanent changes to the DNA during future cell divisions.
4. There may be greater sensitivity to hormonal carcinogens early in life since the development of many organ systems is under hormonal control (e.g., male and female reproductive systems, thyroid control of CNS development).
5. Other factors that may play a role in increased cancer risk from exposures during critical developmental periods include differences in immunological activity, intestinal absorption, biliary and kidney excretion, blood and fat distribution, and expression of enzyme systems that activate or detoxify carcinogens.

Data in humans and animals for a variety of carcinogens suggest that exposures to such carcinogens early in life may result in a greater lifetime risk of cancer compared to exposures later in life. Examples of this effect in humans are carcinogenicity due to ionizing radiation, diethylstilbestrol (DES), chemotherapeutic agents, and tobacco smoke.
Ionizing radiation exposure carries an increased risk of cancer when exposures occur early in life compared to adult exposures for a number of tumor types. Children exposed to ionizing radiation (diagnostic X-rays) *in utero* demonstrate a larger excess of leukemia cases than

children exposed to ionizing radiation postnatally (NRC, 1990). Exposure to radioisotopes (^{131}I, ^{137}Cs, ^{134}Cs, ^{90}Sr) as a consequence of the 1986 Chernobyl nuclear accident resulted in an elevated thyroid cancer incidence in children but not adults (Moysich, 2002). Treatment of children for Hodgkins lymphoma with both chemotherapeutic agents and irradiation has been shown to increase the risk of secondary tumors (Swerdlow et al., 2000; Franklin et al., 2006). Age at irradiation in Hodgkin's disease patients treated with radiotherapy strongly influenced the risk of developing breast cancer. The relative risk (RR) of developing breast cancer was 136 for women treated before 15 years of age, 19 for women 15-24 years of age, and 7 for those 24-29 years of age. In women above 30 years of age, the risk was not increased (Hancock *et al*., 1993).

DES was administered to pregnant women in the 1940s-1960s for the purpose of preventing pregnancy loss. In 1970, Herbst and Scully described 7 cases of vaginal adenocarcinoma (6 cases of the clear-cell type) in women aged 15-22 years. This type of cancer is extremely rare in that age range. A follow-up epidemiological study included an additional case, and noted the fact that the mothers of 7 of the 8 patients had been treated with DES during their pregnancy (Herbst *et al*., 1971). Reports by other investigators confirmed the association between maternal use of DES during pregnancy and the development of vaginal adenocarcinoma in their female offspring (Preston-Martin, 1989). It was observed that *in utero* DES exposure resulted in female genital tract morphological changes which correlated with both dose and duration of exposure, and those changes were not related to the maternal conditions which were the reason for the DES administration. Additionally, the risk of occurrence of those morphological changes declined with increasing gestational age at first exposure (O'Brien *et al*., 1979; Preston-Martin, 1989). In contrast, vaginal adenocarcinoma incidence did not increase in the exposed mothers themselves, indicating an increased early-life susceptibility to the carcinogenic effects of DES.

There is evidence in the epidemiological literature indicating that exposure to tobacco smoke during puberty may increase risk of breast cancer later in life, particularly among women who are NAT2 slow deacetylators (Marcus *et al*., 2000; Morabia *et al*., 2000; Lash and Aschengrau, 1999). Wiencke et al. (1999) report that early age at initiation of smoking is associated with a higher level of DNA adducts in lung tissue of former-smokers with lung cancer.

It has also been observed by Smith *et al*. (2006) that human *in utero* or early childhood exposure to arsenic in drinking water results in significantly increased lung cancer incidences during adult life.

Data from animal studies provide additional examples of increased sensitivity to early life (typically postnatal and juvenile) exposures. These effects span a range of target tissues, including the liver (vinyl chloride, safrole), brain (methylnitrosourea), reproductive tract (DES, tamoxifen), and lung (urethane) (OEHHA, 2001a).

In the following sections we summarize two efforts to evaluate quantitatively the effect of lifestage at exposure on carcinogenic response in experimental animal studies. The first section provides a description of OEHHA's analysis of data on the effect of age at exposure on carcinogenic potency. (Details of this analysis are in Appendix J.) The second section describes U.S. EPA's work in this area. (We also provide the published paper in Appendix I that presents the U.S. EPA analyses.) Both analyses used extant data available in the published literature. U.S. EPA used their analysis to modify the procedures they have used to estimate cancer risk by

weighting risk by specific factors for childhood exposures. The weighting factors are a policy choice supported by U.S. EPA's data analysis. The results of OEHHA's analysis, summarized below and described in detail in Appendix J, support the decision to modify policy to weight risk when exposure occurs during childhood. Thus, OEHHA is also proposing to weight risk when exposure occurs in childhood.

OEHHA Analysis of the Effect of Age at Exposure on Cancer Potency

The analysis of animal cancer studies which include early life exposure by the Reproductive and Cancer Hazard Assessment Branch (RCHAB) of OEHHA also supports the application of lifestage-specific cancer potency factor adjustments. This analysis is provided in detail as Appendix J of this document.

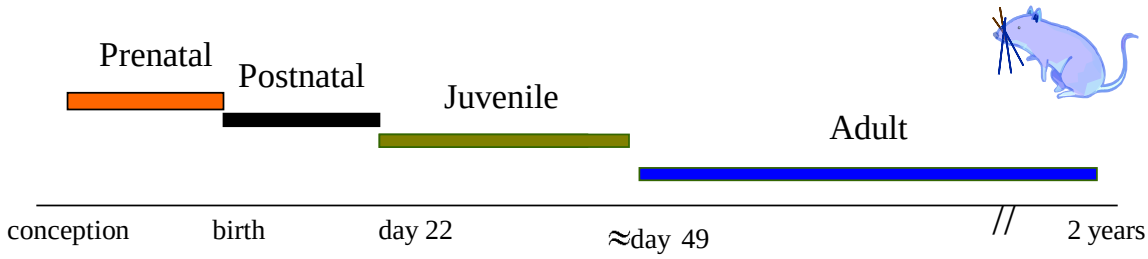
Early-in-life susceptibility to carcinogens has long been recognized by the scientific community and clinicians as a public health concern. Numerous scientific publications and symposia have addressed this issue over the years and the scientific literature contains a number of human clinical findings and epidemiological studies of early life cancer susceptibility. While there are many indications of increased human cancer susceptibility in early life, the magnitude of the impact has been difficult to gauge. Until recently risk assessment procedures have not in general addressed the issue. As described in the next section, in 2005 the U.S. EPA adopted an approach to weight carcinogens by age at exposure if they act via a mutagenic mode of action. The California legislature in 2000 directed OEHHA to assess methodologies used in addressing early-in-life risk, compile animal data to evaluate those methods, and develop methods to adequately address carcinogenic exposures to the fetus, infants, and children (Children's Environmental Health Initiative [AB 2872, Shelly]; California Health and Safety Code [HSC] section 901 [a] through [e]).

OEHHA assessed cancer risk assessment methodologies, and found that the existing risk assessment approaches did not adequately address the possibility that risk from early-in-life and adult exposures may differ. OEHHA further concluded that there was a need to address early-in-life cancer risk, and undertook studies to develop methods for doing so. Age-related cancer susceptibility data were identified from published animal cancer bioassays in which these issues were addressed. Two types of studies with early-in-life exposures were compiled. The first type are "multi-lifestage exposure studies." These studies have at least two groups exposed during different lifestages: One dose group is exposed to a chemical only during one of the following lifestages (Figure 3):

- prenatal (from conception to birth),
- postnatal (from birth to weaning),
- juvenile (from weaning to sexual maturity).

The second dose group is exposed for some period of time at an older age, preferably during the adult lifestage, that is, after sexual maturity. This group served as the reference group. In some cases where there was no adult exposure group, animals exposed as juveniles served as the reference group. Multi-lifestage exposure studies are available for many chemicals, enabling the exploration of patterns in early-life susceptibility across chemicals.

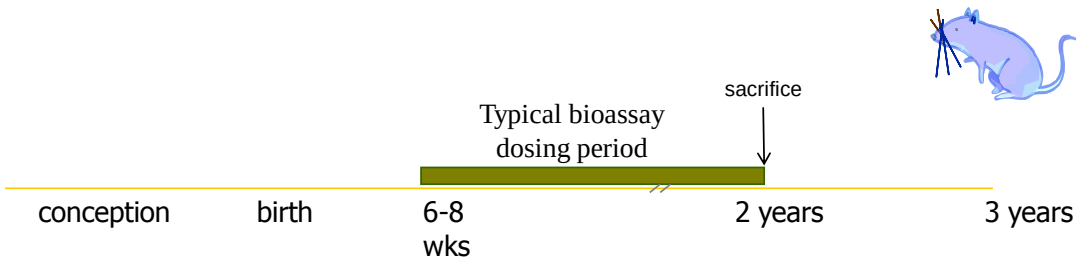
Figure 3. Definition of Rodent Lifestage Adopted in the OEHHA Analyses



OEHHA also conducted "chemical-specific case studies" of early-life sensitivity for two carcinogens, ethyl-N-nitrosoamine (DEN) and N-ethyl-N-nitrosourea (ENU) that combine data from a number of studies. These "chemical-specific case studies" were conducted to explore the feasibility of analyzing chemical-specific data on age susceptibility from single-lifestage exposure experiments. For these chemicals, OEHHA compiled from the literature a second type of study, "single-lifestage exposure experiments." In these experiments dose groups were exposed only during a particular lifestage and, unlike the "multi-lifestage exposure studies," there was no requirement that the same study also include groups exposed during a different lifestage. Thus, single-lifestage exposure experiments were identified as being either prenatal, postnatal, juvenile, or adult exposure studies. For each of the two chemicals, there were many prenatal studies conducted that were compiled, analyzed, and grouped together. Postnatal studies from different publications were similarly compiled, analyzed and grouped together, as were juvenile studies. Adult studies were not available for either DEN or ENU, thus for both chemicals juvenile exposure studies served as the referent for prenatal studies, and for postnatal studies.

Typical cancer bioassays such as those conducted in rats and mice by NTP involve exposing animals starting at six to eight weeks of age, which is the time at which these animals reach sexual maturity (late teenagers relative to humans). The experiments are run for two years, ending when the animal is in late middle age. Thus, early and very late life exposures are not included in the typical rodent bioassay (see Figure 4). If the NTP bioassay is used as a basis for estimating cancer potency, the potency and resulting risk estimates may be too low. Thus OEHHA focused on finding studies that evaluated early in life exposures.

Figure 4. Dosing Period for Typical Rodent Bioassays.



Since bioassays examining the effect of age at exposure on carcinogenesis were conducted by various investigators for different purposes, there is a great deal of variation across studies in terms of dose selection, duration of exposure, number of animals, and length of study duration. To be included in the compilation of studies with early life exposure, a study or an experimental group in a study had to meet minimum requirements.

The criteria for study inclusion are as follows:

- Treated groups were exposed to a single chemical carcinogen or a single carcinogenic chemical mixture.
- Study groups were not compromised by severe treatment-related non-cancer toxicity.
- Overall the duration of exposure period plus observation period exceeded 40 weeks, unless animals died of tumor.
- For included dose groups, the study must report age at dosing, age at sacrifice, and site-specific tumor incidence.
- Each lifestage exposure treatment group has an appropriate concurrent control group, or, for rare tumors only, an appropriate historical control.
- The studies were on mammals.
- Each treatment and control group consists of at least ten animals, unless the conduct and design of the study was well done in all other aspects (e.g., the length of the study was sufficiently long to observe treatment-related tumors) and tumor incidence was high in treated groups and very low in controls.
- Site specific tumor data were reported, not only total number of tumor bearing animals.
- The test compound was administered in the diet, water, via gavage, or by intraperitoneal (i.p.), intravenous (i.v.), or subcutaneous (s.c.) injection. For dermal and subcutaneous injection studies, distal tumor findings are utilized (for dermal, other than skin tumors; for injection, non-injection site tumors).

- While studies designed to histopathologically examine tumors at multiple sites were preferred, studies that examined only a select set of organ/tissue sites were not excluded if the sites examined were known with confidence to be the only target tissues for the chemical and lifestage in question in that particular strain of animal.

Different approaches were taken to identify animal cancer studies that included groups of animals exposed during early life stages. First, MEDLINE and TOXLINE (National Library of Medicine) databases were searched using combinations of various key words for cancer (e.g., tumor(s), neoplasm(s), cancer, neoplasia, cancerous, neoplasms-chemically induced) and for early-life exposure (e.g., age, age-at-exposure, development (al), prenatal, *in utero*, gestation (al), postnatal, neonatal, juvenile, weaning, weanling, adolescent, adolescence, young). Second, the extensive compilation of bioassays in the *Survey of Compounds which have been Tested for Carcinogenic Activity*, was reviewed. This survey, formerly maintained by the National Cancer Institute as Public Health Service Publication Number 149, or PHS 149, is now available from a private source electronically as CancerChem, 2000. Third, from bibliographies from relevant published papers additional studies were identified. Finally the Single Dose Database developed by Calabrese and Blain (1999) was obtained and utilized to identify additional publications that appeared to contain potentially useful data. All of these publications were evaluated to determine if the study dosed separate groups of animals early in life and at or near adulthood. A total of 145 publications, providing data on 84 chemicals, were identified as meeting the criteria for study inclusion. A subset of these met the criteria for inclusion in the multi-lifestage exposure analysis.

Finally, for the OEHHA multi-lifestage analyses, we define "experiment" as a study component consisting of a control group as well as a treated group(s) exposed during the same lifestage (i.e., prenatal, postnatal, juvenile or adult), and using the same experimental protocol (e.g., route of exposure, strain, species, laboratory). Thus, by our definition one publication may report multiple experiments.

In the OEHHA analysis, data from studies on 23 unique carcinogens, 20 of which are considered to act via primarily genotoxic modes of action, were analyzed. Of these 20 carcinogens, 15 are thought to require metabolic activation to the ultimate carcinogenic species (Table 1~~Table 1~~~~Table 1~~). Fourteen carcinogens, including one thought to act via primarily nongenotoxic modes of action, were included in the prenatal multi-lifestage exposure studies. Eighteen carcinogens, including two thought to act via primarily nongenotoxic modes of action, were included in the postnatal multi-lifestage exposure studies. Five carcinogens were included in the juvenile multi-lifestage exposure studies. The case study chemicals, DEN and ENU, are both genotoxic. ENU is a direct acting alkylating agent, while DEN requires metabolic activation.

Table 1. Carcinogens for which studies with multi-lifestage exposures in animal studies are available

Genotoxic carcinogens requiring metabolic activation
Benzidine Benzo[a]pyrene Dibutylnitrosamine Diethylnitrosamine (DEN) 7,12-Dimethylbenz[a]anthracene (DMBA) Dimethylnitrosamine (DMN) Di-n-propylnitrosamine (DPN) 1 -Ethyl-nitrosobiuret 2-Hydroxypropylnitrosamine 3-Hydroxyxanthine 3-Methylcholanthrene (3-MC) 4-(Methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK) Safrole Urethane Vinyl chloride
Genotoxic carcinogens not requiring metabolic activation
Butylnitrosourea 1,2-Dimethylhydrazine Ethylnitrosourea (ENU) Methylnitrosourea (MNU) ß-Propiolactone
Nongenotoxic carcinogens
1,1-Bis(p-chlorophenol)-2,2,2-trichloroethane (DDT) Diethylstilbestrol (DES) 2,3,7,8-Tetrachlorodibenzodioxin (TCDD)

Cancer Potency Estimation

Statistical methods were developed and used to analyze the data and derive measures of early-life susceptibility. These are described in detail in Appendix J. In brief, a cancer potency (the slope of the dose response curve) was developed for each of the experiments selected using the linearized multistage model. This model was chosen because of widespread use in risk assessment, and its flexibility in being able to fit many different data sets needed to evaluate the effect of lifestage-at-exposure on cancer potency. The dose metric used for the potency analyses is cumulative dose normalized to body weight. The cancer potency is thus expressed as the increase in tumor probability with increasing cumulative dose in units of mg/kg body weight.

To take into account uncertainty in potency estimation, cancer potencies are depicted by a statistical distribution, rather than by a single, fixed value, using methods described in Appendix J. While these methods have typically been used to obtain and report the 95th percentile of the cancer slope parameter for cancer risk assessment purposes, here OEHHA utilized the full distribution of the cancer slope parameter to derive measures of early-life susceptibility to carcinogens. This was done to systematically take into account uncertainty in the analysis.

For experiments where treatment related tumors were observed at multiple sites or at the same site but arising from different cell types, slopes from these sites were statistically combined by summing across the potency distributions (assuming independence across the sites that were observed) to create an overall multisite cancer potency. It is not uncommon that a carcinogen causes more than one type of cancer or causes tumors at different sites depending on lifestage at exposure. For example, in humans tobacco smoke causes cancers of the lung, bladder, and certain other organs. This multi-site carcinogenicity is frequently observed in animal experiments as well. In order to account for this, all treatment-related tumors that were observed in a given lifestage were taken into account in estimating cancer potency from that particular experiment.

Addressing Early-Age Sensitivity in Estimating Cancer Risk: Age Sensitivity Factors

Inherent Sensitivity of Lifestages – Lifestage Potency Ratios

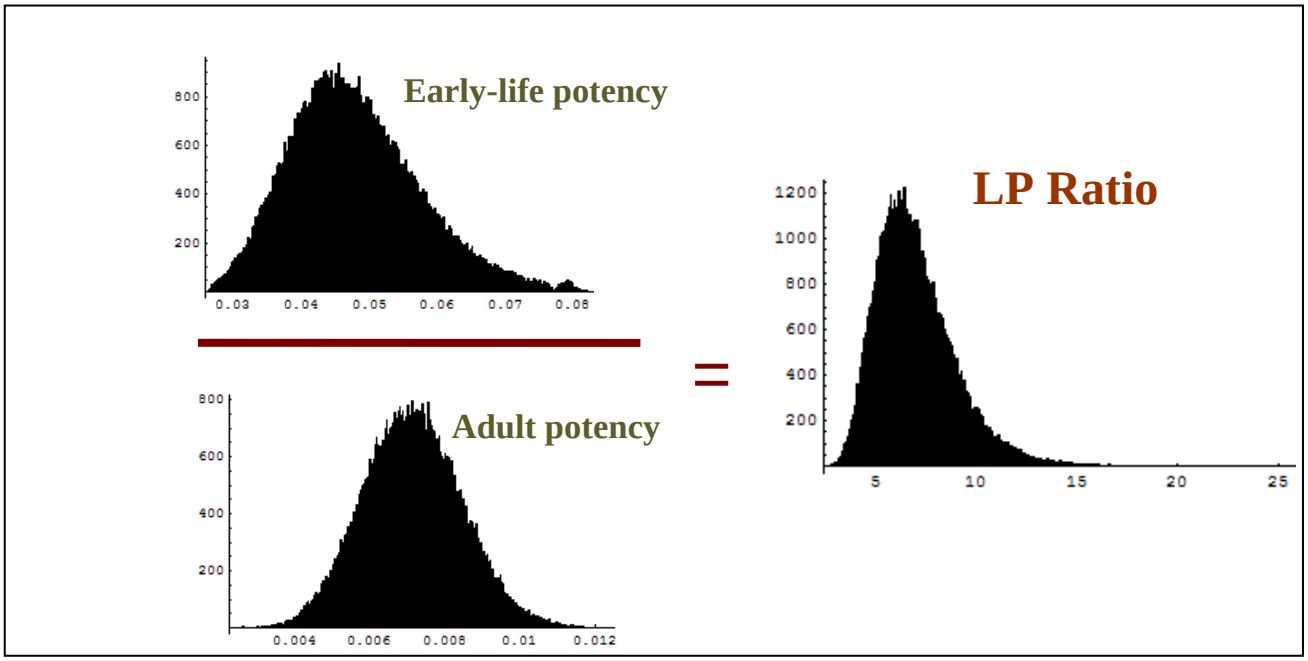
For this analysis, OEHHA calculates the ratio of cancer potency derived from an early lifestage exposure experiment(s) to that derived from an experiment(s) conducted in adult animals. OEHHA used the potency distributions for the individual lifestage exposures, rather than a point estimate, to derive the ratios. The lifestage cancer potency ratio is then described as a distribution and one can select specific percentiles from the distribution to better understand and bound the uncertainty (Figure 5). Of particular importance is the location of the ratio distribution in relation to the reference value of 1.0, which would mean no difference in risk from exposures at early versus adult lifestages. A lifestage cancer potency ratio distribution that primarily lies above the value of 1.0 indicates early life exposures to a carcinogen result in a stronger tumor response relative to adult exposure. Conversely, a lifestage cancer potency ratio distribution that mainly lies below the value of 1.0 indicates early life exposure to a carcinogen results in a weaker tumor response relative to adult exposure.

A lifestage potency (LP) ratio distribution was derived for each multi-lifestage study, resulting in 22 prenatal ratio distributions representing 14 unique carcinogens, 55 postnatal LP ratio distributions representing 18 unique carcinogens, and seven juvenile LP ratio distributions representing five unique carcinogens. The LP ratio distributions for a given early lifestage were combined into a single "LP ratio mixture distribution," in order to show the range of susceptibilities of that lifestage to the carcinogens studied.

LP ratio mixture distributions for a given early lifestage were developed by (1) obtaining a single LP ratio distribution for each chemical (when a chemical is represented by more than one study) and then (2) equally sampling across all chemicals. When a chemical is represented by more than one study, then the LP ratio distributions from all studies of that chemical were combined by equally sampling from each LP ratio distribution via Monte Carlo methods to obtain a single

LP ratio distribution for that chemical. (Appendix J describes this in more detail, as well as a sensitivity analysis that included two alternative sampling methods.) Once each chemical is represented by a single LP ratio distribution, then the LP ratio mixture distribution for each early lifestage (prenatal, postnatal, and juvenile) is obtained by equally sampling across all of the chemicals via Monte Carlo methods.

Figure 5. Lifestage Potency Ratio (LPR) distribution.

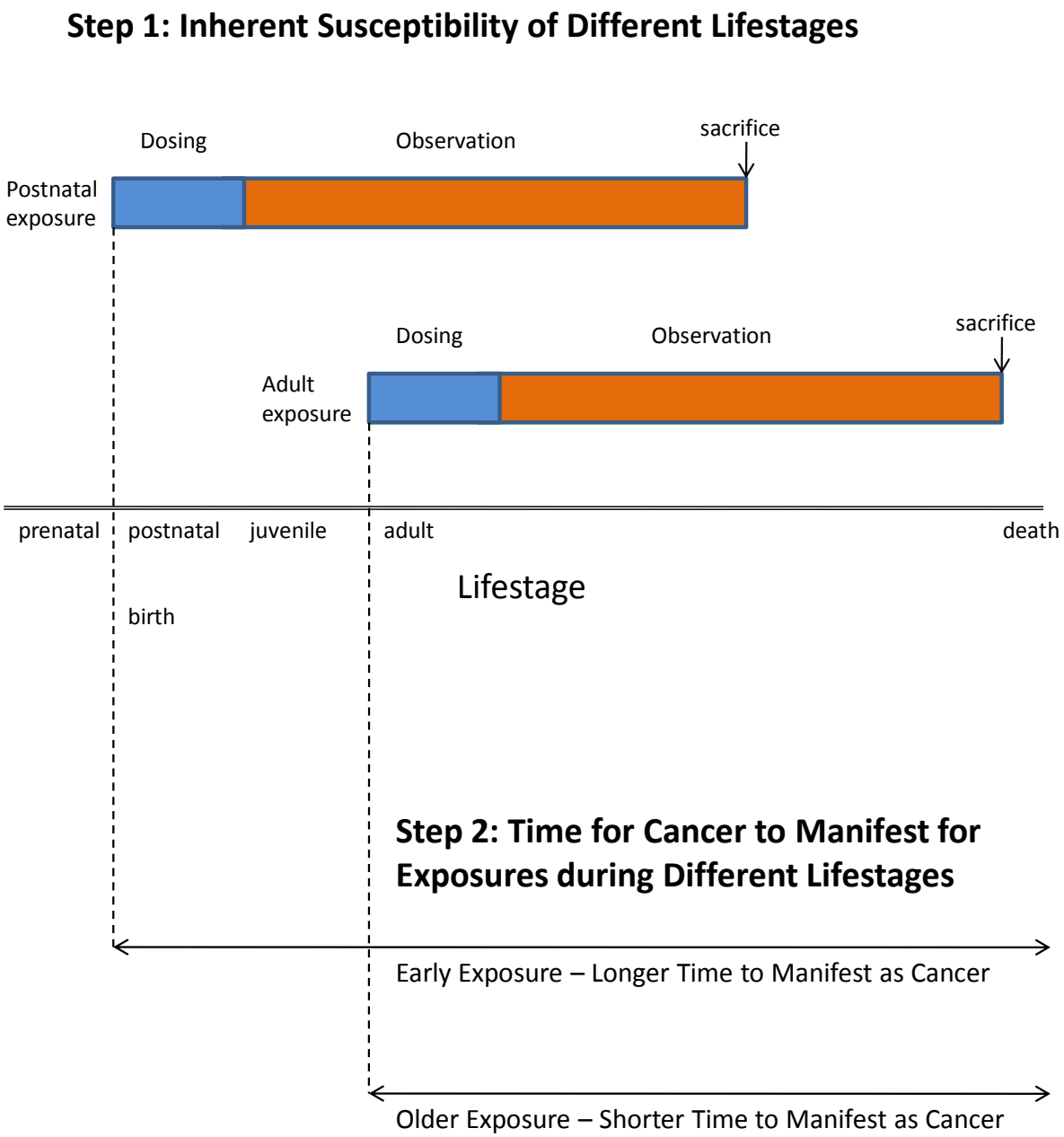


Effect of longer time period for cancer to manifest

The LP ratios described above characterize the inherent susceptibility of early lifestages to carcinogen exposure, by comparing potencies for individuals followed for similar periods of time and similarly exposed, but exposed during different lifestages. Age-specific adjustments to the cancer potency must also take into account the longer period of time that carcinogen exposure to the young has to manifest as cancer. Empirical data from studies of both humans and animals demonstrate that, for many cancers, cancer risk increases with age, or time since first exposure. While some cancers have been seen to increase by as much as the sixth power of age, a general approach taken for example by the National Toxicology Program in analyzing tumor incidences in its chronic bioassays is to assume that cancer risk increases by the third power of age. Thus, consistent with the approach used by the NTP in analyzing rodent cancer bioassay data, the longer period of time that exposed young have to develop tumors is addressed by taking into account time-of-dosing. This was done by multiplying the LP ratio by a time-of-dosing factor, to yield an age sensitivity factor (ASF). Specifically, the prenatal LP ratio is multiplied by a factor of 3.0, the postnatal LP ratio is multiplied by a factor of 2.9, and the juvenile LP ratio is multiplied by 2.7. Thus, ASFs were developed for each experiment, by first calculating the LP ratio to address inherent susceptibility of early lifestages relative to adults, and then accounting for the effect of years available to manifest a tumor following carcinogen exposure. (see Figure

6). Note that we are not using the term "sensitivity" in the immunologic sense (e.g., sensitization), but rather are using the term more generically.

Figure 6. Issues addressed by the Age-Sensitivity Factor (ASF)



Application of this approach for risk associated with lifetime exposures would include an ASF of less than 1 for exposures during the latter part of adult life for carcinogens that act on early stages. Therefore, the addition of this adjustment to the younger lifestages but not to the later part of the adult period could overestimate the risk of whole-life exposures. On the other hand, the 70 year "lifetime" used in estimating lifetime cancer risk does not reflect the longer lifespan of the U.S. population. Further, as noted above, the animal bioassays on which potency was based typically exclude pre-weaning dosing and sacrifice animals during their late middle-age. Use of cancer potencies calculated from standard assays can therefore understate lifetime cancer risk. The ASF calculated for carcinogens includes both inherent sensitivity of developing animals and the available time since exposure to develop cancer.

Results of OEHHA Analysis

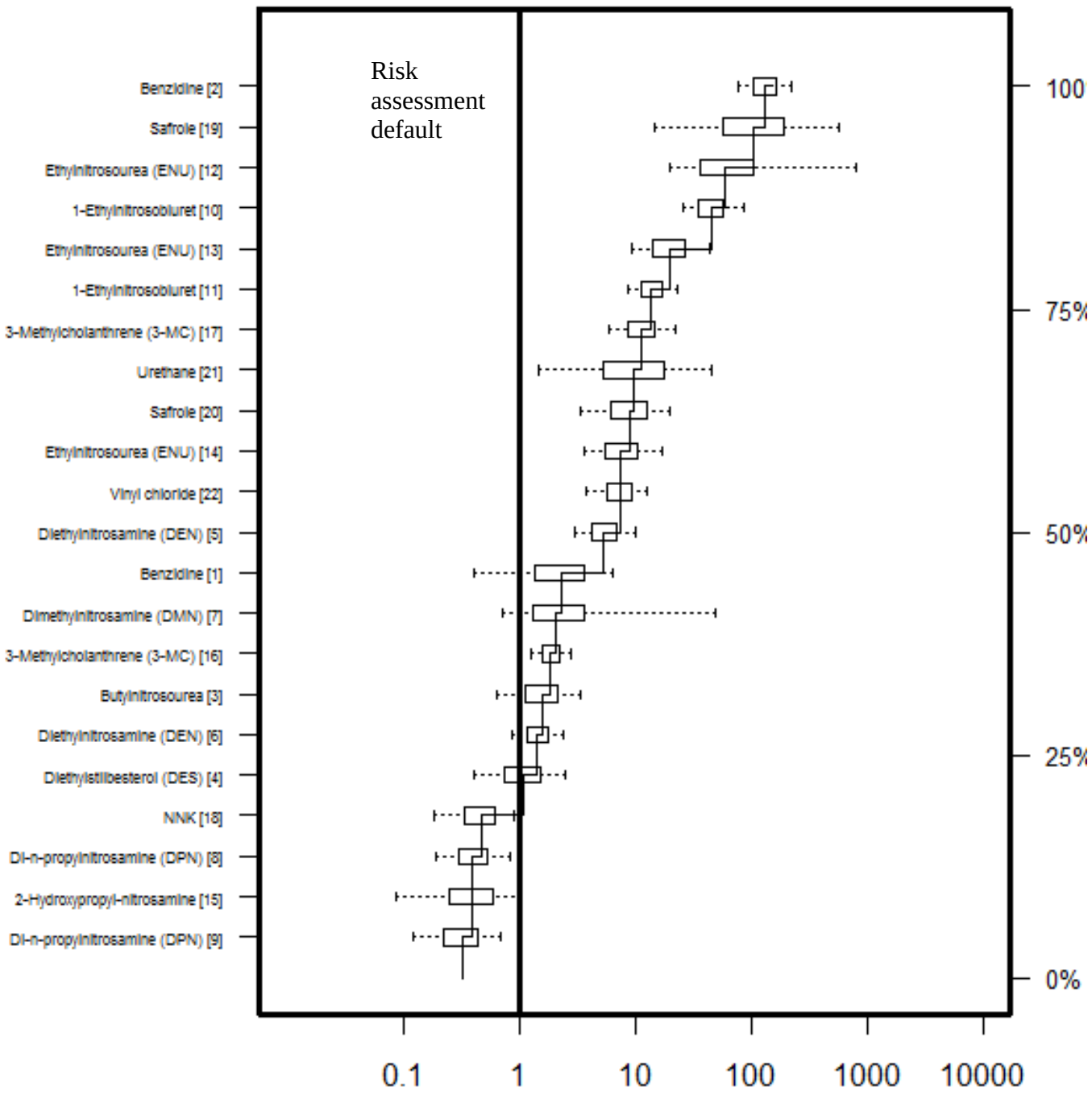
The analyses indicate that both the prenatal and postnatal lifestages can be, but are not always, much more susceptible to developing cancer than the adult lifestage. The analyses also indicated that the ASFs for these age windows vary by chemical, gender and species.

Regarding prenatal lifestage exposure, few cases were indicative of equal inherent adult and prenatal susceptibility, with an LP ratio of unity. The LP ratio distribution was roughly bimodal, with LP ratios for several studies significantly greater than unity and several others significantly less than unity. Figure 7 below shows the ASFs from each of the prenatal multi-lifestage exposure studies, displayed as a cumulative frequency profile. The median of the prenatal ASF mixture distribution was 2.9 (see also Table 6 in Appendix J),

The modality in the prenatal LP ratio distribution was reflected in the DEN and ENU case studies, with results for DEN suggesting inherently less sensitivity than older animals from exposure *in utero*, and for ENU just the opposite. For the DEN and ENU case studies, the referent groups were juvenile rather than adult animals, and the results may have underestimated the LP ratio and ASF, to the extent that some of the apparent sensitivity for DEN and ENU in the prenatal period carries through to the juvenile period. ENU is a direct acting carcinogen that does not require metabolic activation, whereas DEN can not be metabolized to any significant extent by fetal tissues until relatively late in gestation. This may explain the lower fetal susceptibility of DEN. However, prenatal metabolic status is not the sole determinant of prenatal susceptibility; e.g., benzidine and safrole require metabolic activation and exhibit greater susceptibility from prenatal exposure.

The median of the postnatal ASF mixture distribution was 13.5 (see Table 7 in Appendix J). Figure 8 below shows the ASFs from each of the postnatal multi-lifestage exposure studies, displayed as a cumulative frequency profile. Thus, for the chemicals studied, there was generally greater susceptibility to carcinogens during the early postnatal compared to the adult period, particularly when the ASF accounts for the longer period cancer has to manifest when exposure occurs early in life. The DEN and ENU case studies also exhibited substantial extra susceptibility during the postnatal period. To summarize, for most of the carcinogens studied here, animals are inherently more sensitive in the postnatal period, as indicated by Figure 8.

Figure 7. Prenatal ASF Cumulative Frequency Profile

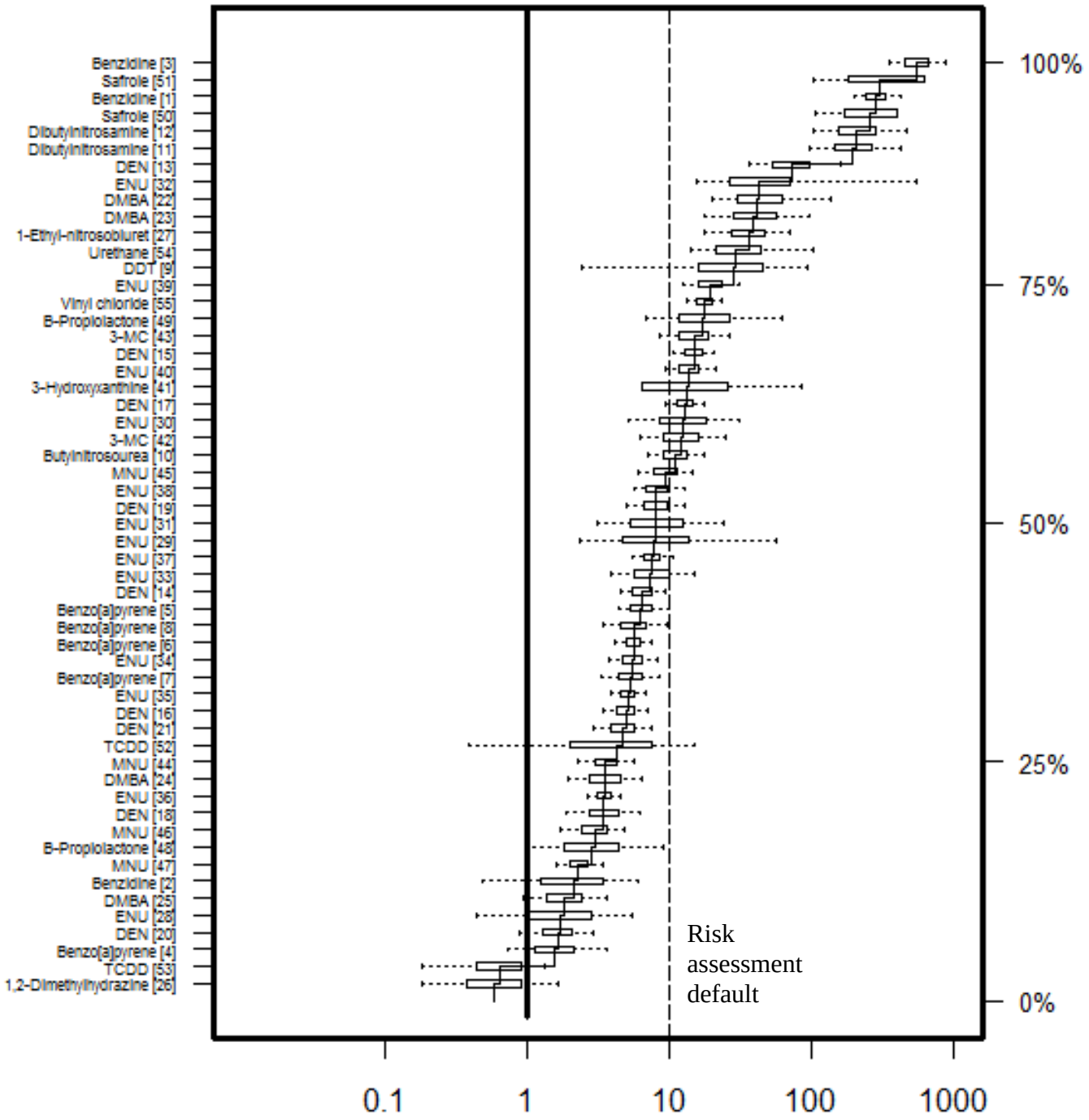


The median of the prenatal ASF mixture distribution was 2.9 (see also Table 6 in Appendix J).
References are given in the legend on the next page

Figure 7 Legend (References as in Appendix J)

1. Vesselinovitch *et al*. (1979a), mouse, B6C3F_1, F, day -9 to 21
2. Ibid, M, day -9 to 21
3. Zeller *et al*. (1978), rat, Sprague Dawley, M/F day -2
4. Turusov *et al.* (1992), mouse, CBA, F, day -2
5. Mohr et al. (1975), hamster, Syrian Golden, day -15 to -1
6. Mohr *et al*. (1995), hamster, Syrian Golden, F, day -3
7. Althoff *et al*. (1977), hamster, Syrian Golden, M/F, day -9 to -3
8. Ibid, day -9 to -3
9. Althoff and Grandjean (1979), hamster, Syrian Golden, F, day -9 to -3
10. Druckrey and Landschutz (1971), rat, BD IX, M/F, day -10
11. Ibid, day -3
12. Naito *et al*. (1981), rat, Wistar, day -9
13. Ibid, day -9
14. Tomatis *et al*. (1977), rat, BDVi, F, day -5
15. Althoff and Grandjean (1979), hamster, Syrian Golden, M/F, day -9 to -3
16. Tomatis *et al*. (1971), mouse, CF-1, F day -4 to -1
17. Turusov *et a*l. (1973), mouse, CF-1, F, day -2
18. Anderson *et al.* (1989), mouse, C3H & B6C3 F_1,M/F day -8 to -4
19. Vesselnovitch *et al.* (1979a), mouse, B6C3 F_1, M, day -9 to -3
20. Vesselnovitch *et al.* (1979b), mouse, B6C3 F_1, F day -9 to -3
21. Choudari Kommineni *et al*. (1970), rat, MRC, M/F, day -4
22. Maltoni *et al.* (1981), rat, Sprague Dawley, M/F day -13 to -7

Figure 8. Postnatal ASF Cumulative Frequency Profile



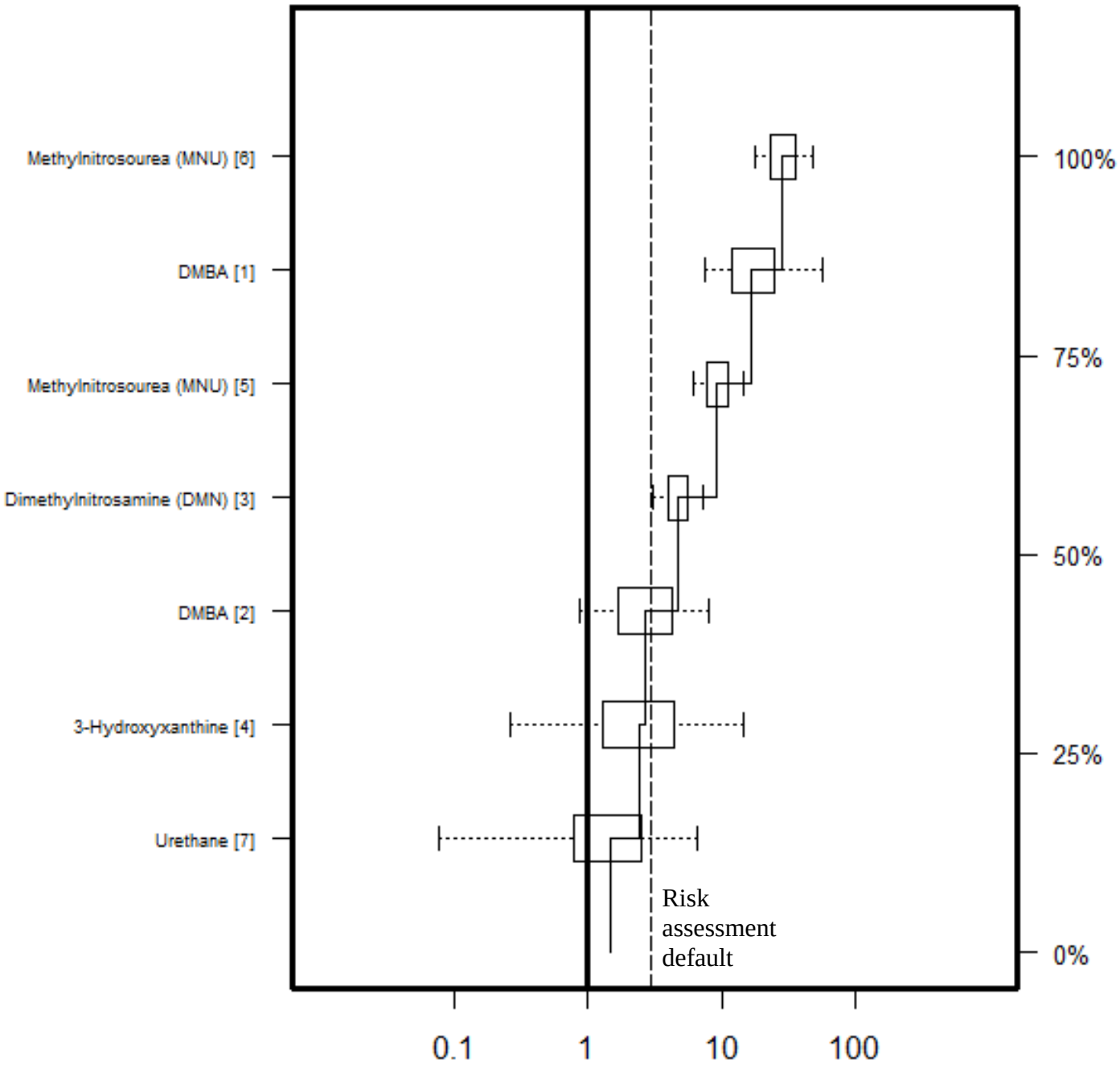
The median of the postnatal ASF mixture distribution is 13.5. The dotted line represents the default ASF for weighting risk for carcinogen exposures between birth and 2 years of age (see next section). References are given in the legend on the next page.

Figure 8~~Figure 8~~Figure 8 Legend (References as in Appendix J)

1 Vesselinovitch *et al.* (1975b), mouse, B6C3F$_1$, M, day 7-27
2 Vesselinovitch *et al.* (1979), mouse, B6C3F$_1$, F, day 1-21
3 Ibid, M, day 1-21
4 Truhaut *et al.* (1966), mouse, swiss, M/F, day 1
5 Vesselinovitch *et al.* (1975a), mouse, B6C3F$_1$, F, day 1
6 Ibid, M, day 1
7 Ibid, C3A F$_1$, F, day 1
8 Ibid, M, day 1
9 Vesselinovitch *et al.* (1979a), mouse, B6C3F$_1$, M, day 1-28
10 Zeller *et al.* (1978), rat, Sprague Dawley, M/F, day 2
11 Wood *et al.* (1970), mouse, IF x C57, F, day 1-15
12 Ibid, M, day 1-15
13 Rao and Vesselinovitch (1973), mouse, B6C3F$_1$, M, day 15
14 Vesselinovitch *et al.* (1984), mouse, B6C3F$_1$, F, day 1
15 Ibid, M, day 1
16 Ibid, F, day 15
17 Ibid, F, day 15
18 Ibid, C3A F$_1$, F, day 1
19 Ibid, M, day 1
20 Ibid, F, day 15
21 Ibid, M, day 15
22 Meranze *et al.* (1969), rat, Fels-Wistar, F, day 10
23 Ibid, M, day 10
24 Walters (1966), mouse, BALB/c, F, day 17
25 Ibid, M, day 17
26 Martin *et al.* (1974), rat, BDIX, M/F, day 10
27 Druckrey and Landschutz (1971), rat, BDIX, M/F, day 10
28 Naito *et al.* (1985), gerbil, mongolian, F, day 1
29 Ibid, M, day 1
30 Bosch (1977), rat, WAG, F, day 8
31 Ibid, M, day 8
32 Naito *et al.* (1981), rat, Wistar, F, day 7
33 Ibid, M, day 7
34 Vesselinovitch *et al.* (1974), mouse, B6C3F$_1$, F, day 1
35 Ibid, M, day 1
36 Ibid, F, day 15
37 Ibid, M, day 15
38 Ibid, C3A F$_1$, F, day 1
39 Ibid, M, day 1
40 Ibid, M, day 15
41 Anderson *et al.* (1978), rat, Wistar, F, day 9
42 Klein (1959), mouse, A/He, F, day 8-31
43 Ibid, M, day 8-31
44 Terracini and Testa (1970), mouse, B6C3F$_1$, F, day 1
45 Ibid, M, day 1
46 Terracini *et al*. (1976), mouse, C3Hf/Dp, F, day 1
47 Ibid, M, day 1
48 Chernozemski and Warwick (1970), mouse, B6A F$_1$, F, day 9
49 Ibid, M, day 9
50 Vesselinovitch *et al*. (1979a), mouse, B6C3F$_1$, M, day 1-21
51 Vesselinovitch *et al*. (1979b), mouse, B6C3F$_1$, M, day 1-21
52 Della Porta *et al*. (1987), mouse, B6C3F$_1$, F, day 10-45
53 Ibid, M, day 10-45
54 Choudari Kommineni *et al*. (1970), rat, MRC, M/F, day 1-17
55 Maltoni *et al*. (1981), rat, Sprague Dawley, M/F, day 1-35

There were only five chemicals and seven studies, two of which were not independent, available to examine susceptibility in the juvenile period. The juvenile LP ratios indicated significantly greater susceptibility in this period for three independent studies, with the remaining studies consistent with equal inherent susceptibility to adult animals (see Figure 16 in Appendix J). Figure 9~~Figure 9~~Figure 9 below shows the ASFs from each of the juvenile multi-lifestage exposure studies, displayed as a cumulative frequency profile. The median of the juvenile ASF mixture distribution was 4.5 (see Table 8 in Appendix J) .

Figure 9. Juvenile ASF Cumulative Frequency Profile



The median of the juvenile ASF mixture distribution is 4.5. The dotted line represents the default value for weighting risk from carcinogen when exposures occur between 2 and 15 years of age (see next section).

Figure 9 Legend (References as in Appendix J)

1.Meranze *et al.* (1969), rat, Fels-Wistar, F, day 45
2. Ibid, M, day 451
3.Noronha and Goodall (1984), rat, CRL/CDF, M, day 46
4. Anderson *et al*. (1978), rat, Wistar, F, day 28
5. Grubbs *et al*. (1983), rat, Sprague Dawley, F, day 50-57
6. Ibid, M, day 50-57
7. Choudari Kommineni *et al*. (1970), rat, MRC, M/F, day 28-43

The studies that comprise the set of multi-lifestage exposure studies available for these analyses were not homogeneous. That is, they do not represent observations from the same distribution. Sensitivity analyses were conducted to test the robustness of the findings to different procedures for analyzing data and combining results. Of the methods used to combine the LC ratio distributions for underlying studies within each lifestage, the method of equally weighting studies within a chemical appeared to best represent the available data.

In calculating the ASF, to take into account the longer period of time for early carcinogen exposures to result in tumors, the hazard function was assumed to increase with the third power of age. This assumption is standard and has been borne out by a number of observations (Bailer and Portier, 1988) If the true rate of increase with age is greater than that, then the use of these ASFs may result in underestimates of the true sensitivity of these early life stages.

As the multi-lifestage exposure and case studies show, there appears to be considerable variability in age-at-exposure related susceptibility across carcinogens. There is also variability in age-at-exposure related susceptibility among studies of the same carcinogen. The sources of variability evident in the analyzed studies include timing of exposure within a given age window, and gender, strain, and species differences in tumor response. The set of studies identified and analyzed was not sufficiently robust to fully describe the variability quantitatively. This variability raises concerns that selection of the median (the 50^{th} percentile) estimates may considerably underestimate effects for certain agents or population groups. Relatively large variability in humans in response to carcinogens is expected to be common (Finkel, 1995). On the other hand, the numbers of carcinogens represented in the available data are limited and may not be representative of the population of carcinogens to which we are exposed (e.g., greater than 500 on the Proposition 65 list alone). Thus, the size of the weighting factors used to weight risk by age at exposure is a policy decision.

Several of the carcinogens studied induced tumors at multiple sites in the same experiment, and at different sites, depending upon the lifestage during which exposure occurred. For these cases the combined multisite potency distribution referred to above was the basis for the lifestage comparison. This approach differs from other researchers investigating early vs. late in life differences who focused on tumor site-specific measures of carcinogenic activity (e.g., Barton *et al*., 2005; Hattis *et al*., 2004, 2005). OEHHA believes that use of combined multisite potency distributions provides a more complete approach for considering age specific differences in carcinogenic activity. However, the observation that early life is generally a period of increased susceptibility was similarly found using the tumor site-specific approach by these other researchers.

One limitation of the approach was the focus on lifestages, without attempting to describe changes in susceptibility that occur within a lifestage. Timing of carcinogen exposure within a given age window can affect the cancer outcome. For example, experiments with 1-ethyl-1-nitroso-biuret in prenatal and adult rats showed a three-fold difference in activity between groups exposed on prenatal day -10 versus prenatal day -3. In a second example, female rats exposed early in the adult period were more than three times as sensitive to the breast cancer effects of MNU as females exposed six weeks later. In general, the adult comparison groups in the multi-lifestage exposure studies were fairly young. The extent to which this may result in an overall bias of the results presented here is unclear. Also for several cases, juvenile animals were used as the later life exposure group. In these cases the ASFs are likely underestimates of the relative sensitivity of the prenatal and postnatal lifestages, compared to that of the adult lifestage.

Excluded from the analysis were early in life studies in which the period of exposure for a specific exposure group crossed multiple lifestages. An example of results from studies of this type is provided by mouse studies for two non-genotoxic carcinogens, diphenylhydantoin (Chhabra *et al*., 1993a) and polybrominated biphenyls (PBBs) (Chhabra *et al*., 1993b), in which exposures began prior to conception, and continued throughout the prenatal, postnatal, and post-weaning period, up to the age of eight weeks. The data demonstrate an increased sensitivity of the early life period. Some studies that crossed multiple lifestages were included in the analyses of Barton *et al*. (2005) (Appendix I), which are consistent with the general conclusions discussed above.

Selection of Default Age-Sensitivity Factors (ASF)

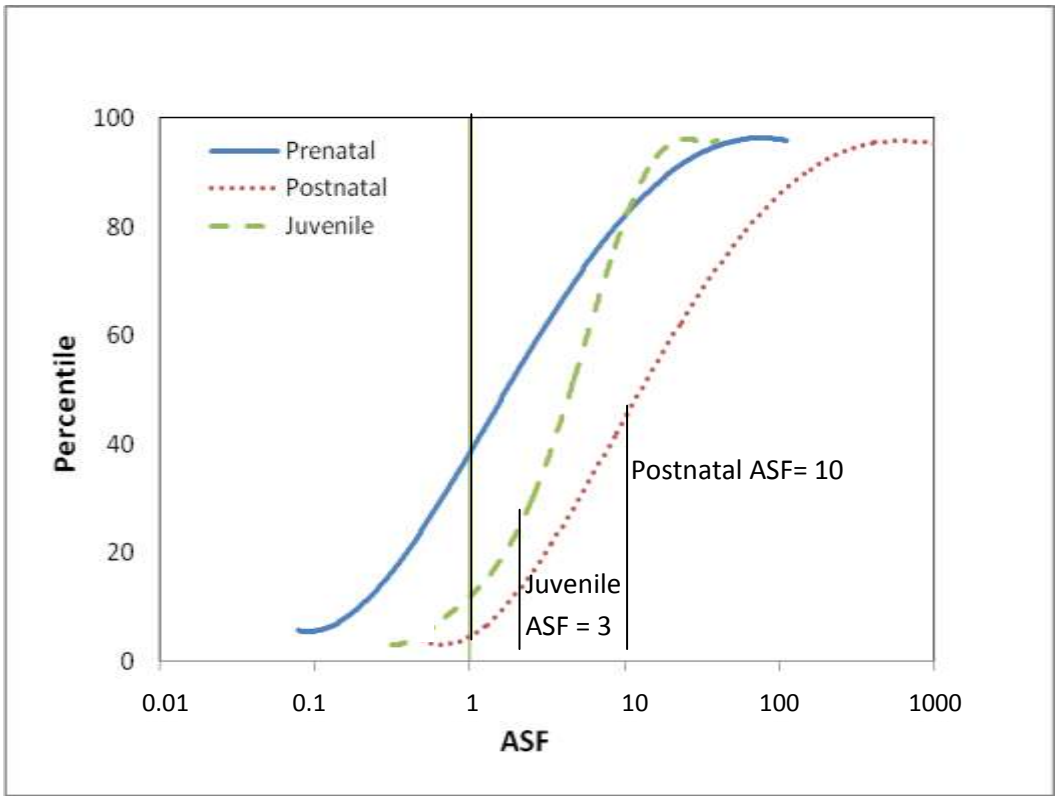
Selection of appropriate values to use to weight exposures that occur early in life using default ASFs for prenatal, postnatal and juvenile exposures is complicated by the limited database of chemicals and studies available for analysis, and the broad distribution of results for different chemicals as is shown in Figure 7, Figure 8, and Figure 9~~Figure 9~~~~Figure 9~~ (see also Appendix J). In view of the variability thus shown, and the considerable uncertainty in applying conclusions from this relatively small set of chemicals to the much larger number of chemicals of concern, it is probably unreasonable to specify a default ASF with greater than half-log precision (*i.e.* values of 1, 3, 10, 30 etc.). Therefore, in the absence of chemical-specific data, OEHHA ~~will~~ proposes to apply a default ASF of 10 for ages birth to 2 years, and a factor of 3 for ages 2 through 15 years to account for potential increased sensitivity to carcinogens during childhood. A factor of 10 for postnatal exposures falls just below the median estimate of the ASF for postnatal studies. This is also the value selected by U.S. EPA; while it is consistent with the OEHHA analysis, it may underestimate risk for some chemicals. The broad distribution of observed chemical-specific sensitivity ratios clearly indicates ~~certain number of~~that there are some chemicals for which the sensitivity ratio is much larger than 10. Further research is needed to develop criteria for identifying these cases. Similarly, a factor of 3 for juvenile exposures is consistent with the range of estimates derived from the multi-lifestage exposure studies, and falls close to the median juvenile ASF estimate. It is acknowledged that there are few data available on which to base an estimate for the juvenile period. A factor of 3 adjusts for the longer time available for cancer to manifest, but may not fully account for some inherent differences in susceptibility to cancer, for example ~~those observed~~the observed susceptibility of ~~in~~ breast tissue of pubescent girls exposed to radiation. For specific carcinogens where data indicate enhanced sensitivity during lifestages other than the immediate postnatal and juvenile periods, or demonstrate ASFs

different from the default ASFs, the chemical-specific data should be used in order to adequately protect public health.

The ASFs will be applied to all carcinogens, regardless of the theorized mode of action. While U.S. EPA currently intends to apply weighting factors only to those carcinogens with "a mutagenic mode of action"(U.S.EPA, 2005), OEHHA notes that there is evidence that early life is a susceptible time for carcinogens that are thought to act via non-mutagenic mode of action (DES is a prime example). Defining a mutagenic mode of action may be problematic if approached narrowly (ERG, 2008). Further, carcinogens may have multiple modes of action and one mode may predominant over other modes at different lifestages. The complexity of carcinogenesis argues against restricting the ASF to chemicals acting via a mutagenic mode of action.

Figure 10~~Figure 10~~~~Figure 10~~ provides a visual comparison of the ASF mixture distributions for the three early-life stages, prenatal, postnatal, and juvenile. In this figure, which is in log space, the policy choice for weighting factors of 10 for birth to age 2 years and 3 for the period of life from 2 to 15 years of age are indicated on the figure. ~~The x-axis represents the exponent (the figure is in log space).~~ It is apparent from this figure that weighting risk from exposures to carcinogens early in life is well-supported.

Figure 10. Prenatal, Postnatal, and Juvenile ASF Mixture Distributions and relation to default ASFs



OEHHA recognizes the limitations in the data and analyses presented, as discussed above. However, the analyses do provide some guidance on the extent risk may be over or underestimated by current approaches. While there is a great deal of variability across chemicals in the prenatal ASFs, the data indicate that the potency associated with prenatal carcinogen exposure is not zero. A factor of 3 is close to the median ASF, while a factor of 10 falls roughly at the 70th percentile of the prenatal ASF estimate. ~~This value~~An ASF could be applied as a default ~~ASF to the potency estimate~~ when calculating lifetime cancer risk in humans arising from carcinogen exposures that occur *in utero*. In view of the considerable variability in the data for different carcinogens and the limited database available for analysis, OEHHA is not ~~including~~ proposing the application of ~~this~~ a specific factor to cancer potency estimates for prenatal exposures as a default position in these Guidelines. However, given that the rodent is born at a stage of maturation similar to a third trimester fetus, it may be reasonable to include the third trimester in the potency weighting proposed for birth to age 2 years. T~~t~~he applicability of a cancer potency adjustment factor for prenatal exposure will be evaluated on a case-by-case basis, and may be used as evidence develops that supports such use. The consideration of prenatal exposures, including application of an appropriate susceptibility factor, would not make a large difference for risk estimates based on continuous lifetime exposures, due to the relatively short duration of gestation. However, risk estimates for short-term or intermittent exposures ~~might~~ would be ~~significantly~~ slightly increased by inclusion of the risks to the fetus during the prenatal period. Thus, risk may be underestimated when this lifestage is excluded from the analysis.

Age Bins for Application of ASFs

The choice of human ages to which the ASFs apply is based on toxicodynamic ~~information on functional maturation of major organ systems~~ and toxicokinetic considerations. Important toxicodynamic factors related to susceptibility to carcinogens include ~~and the concept that~~ the rate of cellular proliferation and differentiation, which is quite high during organ maturation ~~processes renders the tissue more susceptible to carcinogenesis~~. In addition, toxicokinetic differences by age are important, ~~as noted earlier,~~ due to impacts on detoxification and clearance of ~~xenobiotics~~carcinogens (see following section). OEHHA's analysis of the influence of age-at-exposure on carcinogenesis broke the experimental rodent ~~age bins~~data into age bins that we termed "lifestages" ~~into~~ including prenatal, "postnatal" (birth to weaning, about day 21) and "juvenile" (weaning to sexual maturation, or about day 22 to about day 49). Experiments were placed into the lifestage bins if exposure occurred at some time during the experimental rodent age bin. ~~The investigations of age at exposure and cancer potency used in OEHHA's analysis were all done with dissimilar protocols, and the windows of susceptibility are quite varied by chemical and organ system.~~

There is no simple way to compare the rodent age groups used in the OEHHA analysis of available data to equivalent age groups in humans. Complicating factors include variations in organ system structural and functional maturation both within and between species. Further, the rodent age bins were chosen by gross indicators of development namely birth, weaning and sexual maturation, not on the basis of known susceptibility to carcinogenesis. Thus, critical factors relating to carcinogen susceptibility by age are the focus of the choice of human age bins to which the ASFs of 10 and 3 apply, rather than an attempt at exact correlation of rodent lifestage bin with human age.

The investigations of age at exposure and cancer potency used in OEHHA's analysis were not conducted by standardized protocol. Further, the windows of susceptibility are quite varied by chemical and organ system, even within the lifestages defined in the OEHHA analysis. ~~Additional complications in~~ This complicates choosing a default ASF and the human age bin to which it applies ~~are associated with changes in the potency by age at exposure that can be large for specific chemicals~~. Examples from animal studies provided in the appendix include the chemical diethylnitrosamine (DEN). The cancer potency varied over several orders of magnitude depending on when during gestation and postnatal life the exposure occurred. While the inability to metabolize DEN in early gestation influences the carcinogenicity of the compound, it is unlikely the only explanation. Benzidine and safrole also require metabolic activation but are more potent with prenatal exposure. A three-fold difference in potency between exposure on postnatal day 3 and postnatal day 10 is noted for 1-ethyl-1-nitrosobiuret in rats. There are also human examples of extensive variation of potency by age at exposure, including radiation, DES, and chemotherapeutic agents. The diversity of responses to different agents obviously underscores uncertainty in the choice of age bins to apply the default ASFs. However, the ASFs are a ***default*** to use when you have no chemical-specific data on influence of age-at-exposure on potency in order to protect public health. There will always be specific chemical examples where the ASF for either the birth-<2 yrs or 2-<16 yrs age bin is quite a bit larger or quite a bit smaller than the default.

In the following sections, we discuss our logic in ~~choosing~~proposing age bins of birth to age <2 years, and 2 to age <16 years to which the ASFs of 10 and 3 apply, respectively, and offer risk estimate results from other possible age bins.

Toxicokinetic Factors Relevant to Age Bins

Choice of the age-bins to which the default ASFs are applied is based on our understanding of the two primary drivers of age-related sensitivity to carcinogens, namely age-related toxicokinetic factors and toxicodynamic factors. In the case of toxicokinetics, the largest postnatal differences in xenobiotic metabolic capability occur between infants and adults. As noted in OEHHA (2001) and reviewed in detail elsewhere (e.g., Cresteil et al., 1998; Ginsberg et al., 2004), hepatic drug metabolism by the cytochrome p450 family of enzymes and the Phase II conjugating enzymes undergoes a maturation process during the first few years of life. The hepatic cytochrome p450 enzymes exist in fetal isoforms at birth, and progressively change to adult isoforms at a relatively early stage of postnatal development. Thus, in humans the metabolic capability towards prototypical substrates develops over the first year of life towards adult levels. Similarly, the largest differences in metabolic capability of Phase II enzymes (conjugation of xenobiotic metabolites prior to excretion) tend to be between infants and adults. Other factors such as renal capability also are most different between neonates and adults. Thus, the first 2 years of life would encompass the increased sensitivity of early life stages due to toxicokinetic differences between early life and adulthood.

Ontogeny of cytochrome P-450 Enzymes in Humans.

Cresteil (1998) describes three groups of neonatal cytochrome P450: Cyp3A7 and Cyp4A1 present in fetal liver and active on endogenous substrates; an early neonatal group including Cyp2D6 and 2E1 which surge within hours of birth; and a later developing group, Cyp3A4,

Cyp2Cs, and Cyp1A2. Total Cyp 3A protein, a major cytochrome p450 enzyme responsible for biotransformation of many xenobiotics, is relatively constant in neonates and adults. However, Cyp3A7 is the primary fetal form (Hakkola et al., 1998), while Cyp3A4 is the primary adult hepatic form of the 3A series. At one month there is about one-third of the Cyp3A4 activity as an adult liver (Lacroix et al., 1997; Hakkola et al., 1998). Allegaert *et al*. (2007) stated that Cyp3A4 (testosterone-6ß-hydroxylase) activity equaled or exceeded adult activity after 1 year of age. Cyp2E1, which metabolizes benzene, trichloroethylene and toluene, among others, increases gradually postnatally, reaching about one-third of adult levels by one year of age and attains adult levels by 10 years of age (Vieira et al., 1996; Cresteil, 1998). Cyp1A2, and Cyp2C9 and 2C19, the most abundant Cyp2 enzymes in adult human liver, appear in the weeks after birth, and reach 30%to 50% of adult levels at about 1 year of age (Treluyer et al., 1997; Hines and McCarver, 2002). Cyp1A1 is expressed in fetal liver where it can activate such xenobiotics as benzo[a]pyrene and aflatoxin B1 (Shimada et al., 1996), but is less important in adult liver (Hakkola et al., 1998).

Ontogeny of cytochrome P-450 Enzymes in Rodents.

Hart et al. (2009) report developmental profiles of a number of cytochrome P-450 enzymes (measured as levels of mRNA transcripts of the specific genes) in mice. They identified three groups of isoforms. Group 1 (Cyp3A16 in both sexes; Cyp3A41b in males) appeared rapidly after birth but declined to essentially zero at 15-20 days, which is the period of weaning in mice. A second group (Cyp2E1, Cyp3A11 and Cyp4A10 in both sexes; Cyp3A41b in females) also increased rapidly after birth, but reached a stable maximal level by postnatal day 5. The third group (Cyp1A2, Cyp2A4, Cyp2B10, Cyp2C29, Cyp2D22, Cyp2F2, Cyp3A13 and Cyp3A25) were expressed only at low levels until days 10 to 15, but reached high stable levels by day 20.

ElBarbry et al. (2007) examined the developmental profiles of two toxicologically significant cytochrome P-450 enzymes, Cyp1A2 and Cyp2E1 in rats. mRNA transcripts of these genes were very low postnatally, but thereafter increased to reach a peak at weaning (postnatal day 21 - 28 for rats). Immunoreactive Cyp1A2 and Cyp2E1 proteins were first detectable at postnatal day 3 and reached 50% of adult levels at weaning and adult levels at puberty. Differences in profiles between gene expression as ~~M~~mRNA and appearance of specific proteins as determined by immunoassay may reflect changes in the relative importance of transcription and translation control process at various phases in development. Enzyme activities characteristic of Cyp1A2 and Cyp2E1 were found to parallel gene expression levels (ElBarbry et al., 2007) rather than immunodetectable protein levels, so there may also be issues of cross-reactivity between these two isoenzymes and others for which gene expression was not measured in these experiments.

In summary, the gene expression data in rats and mice show differences in details, but broadly resemble one another in that the main changes occur in the early postnatal period, with the major adjustments completed at or around the time of weaning, although the adult pattern may not be completely established until puberty. There do not appear to be substantive data for experimental species other than rats and mice, although the situation in humans appears similar in general outline and one may conclude that this pattern or some variant of it is a characteristic of mammalian species in general.

Ontogeny of Phase II enzymes

Phase II conjugating enzymes are generally less active in the neonate than the adult (Milsap and Jusko, 1994). Hence, there is concern that detoxification and elimination of chemicals is slower in infants. Expression of some of the UGT enzymes matures to adult levels in two months after birth, although glucuronidation of some drugs by the UGT1A subfamily does not reach adult levels until puberty (Levy et al., 1975; Snodgrass, 1992; McCarver and Hines, 2002). Reduced glucuronidation in neonates slows the clearance of *N*-hydroxyarylamines, phenol, and benzene metabolites. Acetylation by the N-acetyltransferases and sulfation by sulfotransferases are generally somewhat comparable to adult levels, although it varies by tissue and by specific sulfotransferase (McCarver and Hines, 2002). Glutathione (GSH) sulfotransferase (GST) is present as a fetal isoform which decreases postnatally, while GST-alpha and GST-mu increase over the first few years of life to adult levels (McCarver and Hines, 2002). Epoxide hydrolase, important in detoxifying reactive epoxide metabolites, is present in neonatal liver although at much reduced activity relative to adults (McCarver and Hines, 2002).

Clearances of drugs in infants and children *vs.* adults

Several investigators have evaluated age-related drug disposition (Renwick, 1998; Renwick et al., 2000; Ginsberg et al., 2002; Hattis et al., 2003). Renwick et al. (2000) noted higher internal doses in neonates and young infants versus adults for seven drugs that are substrates for glucuronidation, one with substrate specificity for CYP1A2, and four with substrate specificity for CYP3A4 metabolism. Ginsberg et al (2002) evaluated toxicokinetic information on 45 drugs in children and adults metabolized by different cytochrome P450 pathways, Phase II conjugations, or eliminated unchanged by the kidney. These authors noted half-lives in infants 3-9-fold longer than those of adults. It was also shown that the bulk of the elevated child/adult half-life ratios occurred primarily in the 0 to 6 month age range, and that for some compounds the clearance is actually higher in the 6 month to 2 year age grouping. In evaluating the interindividual variability by age, Hattis et al (2003) note that the largest interindividual variability occurs in the youngest children, apparently due to variability in development of critical metabolism and elimination pathways. Anderson and Holford (2008) noted that a comparison of three early-life drug clearance models (surface area, allometric ¾ power and per kilogram scaling) all demonstrated an increase in clearance over the first year of life due to the maturation of metabolic capacity.

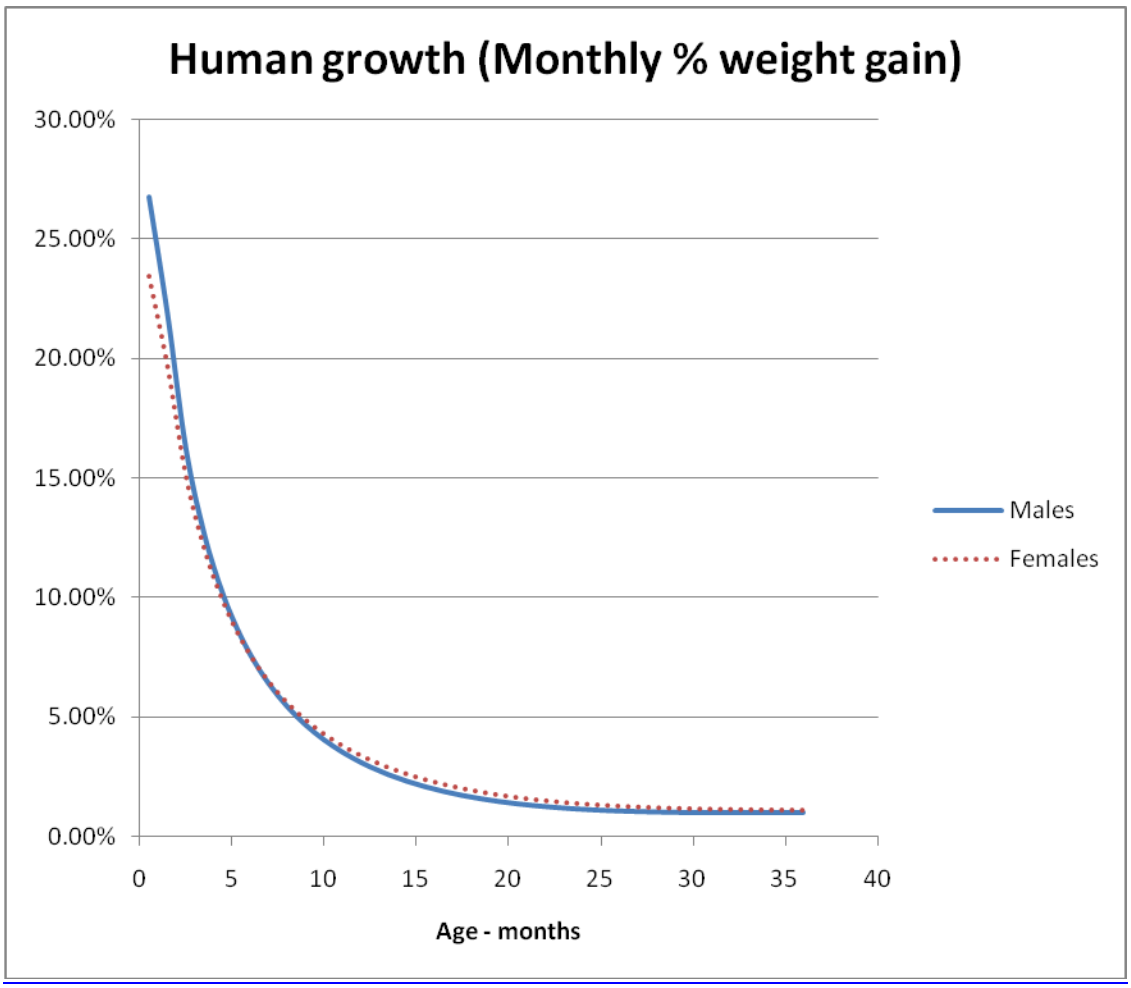
Renal elimination depends on maturity of processes related to tubular reabsorption and secretion, and glomerular filtration rates. At birth, the glomerular filtration rate (GFR) is low (2-4 ml/min), increases in the first few days (8-20 ml/min) and slowly increases to adult values in 8-12 month old infants (Plunkett et al., 1992; Kearns et al, 2003).

Newborn and young animals have less capacity to excrete chemicals into the bile than do adult animals. A number of chemicals are excreted more slowly via bile in neonates than adult rats, including ouabain, the glucuronide conjugate of sulfobromophthalein (Klaassen, 1973), and methyl mercury (Ballatori and Clarkson, 1982), resulting in a longer half-life in neonates.

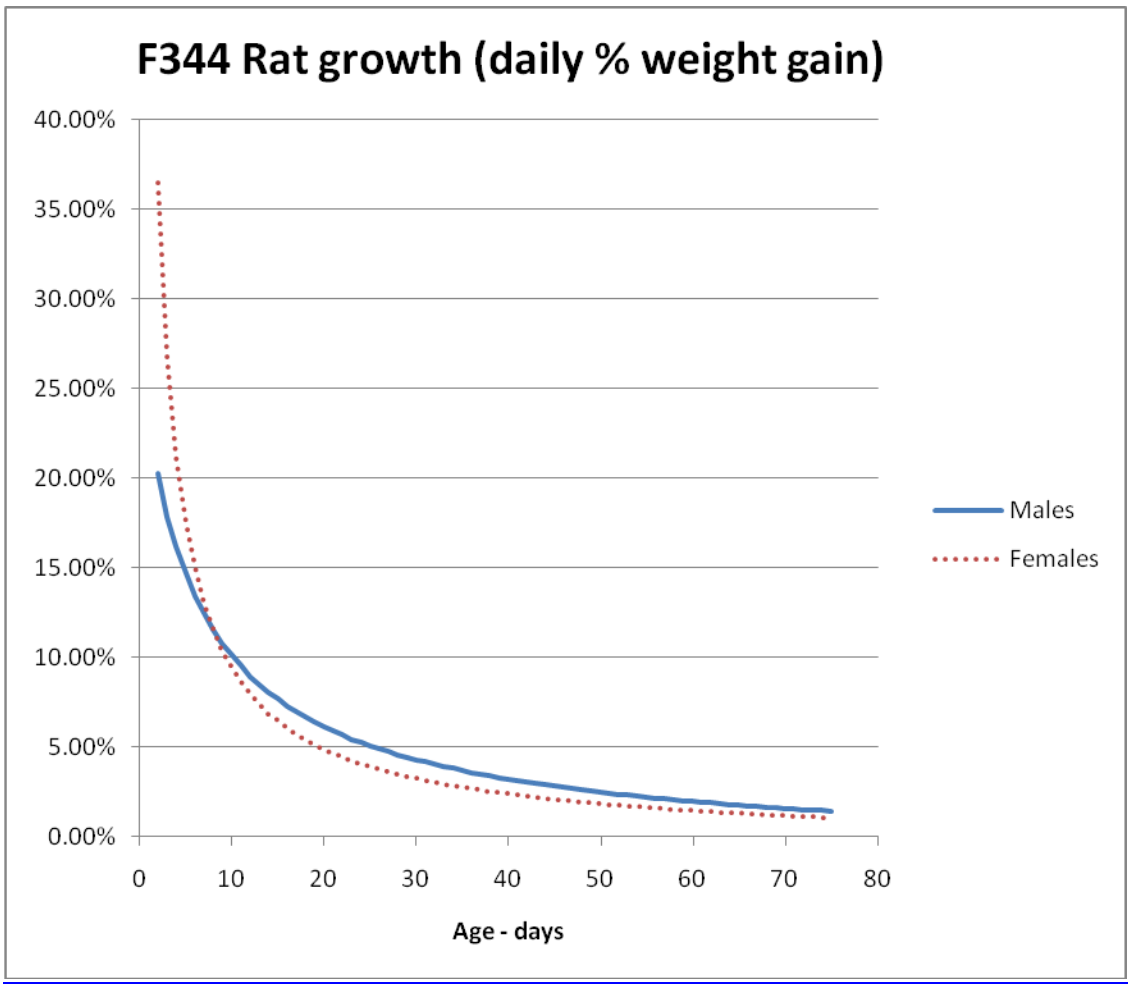
Toxicodynamic Factors Relevant to Age Bins

Important as the developmental changes in toxicokinetics are in determining sensitivity to carcinogens and other toxicants, it is likely that the toxicodynamic differences, i.e. intrinsic differences in susceptibility to carcinogenesis at the tissue or cellular level are even more influential. Changes in cell division rates and differentiation, which are thought to be important toxicodynamic determinants of susceptibility to carcinogenesis, peak in the first 2 years of life for most major organ systems. Cell division continues to accommodate growth throughout childhood and adolescence, extending in some cases even into the young adult period in both humans and experimental animals. Adolescence is an important period for organ cell division and differentiation for the mammary gland and reproductive organs.

As noted above, one of the key factors influencing susceptibility to carcinogenesis is believed to be cell division rate, which acts both by forcing error-prone repair which fixes DNA damage as mutated gene sequences (McLean et al, 1982) and by promoting expansion of mutated clones (Moolgavkar and Knudson, 1981). Actual cell division rates as a function of age are hard to determine for practical and (in the human case) ethical reasons. However, growth curves expressed as the proportional increment in body weight with time may be regarded as a reasonable although not perfect surrogate since for most tissues of the body cell size does not change markedly during growth. Both humans and rodents show remarkably high growth rates in infancy, which then drop steeply to a lower but still significant period during childhood. A growth spurt at the beginning of adolescence is noticeable in its absolute magnitude, especially in males, but does not approach the proportional growth rate seen in infancy. The time intervals proposed to reflect the period of highest sensitivity to carcinogenesis (birth to weaning, about 21 days in rodents, up to 24 months in humans) encompass the period of highest growth rate and thus is is assumed the highest cell division rates, as show in the following charts:



Data from CDC NHANES 2000:
http://www.cdc.gov/nchs/about/major/nhanes/growthcharts/datafiles.htm



Data from Tables A3 and A4 of Appendix J

Cell division rates in adult rodents and humans are harder to relate to growth curves since at least some tissues retain active cell division as part of their ongoing functionality and repair. In humans growth in body weight slows to essentially zero at the end of adolescence (and any later increments represent tissue specific changes such as increase in muscle or adipose tissue mass rather than overall growth). On the other hand, rodents continue to increase in body size (at a modest rate compared to that seen in earlier lifestages) throughout the adult period. However, it appears reasonable to conclude from the body weight data that an essentially adult pattern of overall cell division is established by the late adolescent period (age six weeks in rodents; 16 years in humans). This clearly does not include the marked growth and increases in cell division and physiological activities seen in the reproductive system and its accessories during puberty.

Organ development

The age intervals chosen for the ASFs are generally supported by human organ system development data. Examples of supporting data are available for the lung, brain, immune system and liver. Zeltner and Burri (1987) stated that postnatal lung development consists of an alveolar stage, which lasts to about 1-1.5 years of age, and a stage of microvascular maturation, which

exists from the first months after birth to the age of 2-3 years. Pinkerton and Joad (2006) describe alveolar proliferation as occurring most prominently in the 0-2 year age range, with alveolar expansion continuing in the 2-8 year age range. Ballinoti et al. (2008) demonstrated that addition of alveoli rather than expansion is a major mode of lung growth in infants and toddlers by measuring a constant carbon monoxide diffusion capacity to lung volume from 3 through 23 months of age. Kajekar (2007) also considered the 0-2 age range to be the primary period of alveolar development, although there is continued cellular proliferation resulting in lung growth and expansion up to approximately 18 years of age.

Rice and Barone (2000) note that most of the cell proliferation phase of human radial glia and neuronal growth is finished by 2 years of age, based on evidence in Bayer et al. (1993). They note further that numerous studies have shown actively proliferating brain regions are more susceptible to anti-mitotic agents than the same structures after active proliferation ceases. Peak brain growth as a percentage of body weight occurs at birth and around post-natal day (PND) 7-8 in humans and rats, respectively (Watson *et al*., 2006). De Graaf-Peters and Hadders-Algra (2006) reviewed the ontogeny of the human central nervous system and found that a large amount of axon and dendrite sprouting and synapse formation and the major part of telencephalic myelination take place during the first year after birth. While the brain continues to remodel itself throughout life, cellular proliferation in the whole brain peaks by about one year of age and is relatively complete by age 2. Development of the blood-brain barrier (BBB) appears to continue in humans until approximately 6 months of age. Rat BBB functionality is essentially complete by approximately two weeks after birth (Watson *et al*., 2006).

The immune system development occurs in stages primarily prenatally in primates and both pre- and post-natally in rodents (Dietert et al., 2000). Formation and expansion of hematopoetic stem cells is followed by expansion of lineage-specific stem cells, colonization of bone marrow and thymus, and maturation of cells to immunocompetence. In the primate, this is largely complete by 1 to 2 years of age (Holsapple et al., 2003), although establishment of immune memory develops throughout childhood and beyond. In the rodent, maturation to immunocompetence occurs postnatally from birth to about 30 days of age. In terms of carcinogenesis, perhaps one of the more important immune cells is the NK cell, thought to be responsible for immune surveillance and killing of circulating transformed cells. Based on immunohistochemistry, the principal cell lines including NK cells are present at gestation day 100 in the monkey and are at about 60% of adult values at birth (Holladay and Smialowicz, 2000).

As noted above, renal and hepatic clearance are both lower in humans at birth than in adults. Nephrogenesis is complete by 35 ~~month~~weeks gestation in humans and before birth in the mouse (but after birth in the rat). The ability to concentrate urine and the development of acid-base equilibrium ~~occur~~appear in the first few months after birth (Zoetis and Hurtt, 2003). Renal clearance of drugs, a function of a number of processes in the kidney, appears to be comparable to adults within the first few months of life (Hattis et al., 2003; Ginsberg et al., 2002) , while glomerular filtration, which rises rapidly over the first few postnatal months, is at adult values by two years of age (Zoetis and Hurtt, 2003). While complete anatomic maturity of the human liver is noted by 5 years of age (Walthall et al, 2005), liver function also appears to mature within the first year of life as seen by drug clearance studies cited above.

Critical Windows of Susceptibility to Carcinogens

It has been shown that there are critical windows during development both pre-and postnatally where enhanced susceptibility to carcinogenesis occurs (Anderson et al, 2000). Some of these observations relate to factors affecting the incidence of cancers in childhood, resulting from prenatal or preconception mutational events. For example, prenatal exposure to ionizing radiation and DES can result in leukemia and vaginal carcinoma, respectively, in childhood. Although obviously a source of great concern, these cancers appearing during childhood are relatively rare compared to cancers appearing later in life. Thus the concern in risk assessment for early in life exposures is to address the lifetime cancer incidence as a result of these exposures, including both cancers appearing during childhood and those appearing later.

OEHHA (see Appendix J) and other investigators (U.S. EPA, 2005; Barton et al, 2005; Hattis et al., 2004) have examined the available rodent data on sensitivity to carcinogenic exposures early in life. All these investigators found substantial increases in sensitivity to carcinogens in animal studies where exposures to young animals were compared to similar exposures to adults. Hattis et al. (2004) reported maximum likelihood estimates for the ratio of carcinogenic potency during the period from birth to weaning to the adult potency of between 8.7 and 10.5, whereas Barton et al (2005) reported a weighted geometric mean of 10.4 for the ratio of juvenile (less than 6-8 weeks) to adult potency in rodents. However, the number of experiments which provide information of this type, and the carcinogenic agents which have been studied, are relatively limited. Hattis examined several different datasets and study designs, but these covered only 13 different chemicals, while Barton et al. reported analyses for six of the 18 chemicals which they examined. OEHHA's analysis included data in rodents on 23 chemicals, and found median potency ratios of 13.5 for the postnatal period (birth to day 22) and 4.5 for the juvenile period (postnatal days 22 to 49) relative to adults (day 49 to 2 years). These potency ratios include the adjustment for time to manifest tumor (e.g., age to the power of three), unlike the earlier investigations. All these investigations identified variations in the observed lifetime potency ratio depending on the type of experimental design, the sex of the animals, the time of exposure and especially between chemicals. Nevertheless these analyses, although falling far short of a comprehensive evaluation of the age dependence of carcinogenic potency for all the chemicals of interest, do show a consistent overall trend of increasing potency for exposures early in life, especially soon after birth.

An evaluation of cancer induction by ionizing radiation also provides support for the concept of enhanced sensitivity to carcinogenesis at younger ages. Various studies of this phenomenon have been undertaken in animal models, but the important point for the present discussion is that epidemiological data exist which indicate age-dependent sensitivity in humans (U.S. EPA, 1994; 1999). The most extensive data set showing age-dependent effects is that for Japanese survivors of the atomic bomb explosions at Hiroshima and Nagasaki. Analysis of these data shows linear increases in tumor incidence at a number of sites with increasing radiation dose and younger age at exposure. There are other data suggesting humans are more susceptible to chemical carcinogens when exposure occurs in childhood. These data exist for tobacco smoke (Marcus et al., 2000; Wiencke et al., 1999) and chemotherapy and radiation (Mauch et al., 1996; Swerdlow et al., 2000; Franklin et al., 2006).

Proposed ~~A~~age bins for application of default age sensitivity factors

In developing a default science-based risk assessment policy to address this general conclusion, one key variable to define is the age interval or intervals over which age-dependent sensitivity factors should be applied. Different investigators have considered different age ranges, but in general the more sensitive period has at least been defined as including the time from birth up to mid-adolescence when the major phases of growth and hormonal change are complete. ~~This can be somewhat consistently defined in the case of laboratory rodents whose genetic and environmental factors are relatively constant: a transition point in the range of 6 to 8 weeks is generally identified as the start of adulthood. For humans there is inevitably a lot more variation in the timing of developmental landmarks. The comparison of human development with that of rodents is complicated by the fact that the various organ systems have markedly different pre-and postnatal timetables, both between species and between organ systems. Thus there is no single timeline of developmental equivalence for humans and rodents. Nevertheless there is a general similarity for all mammals.~~

It is also recognized that, apart from the dramatic prenatal developmental events, the earliest postnatal stages represent the greatest differences in physiology and biochemistry from the adult~~,~~. This reflect~~sing~~ the immaturity of many organ systems, extremely rapid growth and the incomplete maturation of various metabolic capabilities. ~~In animal studies, as reflected in the analysis of carcinogenesis by OEHHA, an important developmental milestone is generally identified at the time of weaning, which in rodents occurs at or about postnatal day 21.~~As noted earlier, the rodent age bins in OEHHA's analysis were based on gross developmental milestones (birth, weaning, sexual maturity). OEHHA's analysis of studies that included exposure sometime between birth and weaning indicated this period as having the highest sensitivity to carcinogenesis. The data for the later juvenile period (postnatal days 22 to 49) are somewhat sparse, covering only three carcinogens and only one where there are corresponding data for both infant and juvenile lifestages. However, it appears based on the overall range of potency ratios observed for the juvenile period that sensitivity to many carcinogens is elevated in this period also, but to a lesser extent than during the first 22 days. [Hattis et al. (2005) and Barton et al. (2005) report analyses for exposures at any time during the juvenile period, i.e. up to 6-8 weeks, and do not separate by additional age bins].

Weaning is not such an obvious or consistently timed transition for humans, being subject to a wide range of cultural and economic variables. However, it is generally considered that the human infant period encompasses the first two years of life. This period includes the most rapid periods of cellular division and differentiation for the major organ systems (excluding the breast and reproductive organs). Although there is linear growth between 2 and 8 years of age, the organ development is largely although not entirely complete.

Thus, considering both the development of major organ systems and the associated differences in toxicodynamic and toxicokinetic factors, OEHHA ~~chose~~proposes to apply the postnatal ASF derived from rodent studies (birth to ~21 days) to the human age intervals of ~~1~~birth - <2years. Similarly, OEHHA chose to apply the "juvenile" ASF derived from rodent studies (~22- ~49 days) to the human ages 2 - <16 years. This timetable was also selected by U.S. EPA (2005) in their supplemental guidance for assessing early-life susceptibility to carcinogens. They describe their choice of critical periods as follows:

> "The adjustments described below reflect the potential for early-life exposure to make a greater contribution to cancers appearing later in life. The 10-fold adjustment represents an approximation of the weighted geometric mean tumor incidence ratio from juvenile or adult exposures in the repeated dosing studies (see Table 8). This adjustment is applied for the first 2 years of life, when toxicokinetic and toxicodynamic differences between children and adults are greatest (Ginsberg et al., 2002; Renwick, 1998). Toxicokinetic differences from adults, which are greatest at birth, resolve by approximately 6 months to 1 year, while higher growth rates extend for longer periods. The 3-fold adjustment represents an intermediate level of adjustment that is applied after 2 years of age through <16 years of age. This upper age limit represents middle adolescence following the period of rapid developmental changes in puberty and the conclusion of growth in body height in NHANES data (Hattis et al., 2005). Efforts to map the approximate start of mouse and rat bioassays (i.e., 60 days) to equivalent ages in humans ranged from 10.6 to 15.1 years (Hattis et al., 2005)."

There is general agreement that rodents are born at a maturational stage approximately equivalent to a third trimester human fetus. Thus, there is good rationale to include the third trimester of pregnancy in the age bin for application of the ASF of 10.

While there is strong evidence that growth and therefore cell proliferation rates and cell differentiation are extremely high prior to age 2, there is still residual uncertainty with respect to the cutpoint for application of the ASFs of 10 and 3. Thus, another possible approach is to move the cut point for the application of the ASF of 10 to a later age to account for this uncertainty. We present the effect on risk estimates of varying cutpoints in Tables 2 and 3.

Special consideration of puberty

In addition to the general concerns over increased sensitivity to carcinogenesis during infancy and childhood, there are specific concerns for exposure during the period when hormonal and developmental changes associated with puberty are in process, especially for carcinogens with hormonal modes of action or with impacts on the reproductive system and its accessory organs. At puberty, there is increased development of breast and reproductive organs that clearly involves rapid cellular division and differentiation. Thus, for carcinogens that induce mammary and reproductive organ cancers, puberty represents a time of increased sensitivity. As noted in the section on Selection of Default Age-Sensitivity Factors (page 48), if the risk assessor is evaluating a chemical with the potential for more than usually enhanced potency during this period, such as those which induce mammary or reproductive organ tumors (e.g., a polycyclic aromatic hydrocarbon), then the risk assessment may use a larger ASF to calculate risk from exposure during puberty. OEHHA may recommend chemical-specific ASFs for puberty to the local air quality management districts for use in the Air Toxics Hot Spots program.

Application of ASFs in Risk Assessment

The effect of using the proposed default ASFs in calculating cancer risk over a 70 year lifetime, and for a 9 year exposure common in the Hot Spots program risk assessments is demonstrated in Table 2 and Table 3 below. Ignoring for the moment the increased exposures to carcinogens that children experience, the effect of the weighting factors is to increase the lifetime cancer risk by about 2. For risks from shorter exposures, such as the commonly used 9 year exposure scenario, OEHHA proposes to evaluate risk starting at age 0 in the surrounding general population. The weighting factors in this case increase the risk to a larger extent. Depending on the exposure scenario, the use of age-specific distributions for uptake rates for air, food and water would also increase the risk estimates significantly independent of any application of ASFs. This is because the uptake rates for all these media per unit of body weight are higher in children and, especially, infants.

Assessing risks to short-term exposures to carcinogens involves additional uncertainties. The cancer potency factors are generally based on long-term exposures. However, in reality, the local air districts in California are frequently assessing risk from short term activities related to construction, mitigation of contaminated soils, and so forth. OEHHA recommends that when assessing such shorter term projects, the districts assume a minimum of 2 years of exposure and apply the slope factors and the 10 fold ASF to such assessments. Exposure durations longer than 2 years would use the method for the remaining years as noted above.

Table 2. Example of default ASF use for a lifetime exposure (not adjusted for age-specific exposure)

Carcinogen Potency = 1 $(mg/kg\text{-}d)^{-1}$
Exposure = 0.0001 mg/kg-d
No consideration of differences of exposure

No adjustment: Lifetime Risk = potency × dose			Risk
70 year Lifetime risk = 1 × 0.0001			**1.0×10^{-4}**
With proposed default ASF of 10 for birth to age 2 and 3 for age 2 to 16 years: LR = Σ (potency x dose x ASF x fraction of lifetime)	ASF	Duration	Risk
R (birth to age 2 yrs)	10	2/70	0.286×10^{-4}
R (age 2 to 16 yrs)	3	13/70	0.557×10^{-4}
R (age 16 to 70 yrs)	1	55/70	0.786×10^{-4}
70 year Lifetime Risk			**1.6×10^{-4}**
With proposed default ASF of 10 for third trimester to age 2 and 3 for ages 2 to 16 years: LR = Σ (potency x dose x ASF x fraction of lifetime)	ASF	Duration	Risk
R (third trimester to age 2yrs)	10	2.25/70.25	0.320×10^{-4}
R (age 2 to age 16 yrs)	3	13/70.25	0.555×10^{-4}
R (age 16 to 70 yrs)	1	55/70.25	0.783×10^{-4}
70 year Lifetime Risk			**1.66×10^{-4}**
With proposed default ASF of 10 for birth to age 5 and 3 for the ages 5 to 16 years: LR = Σ (potency x dose x ASF x fraction of lifetime)	ASF	Duration	Risk
R (birth to age 5)	10	4/70	0.571×10^{-4}
R (age 5 to 16 yrs)	3	11/70	0.471×10^{-4}
R (age 16 to 70 yrs)	1	55/70	0.786×10^{-4}
70 year Lifetime Risk			**1.8×10^{-4}**

Table 3. Example of default ASF use for a 9-year exposure

Carcinogen Potency = 1 $(mg/kg\text{-}d)^{-1}$
Exposure = 0.0001 mg/kg-d
No consideration of differences of exposure

No adjustment: Total Risk = potency × dose x fraction of lifetime		Duration	Risk
9-year Total Risk		9/70	**0.13×10^{-4}**
With default ASF of 10 for birth to age 2, and 3 thereafter: LR = Σ (potency x dose x ASF x fraction of lifetime)	**ASF**	**Duration**	**Risk**
R (birth to age 2 yrs)	10	2/70	0.286×10^{-4}
R (age 3 to 9 yrs)	3	7/70	0.300×10^{-4}
9 year Total Risk			**0.59×10^{-4}**
With default ASF of 10 for third trimester to age 2 and 3 thereafter: LR = Σ (potency x dose x ASF x fraction of lifetime)	**ASF**	**Duration**	**Risk**
R (third trimester to age 2yrs)	10	2.25/70.25	0.325×10^{-4}
R (age 2 to 9 yrs)	3	7/70.25	0.300×10^{-4}
9 year Total Risk			**0.625×10^{-4}**
With default ASF of 10 to age 5 and 3 thereafter: LR = Σ (potency x dose x ASF x fraction of lifetime)	**ASF**	**Duration**	**Risk**
R (birth to age 5 yrs)	10	4/70	0.571×10^{-4}
R (age 5 to 9 yrs)	3	5/70	0.214×10^{-4}
9 year Total Risk			**0.785×10^{-4}**

U.S.EPA Analysis of the Effect of Age at Exposure on Cancer Potency

U.S. EPA addressed the potential for increased susceptibility to cancer caused by environmental chemicals when the exposure occurs during an early lifestage in "Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens" (U.S. EPA, 2005b) (referred to henceforth as the Supplemental Guidance). This document is intended to be a companion to the revised "Guidelines for Carcinogen Risk Assessment" (U.S. EPA, 2005a). We present a summary of their analysis, which support the policy decision to weight cancer potency and therefore risk by age-at-exposure. As previously noted, there are several methodological differences between the U.S. EPA analysis and the OEHHA analysis. Of note, in the OEHHA analysis all treatment-related tumors that were observed in a given lifestage exposure experiment were taken into account in estimating cancer potency. Thus in comparing cancer potencies

associated with early life vs. adult exposure, OEHHA compared the total cancer risk associated with exposure during a given lifestage, rather than comparing the risk for cancers at one single site in each lifestage, as the U.S. EPA did. In addition, the age groupings are a bit different in the U.S. EPA analysis than those used by OEHHA in their analysis (described above). For example, prenatal (*in utero*) exposures were not part of the analysis performed by U.S. EPA, and that Agency's analyses did not distinguish between postnatal and juvenile exposures.

U.S. EPA oral exposure cancer risk methodology relies on estimation of the lifetime average daily dose, which can account for exposure factor differences between adults and children (e.g. eating habits and body weight). However, early lifestage susceptibility differences have not been taken into consideration when cancer potency factors were calculated. The Supplemental Guidance document focused on studies that define the potential duration and degree of increased susceptibility that may arise from early-life exposures. An analysis of those studies including a detailed description of the procedures used was published in Barton *et al*. (2005) (included as Appendix I). The criteria used to decide if a study could be included in the quantitative analysis are as follows (excerpted from U.S. EPA, 2005b):

1. Exposure groups at different post-natal ages in the same study or same laboratory, if not concurrent (to control for a large number of potential cross-laboratory experimental variables including pathological examinations),
2. Same strain/species (to eliminate strain-specific responses confounding age-dependent responses),
3. Approximately the same dose within the limits of diets and drinking water intakes that obviously can vary with age (to eliminate dose-dependent responses confounding age-dependent responses),
4. Similar latency period following exposures of different ages (to control for confounding latency period for tumor expression with age-dependent responses), arising from sacrifice at >1 year for all groups exposed at different ages, where early-life exposure can occur up to about 7 weeks. Variations of around 10 to 20% in latency period are acceptable,
5. Postnatal exposure for juvenile rats and mice at ages younger than the standard 6 to 8 week start for bioassays; prenatal (*in utero*) exposures are not part of the current analysis. Studies that have postnatal exposure were included (without adjustment) even if they also involved prenatal exposure,
6. "Adult" rats and mice exposure beginning at approximately 6 to 8 weeks old or older, i.e. comparable to the age at initiation of a standard cancer bioassay (McConnell, 1992). Studies with animals only at young ages do not provide appropriate comparisons to evaluate age-dependency of response (e.g., the many neonatal mouse cancer studies). Studies in other species were used as supporting evidence, because they are relatively rare and the determination of the appropriate comparison ages across species is not simple, and
7. Number of affected animals and total number of animals examined are available or reasonably reconstructed for control, young, and adult groups (i.e., studies reporting only percent response or not including a control group would be excluded unless a reasonable estimate of historical background for the strain was obtainable).

Cancer potencies were estimated from a one-hit model (a restricted form of the Weibull time-to-tumor model), which estimates cumulative incidence for tumor onset. U.S. EPA (2005b) compared the estimated ratio of the cancer potency from early-life exposure to the estimated cancer potency from adult exposure. The general form of the equation for the tumor incidence at a particular dose, [P(dose)] is:

$$P(dose) = 1-[1-P(0)]\exp(-\text{cancer potency}*\text{dose})$$

where P(0) is the incidence of the tumor in controls. The ratio of juvenile to adult cancer potencies at a single site were calculated by fitting this model to the data for each age group. The model fit depended upon the design of the experiment that generated the data. Studies evaluated by U.S. EPA had two basic design types: experiments in which animals were exposed either as juveniles or as adults (with either a single or multiple dose in each period), and experiments in which exposure began either in the juvenile or in the adult period, but once started, continued through life.

The model equations for the first study type are:

$$P_A = P_0 + (1-P_0)\,(1-e^{-m_A \delta_A})$$

$$P_J = P_0 + (1-P_0)\,(1-e^{-m_A e^{\lambda} \delta_J})$$

where *A* and *J* refer to the adult and juvenile period, respectively, λ is the natural logarithm of the juvenile:adult cancer potency ratio, P_0 is the fraction of control animals with the particular tumor type being modeled, P_x is the fraction of animals exposed in age period *x* with the tumor, m_A is the cancer potency, and δ_x is the duration or number of exposures during age period *x*.

The goal of the model is to determine λ, which is the logarithm of the estimated ratio of juvenile to adult cancer potencies. This serves as a measure of potential susceptibility for early-life exposure.

For the second study type, the model equations take into account that exposures that were initiated in the juvenile period continue through the adult period. The model equations for the fraction of animals exposed only as adults with tumors in this design are the same as in the first study type, but the fraction of animals whose first exposure occurred in the juvenile period is:

$$P_J = P_0 + (1-P_0)\,(1-e^{-m_A e^{\lambda} (\delta_J - \delta_A) - m_A \delta_A})$$

δ_J includes the duration of exposure during the juvenile period and the subsequent adult period.

Parameters in these models were estimated using Bayesian methods and all inferences about the ratios were based on the marginal posterior distribution of λ. A complete description of these procedures (including the potential effect of alternative Bayesian priors that were examined) was published in Barton *et al*. (2005) (Appendix I). This method produced a posterior mean ratio of the early-life to adult cancer potency, which is an estimate of the potential susceptibility of early-life exposure to carcinogens. Ratios of greater or less than one indicate greater or less susceptibility from early-life exposure, respectively.

U.S. EPA reviewed several hundred studies reporting information on 67 chemicals or complex mixtures that are carcinogenic via perinatal exposure. Eighteen chemicals were identified which had animal study designs involving early-life and adult exposures in the same experiment. Of those 18 chemicals, there were overlapping subsets of 11 chemicals involving repeated exposures during early postnatal and adult lifestages and 8 chemicals using acute exposures (usually single doses) at different ages. Those chemicals are listed in Table 4~~Table 4~~~~Table 4~~.

Table 4 Chemicals having animal cancer study data available with early-life and adult exposures in the same experiment.

Chemical	Study Type
Amitrole	repeat dosing
Benzidine	repeat dosing
Benzo[a]pyrene (BaP)	acute exposure
Dibenzanthracene (DBA)	acute exposure
Dichlorodiphenyltrichloroethane (DDT)	lifetime exposure, repeat dosing
Dieldrin	lifetime exposure, repeat dosing
Diethylnitrosamine (DEN)	acute exposure, lifetime exposure
Dimethylbenz[a]anthracene (DMBA)	acute exposure
Dimethylnitrosamine (DMN)	acute exposure
Diphenylhydantoin, 5,5-(DPH)	lifetime exposure, repeat dosing
Ethylnitrosourea (ENU)	acute exposure
Ethylene thiourea (ETU)	lifetime exposure, repeat dosing
3-Methylcholanthrene (3-MC)	repeat dosing
Methylnitrosourea (NMU)	acute exposure
Polybrominated biphenyls (PBBs)	lifetime exposure, repeat dosing
Safrole	lifetime exposure, repeat dosing
Urethane	acute exposure, lifetime exposure
Vinyl chloride (VC)	repeat dosing

U.S. EPA calculated the difference in susceptibility between early-life and adult exposure as the estimated ratio of cancer potency at specific sites from early-life exposure over the cancer potency from adult exposure for each of the studies that were determined qualitatively to have appropriate study designs and adequate data. The results were grouped into four categories: 1) mutagenic chemicals administered by a chronic dosing regimen to adults and repeated dosing in the early postnatal period (benzidine, diethylnitrosamine, 3-methylcholanthrene, safrole, urethane and vinyl chloride); 2) chemicals without positive mutagenicity data administered by a chronic dosing regimen to adults and repeated dosing in the early postnatal period (amitrole, dichlorodiphenyltrichloroethane (DDT), dieldrin, ethylene thiourea, diphenylhydantoin, polybrominated biphenyls); 3) mutagenic chemicals administered by an acute dosing regimen

(benzo[*a*]pyrene, dibenzanthracene, diethylnitrosamine, dimethylbenzanthracene, dimethylnitrosamine, ethylnitrosourea, methylnitrosourea and urethane); 4) chemicals with or without positive mutagenicity data with chronic adult dosing and repeated early postnatal dosing.

The acute dosing animal cancer studies were considered qualitatively useful by U.S. EPA because they involve identical exposures with defined doses and time periods demonstrating that differential tumor incidences arise exclusively from age-dependent susceptibility. However, they were not used to derive a quantitative cancer potency factor age adjustment, primarily because most of the studies used subcutaneous or intraperitoneal injection as a route of exposure. These methods have not been considered quantitatively relevant routes of environmental exposure for human cancer risk assessment by U.S. EPA, for reasons including the fact that these routes of exposure are expected to have a partial or complete absence of first pass metabolism which could affect potency estimates. Additionally, U.S. EPA decided that cancer potency estimates are usually derived from chronic exposures, and therefore, any adjustment to those potencies should be from similar exposures.

The repeated dosing studies with mutagenic chemicals using exposures during early postnatal and adult lifestages were used to develop a quantitative cancer potency factor age adjustment. Studies with repeated early postnatal exposure were included in the analysis even if they also involved earlier maternal and/or prenatal exposure, while studies addressing only prenatal exposure were not used in the analysis. The weighted geometric mean susceptibility ratio (juvenile to adult) for repeated and lifetime exposures in this case was 10.4 (range 0.12 – 111, 42% of ratios greater than 1).

USEPA suggests the use of age-dependent-adjustment factors (ADAF) for chemicals acting through a mutagenic mode of action., based on the results of the preceding analysis, which concluded that cancer risks generally are higher from early-life exposure than from similar exposure doses and durations later in life:

1. For exposures before 2 years of age (i.e., spanning a 2-year time interval from the first day of birth until a child's second birthday), a 10-fold ADAF.

2. For exposures between 2 and <16 years of age (i.e., spanning a 14-year time interval from a child's second birthday until their sixteenth birthday), a 3-fold ADAF.

3. For exposures after turning 16 years of age, no adjustment (ADAF=1).

The ADAF of 10 used for the 0 – 2 years of age range is approximately the weighted geometric mean cancer potency ratio from juvenile versus adult exposures in the repeated dosing studies. U.S. EPA considered this period to display the greatest toxicokinetic and toxicodynamic differences between children and adults. Data were not available to calculate a specific dose-response adjustment factor for the 2 to <16-year age range, so EPA selected an ADAF of 3 because it was half the logarithmic scale difference between the 10-fold adjustment for the first two years of life and no adjustment (*i.e.*, 1-fold) for adult exposure. The ADAF of 3 represents an intermediate level of adjustment applied after 2 years of age through <16 years of age. The upper age limit (16 years of age) reflects the end of puberty and the attainment of a final body height. U.S. EPA recognizes that the use of a weighted geometric mean of the available study

data to develop an ADAF for cancer potencies may either overestimate or underestimate the actual early-life cancer potency for specific chemicals, and therefore emphasizes in the Supplemental Guidance that chemical-specific data should be used in preference to these default adjustment factors whenever such data are available.

U.S. EPA is recommending the ADAFs described above only for mutagenic carcinogens, because the data for non-mutagenic carcinogens were considered to be too limited and the modes of action too diverse to use this as a category for which a general default adjustment factor approach can be applied. OEHHA considers this approach to be insufficiently health protective. There is no obvious reason to suppose that the toxicokinetics of non-mutagens would be systematically different from those of mutagens. It would also be inappropriate to assume by default that non-mutagenic carcinogens are assumed to need a toxicodynamic correction factor of 1. Most if not all of the factors that make individuals exposed to carcinogens during an early-lifestage potentially more susceptible than those individuals exposed during adulthood also apply to non-mutagenic carcinogen exposures (*e.g.*, rapid growth and development of target tissues, potentially greater sensitivity to hormonal carcinogens, differences in metabolism). It should also be noted that carcinogens that do not cause gene mutations may still be genotoxic by virtue of causing chromosomal damage. Additionally, many carcinogens do not have adequate data available for deciding on a specific mode of action, or do not necessarily have a single mode of action. For these reasons, OEHHA will apply the default cancer potency factor age adjustments described above to all carcinogens unless data are available which allow for the development of chemical-specific cancer potency factor age adjustments. In those cases, an agent-specific model of age dependence (based on observational or experimental data) might be used, or alternative (larger or smaller) adjustment factors and age ranges may be applied where understanding of the mechanism of action and target tissues makes this appropriate.

Other Source Documents for Cancer Risk Assessment Guidance

As noted previously, the cancer potencies and unit risks tabulated in this technical support document have been developed by various programs over a number of years. The methods used therefore necessarily varied according to the date of the assessment and the program responsible. The following section summarizes the sources and procedures most commonly applied, and their historical context where this is apposite.

United States Environmental Protection Agency (U.S. EPA)

The U.S. EPA was one of the first regulatory agencies to develop and apply cancer risk assessment methodology. Their guidance documents and technical publications have been influential for many programs, including the California Air Toxics (Toxic Air Contaminants and Hot Spots) programs.

Guidelines for Carcinogen Risk Assessment (U.S. EPA, 1986)

Prior to the more recent guidelines updating project which, after nearly ten years of internal and public review drafts culminated in the 2005 final revision (see below), U.S. EPA carcinogen risk assessment procedures were generally as described in Anderson *et al*. (1983) and "Guidelines for Carcinogen Risk Assessment" (U.S. EPA, 1986). These methods, which are outlined below, were used to calculate the Integrated Risk Information System (IRIS) cancer potency values, some of which are cited in this document. U.S. EPA has always indicated that cancer risk estimates based on adequate human epidemiologic data are preferred if available over estimates based on animal data. Although the newer guidelines offer alternative methods for dose-response analysis of animal bioassays, and updated consideration of specific topics such as lifestage-related differences in sensitivity, and mechanism of action for some types of carcinogen, the underlying principles, and many of the specific procedures developed in these original guidelines are still applicable and in use.

U.S. EPA Calculation of Carcinogenic Potency Based on Animal Data

In extrapolating low-dose human cancer risk from animal carcinogenicity data, it is generally assumed that most agents that cause cancer also damage DNA, and that the quantal type of biological response characteristic of mutagenesis is associated with a linear non-threshold dose-response relationship. U.S. EPA stated that the risk assessments made with this model should be regarded as conservative, representing the most plausible upper limit for the risk. The mathematical expression used by U.S. EPA in the 1986 guidelines to describe the linear non-threshold dose-response relationship at low doses is the linearized multistage procedure developed by Crump (1980). This model is capable of fitting almost any monotonically increasing dose-response data, and incorporates a procedure for estimating the largest possible linear slope at low extrapolated doses that is consistent with the data at all experimental dose levels. A description of the linearized multistage procedure has been provided above (page 292~~928~~). U.S. EPA used an updated version (GLOBAL86, Howe *et al*., 1986) of the computer program GLOBAL79 developed by Crump and Watson (1979) to calculate the point estimate and the 95% upper confidence limit of the extra risk $A(d)$.

U.S. EPA separated tumor incidence data according to organ sites or tumor types. The incidence of benign and malignant tumors was combined whenever scientifically defensible. U.S. EPA considered this incidence combination scientifically defensible unless the benign tumors are not considered to have the potential to progress to the associated malignancies of the same histogenic origin. The primary comparison in carcinogenicity evaluation is tumor response in dosed animals as compared to contemporary matched control animals. However, U.S. EPA stated that historical control data could be used along with concurrent control data in the evaluation of carcinogenic responses, and notes that for the evaluation of rare tumors, even small tumor responses may be significant compared to historical data. If several data sets (dose and tumor incidence) are available (different animal species, strains, sexes, exposure levels, exposure routes) for a particular chemical, the data set used in the model was the set where the incidence is statistically significantly higher than the control for at least one test dose level and/or where the tumor incidence rate shows a statistically significant trend with respect to dose level. The data set generating the highest lifetime cancer risk estimate (q_1^*) was chosen where appropriate. An example of an inappropriate data set would be a set which generates an artifactually high risk estimate because of a very small number of animals used. If there are 2 or more data sets of comparable size for a particular chemical that are identical with respect to species, strain, sex and tumor sites, the geometric mean of q_1^* estimated from each of those data sets was used for risk estimation. U.S. EPA assumed that mg/surface area/day is an equivalent dose between species. Surface area was further assumed to be proportional to the 2/3 power of the weight of the animal in question. Equivalent dose was therefore computed using the following relationship:

$$d = \frac{1_e * m}{L_e * W^{2/3}}$$

where L_e = experimental duration, l_e = exposure duration, m = average dose (mg/day) and W = average animal weight. Default average body weights for humans, rats and mice are 70, 0.35 and 0.03 kg, respectively.

Exposure data expressed as ppm in the diet were generally converted to mg/day using the relationship m = ppm * F * r, where ppm is parts per million of the chemical in the diet, F is the weight of the food consumed per day in kg, and r is the absorption fraction (assumed to be 1 in the absence of data indicating otherwise). The weight of food consumed, calories required, and animal surface area were generally all considered to be proportional to the 2/3 power of the animal weight, so:

$$m \propto \text{ppm} * W^{2/3} * r, \text{ or } \quad \frac{m}{rW^{2/3}} \propto \text{ppm}$$

The relationship could lead to the assumption that dietary ppm is an equivalent exposure between species. However, U.S. EPA did not believe that this assumption is justified, since the calories/kg food consumed by humans is significantly different from that consumed by laboratory animals (primarily due to differences in moisture content). An empirically derived food factor, $f = F/W$ was used, which is the fraction of a species' body weight consumed per day as food. U.S. EPA (1986) gave the f values for humans, rats and mice as 0.028, 0.05 and 0.13, respectively.

Dietary exposures expressed as concentrations in ppm were converted to mg/surface area using the following relationship:

$$\frac{m}{r * W^{2/3}} = \frac{\text{ppm} * F}{W^{2/3}} = \frac{\text{ppm} * f * W}{W^{2/3}} = \text{ppm} * f * W^{2/3}$$

Exposures expressed as mg/kg/day ($m/Wr = s$) were converted to mg/surface area using the relationship:

$$\frac{m}{rW^{2/3}} = s * W^{2/3}$$

The calculation of dose when exposure is via inhalation was performed for cases where 1) the chemical is either a completely water-soluble gas or aerosol and is absorbed proportionally to the amount of inspired air, or 2) where the chemical is a partly water-soluble gas which reaches an equilibrium between the inspired air and body compartments. After equilibrium is attained, the rate of absorption is proportional to metabolic rate, which is proportional to the rate of oxygen consumption, which is related to surface area.

Exposure expressed as mg/day to completely water-soluble gas or aerosols can be calculated using the expression $m = I * v * r$, where I is the inspiration rate/day in m^3, v is the concentration of the chemical in air (mg/m^3), and r is the absorption fraction (assumed to be the same for all species in the absence of data to the contrary; usually 1). For humans, the default inspiration rate of 20 m^3 has been adopted. Inspiration rates for 113 g rats and 25 g mice have been reported to be 105 and 34.5 liters/day, respectively. Surface area proportionality can be used to determine inspiration rate for rats and mice of other weights; for mice, $I = 0.0345\ (W / 0.025)^{2/3}$ m^3/day; for rats, $I = 0.105\ (W / 0.113)^{2/3}$ m^3/day. The empirical factors for air intake/kg/day (i) for humans, rats and mice are 0.29, 0.64 and 1.3, respectively. Equivalent exposures in mg/surface area can be calculated using the relationship:

$$\frac{m}{W^{2/3}} = \frac{Ivr}{W^{2/3}} = \frac{iWvr}{W^{2/3}} = iW^{1/3}vr$$

Exposure expressed as mg/day to partly water-soluble gases is proportional to surface area and to the solubility of the gas in body fluids (expressed as an absorption coefficient r for that gas). Equivalent exposures in mg/surface area can be calculated using the relationships $m = kW^{2/3} * v * r$, and $d = m/W^{2/3} = kvr$. The further assumption is made that in the case of route-to-route extrapolations (e.g., where animal exposure is via the oral route, and human exposure is via inhalation, or vice versa), unless pharmacokinetic data to the contrary exist, absorption is equal by either exposure route.

Adjustments were made for experimental exposure durations shorter than the lifetime of the test animal; the slope q_1^* was increased by the factor $(L/L_e)^3$, where L is the normal lifespan of the experimental animal and L_e is the duration of the experiment. This assumed that if the average dose d is continued, the age-specific rate of cancer will continue to increase as a constant function of the background rate. Since age-specific rates for humans increase by at least the 2nd power of the age, and often by a considerably higher power (Doll, 1971), there is an expectation

that the cumulative tumor rate, and therefore q_1^*, will increase by at least the 3rd power of age. If the slope q_1^* is calculated at age L_e, it would be expected that if the experiment was continued for the full lifespan L at the same average dose, the slope q_1^* would have been increased by at least $(L/L_e)^3$.

U.S. EPA Calculation of Carcinogenic Potency Based on Human Data

U.S. EPA stated that existing human epidemiologic studies with sufficiently valid exposure characterization are always used in evaluating the cancer potency of a chemical. If they showed a carcinogenic effect, the data were analyzed to provide an estimate of the linear dependence of cancer rates on lifetime cancer dose (equivalent to the factor q_1^*). If no carcinogenic effect was demonstrated and carcinogenicity had been demonstrated in animals, then it was assumed that a risk does exist, but it is smaller than could have been observed in the epidemiologic study. An upper limit of cancer incidence was calculated assuming that the true incidence is just below the level of detection in the cohort studied, which is largely determined by the cohort size. Whenever possible, human data are used in preference to animal data. In human epidemiologic studies, the response is measured as the relative risk of the exposed cohort of individuals compared to the control group. The excess risk ($R(X)$ - 1, where $R(X)$ is relative risk) was assumed to be proportional to the lifetime average exposure X, and to be the same for all ages. The carcinogenic potency is then equal to $[R(X) - 1]/X$ multiplied by the lifetime risk at that site in the general population. According to this original procedure, the confidence limit for the excess risk was not usually calculated: this decision was ascribed to the difficulty in accounting for inherent uncertainty in the exposure and cancer response data. More recent assessments have taken the opposite view and attempted to calculate and characterize this uncertainty by determining confidence limits, *inter alia*.

Guidelines for Carcinogen Risk Assessment (U.S. EPA, 2005a)

U.S. EPA revised its "Guidelines for Carcinogen Risk Assessment" (referred to henceforth as the "U.S. EPA Guidelines") in 2005. Compared to the 1986 version of this document, more emphasis is placed on establishing a "mode of action" (MOA). The following excerpt provides a definition of this term:

> "The term "mode of action" is defined as a sequence of key events and processes, starting with interaction of an agent with a cell, proceeding through operational and anatomical changes, and resulting in cancer formation. A "key event" is an empirically observable precursor step that is itself a necessary element of the mode of action or is a biologically based marker for such an element. Mode of action is contrasted with "mechanism of action," which implies a more detailed understanding and description of events, often at the molecular level, than is meant by mode of action".

Cancer risk assessments performed under the prior U.S. EPA Guidelines sometimes included a MOA description. However, the 1986 U.S. EPA Guidelines did not explicitly mandate the development of a MOA description in cancer risk assessments.

The MOA information is then used to govern how a cancer risk assessment shall proceed. Tumor incidence data sets arising from a MOA judged to be not relevant to humans are not used

to extrapolate a cancer potency factor. If an MOA cannot be determined or is determined to have a low-dose linear dose-response and a nonmutagenic MOA, then a linear extrapolation method is used to develop a cancer potency factor. The same linear extrapolation is used for all lifestages, unless chemical specific information on lifestage or population sensitivity is available. Carcinogens that act via an MOA judged to have a nonlinear low-dose dose response are modeled using MOA data, or the RfD/RfC risk assessment method is used as a default. Adjustments for susceptible lifestages or populations are to be performed as part of the risk assessment process.

If a carcinogen is deemed to act via a mutagenic MOA, then the data from the MOA analysis is evaluated to determine if chemical-specific differences between adults and juveniles exist and can be used to develop a chemical-specific risk estimate incorporating lifestage susceptibility. If this cannot be done, then early-life susceptibility is assumed, and age-dependent adjustment factors (ADAFs) are applied as appropriate to develop risk estimates. In cases where it is not possible to develop a toxicokinetic model to perform cross-species scaling of animal tumor data sets which arise from oral exposures, the U.S. EPA Guidelines state that administered doses should be scaled from animals to humans on the basis of equivalence of $mg/kg^{3/4}$-d (milligrams of the agent normalized by the 3/4 power of body weight per day). This is a departure from the 1986 U.S. EPA guidelines, which used a 2/3 power of body weight normalization factor. Other adjustments for dose timing, duration and route are generally assumed to be handled in similar fashion to that described for the 1986 guidelines, although of course updated parameter values would be used where available.

The 2005 U.S. EPA Guidelines also use benchmark dose methodology (described above, page 27) to develop a "point-of departure" (POD) from tumor incidence data. For linear extrapolation, the POD is used to calculate a cancer potency factor, and for nonlinear extrapolation the POD is used in the calculation of a reference dose (RfD) or reference concentration (RfC).

It should be noted that none of the cancer potency factors listed in this document were obtained from U.S. EPA risk assessments performed under the 2005 U.S. EPA Guidelines. All U.S. EPA IRIS cancer potency values contained in this document were obtained from risk assessments using the 1986 U.S. EPA Guidelines.

Office of Environmental Health Hazard Assessment (OEHHA), California Environmental Protection Agency

The cancer risk assessment procedures originally used by the Office of Environmental Health Hazard Assessment (OEHHA) are outlined in "Guidelines for Chemical Carcinogen Risk Assessments and their Scientific Rationale" (referred to below as the Guidelines) (CDHS, 1985). These procedures were generally used in generating Toxic Air Contaminant (TAC) cancer potency values, standard Proposition 65 cancer potency values and Public Health Goal (PHG) cancer potency values. Expedited Proposition 65 cancer potency values depart somewhat from those procedures and are discussed separately below.

OEHHA cancer risk assessment methodology as described by CDHS (1985) generally resembled that used at that time by U.S. EPA (Anderson *et al*., 1983; U.S. EPA, 1986). OEHHA risk

assessment practice similarly reflects the evolution of the technical methodology (e.g. as described in U.S. EPA, 2005a) since the original guidelines were published. The basic principles and procedures described below are still considered applicable. More recent additions to OEHHA cancer risk assessment methods such as the use of benchmark dose methodologies and early-lifestage cancer potency adjustments are discussed above. The Guidelines state that both animal and human data, when available, should be part of the dose-response assessment.

OEHHA Calculation of Carcinogenic Potency Based on Animal Data

The procedures used to extrapolate low-dose human cancer risk from animal carcinogenicity data assumed that a carcinogenic change induced in a cell is transmitted to successive generations of cell descendents, and that the initial change in the cell is an alteration (e.g. mutation, rearrangement, etc.) in the cellular DNA. Non-threshold models are used to extrapolate to low-dose human cancer risk from animal carcinogenicity data.

Several models were proposed for extrapolating low-dose human cancer risk from animal carcinogenicity data in the original Guidelines. These models include the Mantel-Bryan method (log-probit model), the one-hit model, the linearized multistage procedure, the gamma multihit model, and a number of time-to-tumor models. The Guidelines stated that time-to-tumor models (i.e., a Weibull-in-time model) should be used for low-dose extrapolation in all cases where supporting data are available, particularly when survival is poor due to competing toxicity. However, the Guidelines also noted the difficulty of determining the actual response times in an experiment. Internal tumors are generally difficult to detect in live animals and their presence is usually detected only at necropsy. Additionally, use of these models often requires making the determination of whether a tumor was the cause of death, or was found only coincidentally at necropsy when death was due to other causes. Further, competing causes of death, such as chemical toxicity, may decrease the observed time-to-tumor for nonlethal cancers by allowing earlier necropsy of animals in higher dose groups. The linearized multistage (LMS) procedure was noted as being an appropriate method for dose extrapolation in most cases, with the primary exception being a situation in which sufficient empirical data are available to indicate a dose-response curve of a "quasi-threshold" type (e.g., flat for two or three dose levels, then curving sharply upwards). In this case, the LMS procedure may underestimate the number of stages and overestimate the low-dose risks. In this case, the gamma multihit model was suggested as being a potential alternative. The Mantel-Bryan model was described as having little biological basis as applied to carcinogenesis, and being likely to underestimate risks at low doses. The Guidelines stated that this model should not be used for low dose extrapolation. More recent practice has departed from these original guidelines in some respects, for instance by experimenting with cell-proliferation based models in a few cases: however the LMS model remained the preferred extrapolation model for most purposes. Some of the difficulties in achieving a satisfactory fit to tumor incidence data were found to be alleviated by application of toxicokinetic models and use of an internal rather than applied dose metric with the LMS model. This has resulted in the alternative models originally advocated (Gamma multihit, Mantel-Bryan) being mostly abandoned. As noted above (Dose-Response Assessment, page 23), the use of allegedly biologically based statistical models such as LMS has fallen from favor in recent years, and benchmark dose methodology has become the preferred method for extrapolating cancer potency values from animal cancer incidence data. However, it should also be noted that results

generated by the LMS model and benchmark dose methodology from the same data set are often quite similar.

The 1985 Guidelines stated that both animal and human data, when available, should be part of the dose-response assessment. Although preference was given to human data when these were of adequate quality, animal studies may provide important supporting evidence. Low-dose extrapolation of human cancer risk from animal carcinogenicity data was generally based on the most sensitive site, species and study demonstrating carcinogenicity of a particular chemical, unless other evidence indicates that the data set in question is not appropriate for use. Where both benign and malignant tumors are induced at the same site and the benign tumors are considered to have the potential to progress to malignant tumors, the incidence data for both types of tumors could be combined to form the basis for risk assessment. Pharmacokinetic data on chemical metabolism, effective dose at target site, or species differences between laboratory test animals and humans were considered in dose-response assessments when available. In performing exposure scaling from animals to humans, the "surface area" correction (correcting by the 2/3 power of body weight) was used unless specific data indicates that this should not be done. The Guidelines assumed that in the absence of evidence to the contrary, chemicals that cause cancer after exposure by ingestion will also cause cancer after exposure by inhalation, and vice versa. These original proposals have continued in use with little change except that currently, TAC and PHG cancer potency factor calculations use a 3/4 power of body weight correction for interspecies scaling, in line with current U.S. EPA practice. The standard Proposition 65 cancer potency factor calculations still use a 2/3 power correction because the cancer potency calculation method is specified in regulation (California Health and Safety Code 25249.5 *et seq.*).

Cancer unit risk factors [in units of $(\mu g/m^3)^{-1}$]have been calculated from cancer potency factors [in units of $(mg/kg\text{-}day)^{-1}$] using the following relationship:

$$UR = \frac{CPF * 20\ m^3}{70\ kg\ *\ CV}$$

where UR is the cancer unit risk, CPF is the cancer potency factor, 70 kg is the reference human body weight, 20 m^3 is the reference human inspiration rate/day, and CV is the conversion factor from mg to µg (= 1000). The cancer unit risk describes the excess cancer risk associated with an inhalation exposure to a concentration of 1 $\mu g/m^3$ of a given chemical; the cancer potency factor describes the excess cancer risk associated with exposure to 1 mg of a given chemical per kilogram of body weight.

It should be noted that although this default method is still used in deriving published cancer unit risk values, for site-specific risk assessments age-appropriate distributions and percentile values are used in the current version of the Hot Spots exposure assessment document. Where exposure to children occurs (as it does in most exposures to the general population surrounding a source site) it is also necessary to apply the age-specific adjustment factors for the appropriate durations in accordance with the guidance offered above (Page 30 *et seq.*).

OEHHA Calculation of Carcinogenic Potency Based on Human Data

Human epidemiologic studies with adequate exposure characterization are used to evaluate the cancer potency of a chemical. If they show a carcinogenic effect, the data are analyzed to provide an estimate of the linear dependence of cancer rates on lifetime cancer dose. The 1985 Guidelines stated that with continuous exposure, age-specific incidence continues to increase as a power function (e.g., t^3 or t^4) of the elapsed time since initial exposure. Lifetime risks can be estimated by applying such a power function to the observed data and extrapolating beyond the actual followup period. OEHHA has generally undertaken the calculation of study power and confidence bounds on the potency estimate as important tools to establish the credibility of the estimate obtained and in comparing this with other estimates (from other human studies or from animal data). Due to the diversity in quality and type of epidemiological data, the specific approaches used in OEHHA risk assessments based on human epidemiologic studies vary on a case by case basis rather than following explicit general guidelines. Examples of the methods used can be observed in the Toxic Air Contaminant documents (these documents are listed in Appendix D: the methods used are described in the compound summaries provided in Appendix B).

Expedited Proposition 65 Cancer Risk Assessment Methodology

Expedited cancer potency values developed for several agents listed as carcinogens under Proposition 65 (California Health and Safety Code 25249.5 *et seq*.) were derived from selected animal carcinogenicity data sets of the Carcinogenic Potency Database (CPDB) of Gold *et al.* (1984, 1986, 1987, 1989, 1990, 1997) using default procedures specified in the administrative regulations for Proposition 65 (Title 22 California Code of Regulations [CCR] 12703). OEHHA hazard assessments usually describe all relevant data on the carcinogenicity (including dose-response characteristics) of the chemical under examination, followed by an evaluation of any pharmacokinetic and mechanistic (e.g. genotoxicity) data. An evaluation of the data set for the chemical may indicate that adjustments in target dose estimates or use of a dose response model different from the default are appropriate. The procedure used to derive expedited Proposition 65 cancer potency values differs from the usual methodology in two ways. First, it relies on cancer dose response data evaluated and extracted from the original literature by Gold *et al.* Second, the choice of a linearized multistage procedure for generating cancer potency values is automatic, and pharmacokinetic adjustments are not performed. The methods used to develop expedited cancer potency values incorporate the following assumptions:

1. The dose response relationship for carcinogenic effects in the most sensitive species tested is representative of that in humans.
2. Observed experimental results can be extrapolated across species by use of the interspecies factor based on "surface area scaling."
3. The dose to the tissue giving rise to a tumor is assumed to be proportional to the administered dose.
4. The linearized multistage polynomial procedure can be used to extrapolate potency outside the range of experimental observations to yield estimates of "low" dose potency.
5. Cancer risk increases with the third power of age.

The Carcinogenic Potency Database of Gold *et al.* (1984, 1986, 1987, 1989, 1990) contains the results of more than 4000 chronic laboratory animal experiments on 1050 chemicals by combining published literature with the results of Federal chemical testing programs (Technical Reports from the Carcinogenesis Bioassay Program of the National Cancer Institute (NCI)/National Toxicology Program (NTP) published prior to June 1987). The published literature was searched (Gold *et al*., 1984) through the period December 1986 for carcinogenicity bioassays; the search included the Public Health Service publication "Survey of Compounds Which Have Been Tested for Carcinogenic Activity" (1948-1973 and 1978), monographs on chemical carcinogens prepared by the International Agency for Research on Cancer (IARC) and Current Contents. Also searched were Carcinogenesis Abstracts and the following journals: British Journal of Cancer, Cancer Letters, Cancer Research, Carcinogenesis, Chemosphere, Environmental Health Perspectives, European Journal of Cancer, Food and Cosmetics Toxicology, Gann, International Journal of Cancer, Journal of Cancer Research and Clinical Oncology (formerly Zeitschrift fur Krebsforschung und Klinische Onkologie), Journal of Environmental Pathology and Toxicology, Journal of Toxicology and Environmental Health, Journal of the National Cancer Institute, and Toxicology and Applied Pharmacology. Studies were included in the database if they met the following conditions:

1. The test animals were mammals.
2. Chemical exposure was started early in life (100 days of age or less for hamsters, mice and rats).
3. Route of administration was via the diet, drinking water, gavage, inhalation, intravenous injection or intraperitoneal injection.
4. The test chemical was administered alone (not in combination with other chemicals).
5. Chemical exposure was chronic (*i.e.*, duration of exposure was at least one-fourth the standard lifespan for that species), with not more than 7 days between exposures.
6. The experiment duration was at least half the standard lifespan for the species used.
7. The study design included a control group and at least 5 animals/exposure group.
8. No surgical interventions were performed.
9. Pathology data were reported for the number of animals with tumors (not total number of tumors).
10. All results reported were original data (not analysis of data reported by other authors).

Included in their data set tabulations are estimates of average doses used in the bioassay, resulting tumor incidences for each of the dose levels employed for sites where significant responses were observed, dosing period, length of study and histopathology. Average daily dose levels were calculated assuming 100% absorption. Dose calculations follow procedures similar to those of Cal/EPA and U.S. EPA; details on methods used and standard values for animal lifespans, body weights, and diet, water and air intake are listed in Gold *et al.* (1984). OEHHA (1992) reviewed the quality assurance, literature review, and control procedures used in compiling the data and found them to be sufficient for use in an expedited procedure. Cancer potency estimates were derived by applying the mathematical approach described in the section below to dose response data in the Gold *et al.* database.

The following criteria were used for data selection:

1. Data sets with statistically significant increases in cancer incidence with dose ($p \leq 0.05$) were used. (If the authors of the bioassay report considered a statistically significant result to be unrelated to the exposure to the carcinogen, the associated data set was not used.)
2. Data sets were not selected if the endpoint was specified as "all tumor-bearing animals" or results were from a combination of unrelated tissues and tumors.
3. When several studies were available, and one study stood out as being of higher quality due to numbers of dose groups, magnitude of the dose applied, duration of study, or other factors, the higher quality study was chosen as the basis for potency calculation if study results were consistent with those of the other bioassays listed.
4. When there were multiple studies of similar quality in the sensitive species, the geometric mean of potencies derived from these studies was taken. If the same experimentalists tested two sexes of the same species/strain under the same laboratory conditions, and no other adequate studies were available for that species, the data set for the more sensitive sex was selected.
5. Potency was derived from data sets that tabulate malignant tumors, combined malignant and benign tumors, or tumors that would have likely progressed to malignancy.

Cancer potency was defined as the slope of the dose response curve at low doses. Following the default approach, this slope was estimated from the dose response data collected at high doses and assumed to hold at very low doses. The Crump linearized multistage polynomial (Crump *et al.*, 1977) was fit to animal bioassay data:

$$\text{Probability of cancer} = 1 - \exp[-(q_0 + q_1 d + q_2 d^2 + ...)]$$

Cancer potency was estimated from the upper 95 % confidence bound on the linear coefficient q_1, which is termed q_1^*.

For a given chemical, the model was fit to a number of data sets. As discussed in the section above, the default was to select the data for the most sensitive target organ in the most sensitive species and sex, unless data indicated that this was inappropriate. Deviations from this default occur, for example, when there are several bioassays or large differences exist between potency values calculated from available data sets.

Carcinogenicity bioassays using mice and/or rats will often use an exposure duration of approximately two years. For standard risk assessments, this is the assumed lifespan for these species. Animals in experiments of shorter duration are at a lower risk of developing tumors than those in the standard bioassay; thus potency is underestimated unless an adjustment for experimental duration is made. In estimating potency, short duration of an experiment was taken into account by multiplying q_1^* by a correction factor equal to the cube of the ratio of the assumed standard lifespan of the animal to the duration of the experiment (T_e). This assumes that the cancer hazard would have increased with the third power of the age of the animals had they lived longer:

$$q_{animal} = q_1^* * (104 \text{ weeks}/T_e)^3$$

In some cases excess mortality may occur during a bioassay, and the number of initial animals subject to late occurring tumors may be significantly reduced. In such situations, the above described procedure can, at times, significantly underestimate potency. A time-dependent model fit to individual animal data (i.e., the data set with the tumor status and time of death for each animal under study) may provide better potency estimates. When Gold *et al.* indicated that survival was poor for a selected data set, a time-dependent analysis was attempted if the required data were available in the Tox Risk (Crump *et al.*, 1991) data base. The Weibull multistage model (Weibull-in-time; multistage-in-dose) was fit to the individual animal data.

To estimate human cancer potency, q_{animal} values derived from bioassay data were multiplied by an interspecies scaling factor (K; the ratio of human body weight (bw_h) to test animal body weight (bw_a), taken to the 1/3 power (Anderson *et al.*, 1983)):

$$K = (bw_h/bw_a)^{1/3}$$

Thus, cancer potency = $q_{human} = K * q_{animal}$

Chemical-specific Descriptions of Cancer Potency Value Derivations

Unit Risk and potency values for chemicals whose cancer potency values were obtained from Toxic Air Contaminant documents, standard or expedited Proposition 65 documents, U.S. EPA's Integrated Risk Information System (IRIS) documents and Health Effects Assessment Summary Table (HEAST) entries, or from other documents prepared by OEHHA's Air Toxicology and Epidemiology Branch or Pesticide and Environmental Toxicology Branch are presented in Appendix A. Information summaries for these chemicals are presented in Appendix B.

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U.S. Department of Housing and Urban Development
Office of Community Planning and Development

The Noise Guidebook

The Noise Guidebook

A Reference Document for
Implementing the Department of
Housing and Urban Development's
Noise Policy

Prepared By The Environmental
Planning Division,
Office of Environment and Energy

For sale by the Superintendent of Documents, U.S. Government Printing Office Washington, D.C. 20402

Preface

Introduction

This *Noise Guidebook* has been prepared to serve as the basic reference document for all HUD field staff who are responsible for implementing the Department's noise policy. It brings together in one place all the various reports, informational papers and other items that have been put out by the Department over the past several years. It also contains several new items designed to make your job easier.

This *Guidebook* is designed to serve not only the experienced HUD staff member but also the new employee or the old employee who is new to the noise field. Because of this, the *Guidebook* contains some fairly basic background material as well as quizzes and other material specifically geared for the "learner."

Chapter 1

Basic Overview of the Environmental Noise Problem

Introduction

Background

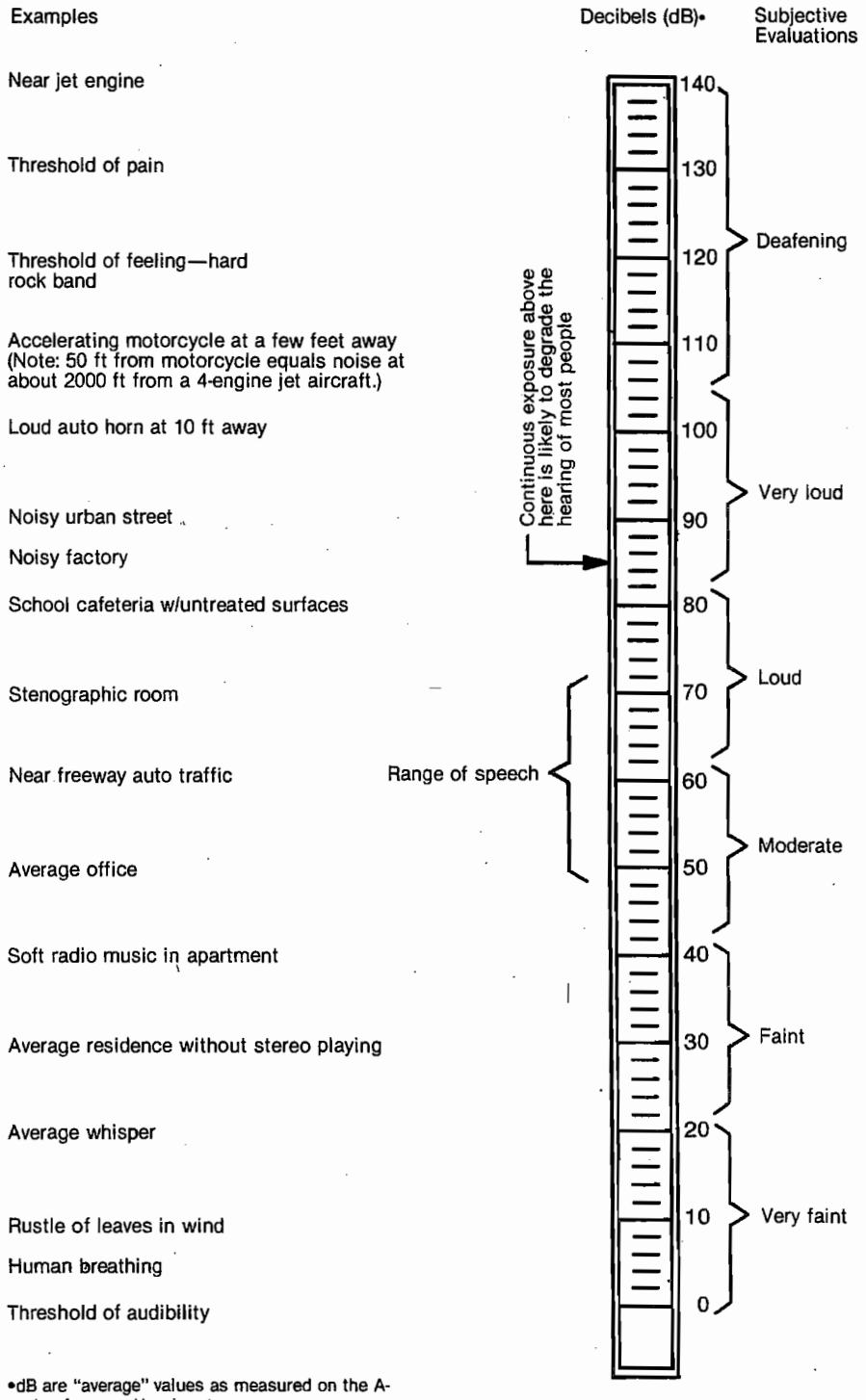
Definition and Scope of the Noise Problem

The air around us is constantly filled with sounds, yet most of us would probably not say we are surrounded by noise. What then is the difference between ordinary sound and what we call noise? The traditional definition of noise is that it is "unwanted sound." Sound becomes unwanted when it either interferes with our normal activities such as sleeping, conversation or recreation, when it causes actual physical harm such as hearing loss or has adverse effects on mental health. As we have become a more urbanized country and as technology has advanced, the level of sound in our environment has reached the point when it sometimes does cause interference and does cause physical and psychological harm, and thus we have developed a noise problem. (See Figure 1 for a listing of common sounds.)

The dimensions of the noise problem have grown larger and larger over the past few decades. In its 1979 Annual Report, The Council on Environmental Quality stated that "nearly half the US population is regularly exposed to levels of noise that interfere with ...normal activities" and about "1 in 10 ...are exposed to noises of duration and intensity sufficient to cause a permanent reduction in their ability to hear."

Figure 1
Common Sounds
Basic Theory: Common Sounds in Decibels (dB)

Some common, easily recognized sounds are listed below in order of increasing sound intensity levels in decibels. The sound levels shown for occupied rooms are typical general activity levels only and do *not* represent criteria for design.



•dB are "average" values as measured on the A-scale of a sound-level meter
(From *Concepts in Architectural Acoustics:* M. David Egan, McGraw Hill, 1972.)

The Dynamics of the Noise Problem

There are basically two types of noise problems. There is the specific, job related, occupational noise problem created by extremely loud machinery. Then there is the community noise problem where the combined effect of many individual noise sources creates an overall noise level that is unacceptable. In the following pages we will be addressing the community noise problem only.

The main contributors to a community noise problem are transportation sources such as highways, railroads and airports. These sources are the most pervasive and continuing of the noise sources within the community. Of course, at any given site, there may be other noise sources which add to the problem, sources such as jackhammers at a construction site. But in general, and for the purposes of this section, the main concern is with the transportation sources.

The dynamics of a noise problem are based on the relationship between the noise source, the person or place exposed to the noise (hereafter called the receiver) and the path the noise will travel from source to receiver.

The source generates a given amount of noise which travels along the path and arrives at the receiver. The amount of noise will be reduced to some extent as a result of how long that path is or whether there are any barriers along the path. The severity of the impact on the receiver is a function of what type of activity is taking place, whether it is indoors or outdoors, and what type of building it is in if the activity is indoors. Figure 3 contains some basic compatibility guidelines.

The impact of the noise can be altered or mitigated by changing the characteristics of any of the three elements: source, path or receiver. Later on we will look at the various mitigation measures that are possible. Our concern however will be primarily with the receiver and the path. Control of the sources themselves is the specific responsibility of agencies such as the Environmental Protection Agency (EPA) or the Federal Aviation Administration (FAA).

Figure 2
Dynamics of a Noise Problem

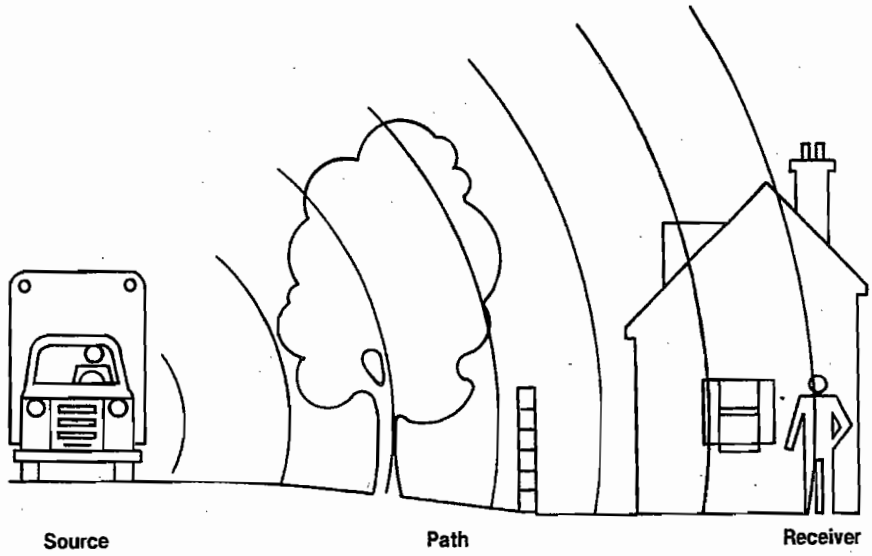
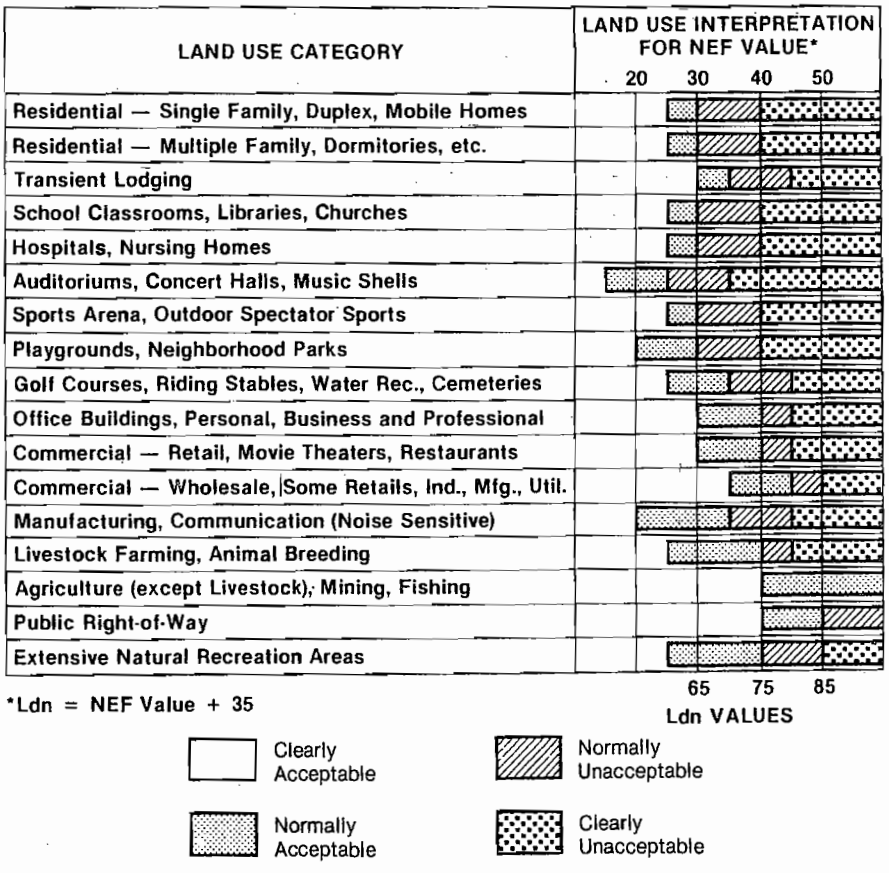


Figure 3
Land Use Compatibility Guidelines



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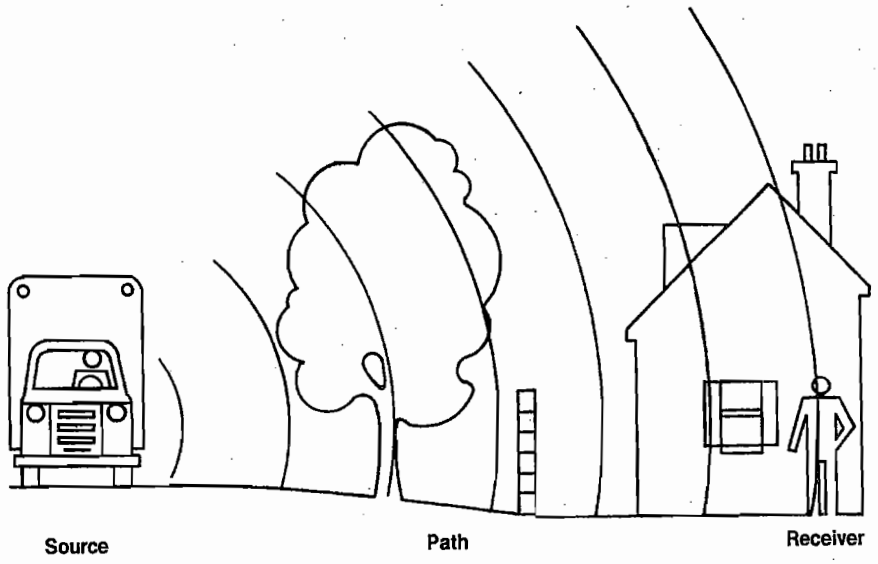

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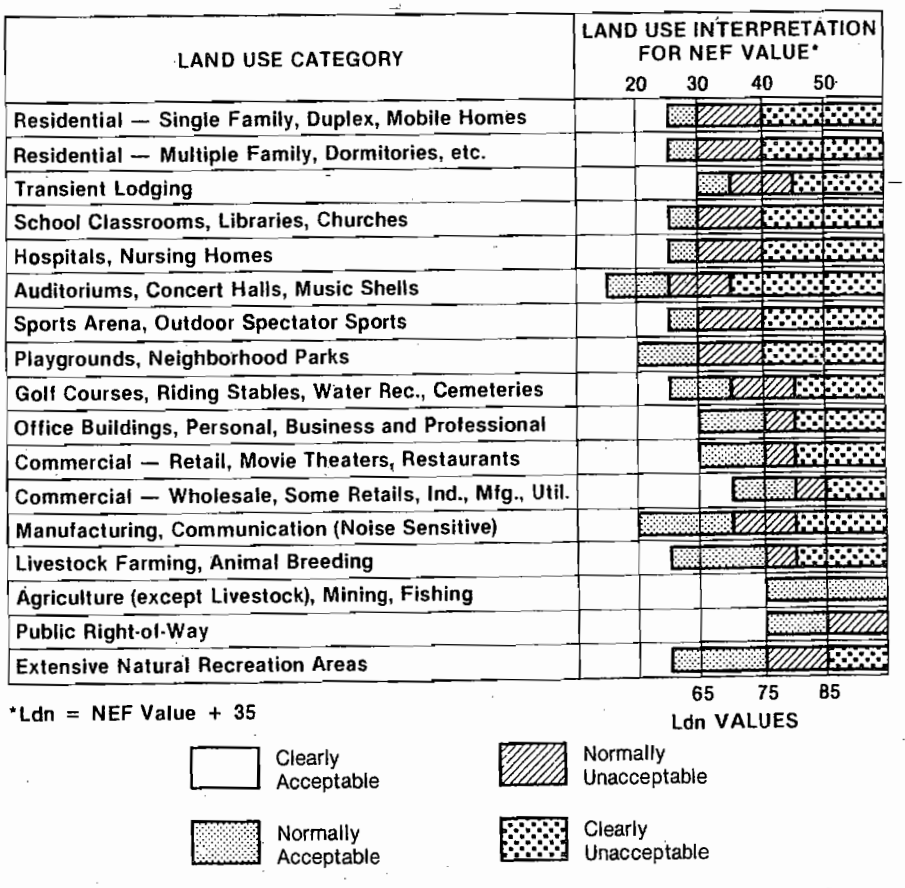


The ideal solution to a potential problem is to reduce the noise being produced by the source. The best solution available to HUD, or the community, however, is to make sure that noise sensitive uses are located where they will not be exposed to high noise levels. The next best approach to mitigating noise impact is to attempt to reduce the amount of noise that reaches the receiver. This can be accomplished through the use of barriers such as walls or earthen berms, or combinations of both, along the noise path. If the use of barriers is not possible then the only alternative available is to provide noise reduction measures in any structures associated with the activity so that at least the interior spaces are not exposed to high noise levels. This approach is considered the least desirable because most of the land uses we are concerned about, such as residential, do have outdoor areas and activities associated with them which would remain exposed to high noise levels.

A Note on Descriptors

A key factor in the growth of our ability to evaluate and reduce noise impacts has been the development of better tools to measure and describe the noise levels generated by various sources. The development of better tools (called noise descriptors or metrics) has been particularly important for dealing with community noise problems. Many of the older descriptor systems could only be used for one or two sources such as cars and railroads, but not airplanes. Since the community noise problem very often includes noise from all these sources the lack of an adequate descriptor made it difficult to do an adequate evaluation.

The most advanced descriptor currently in general use is the day night average sound level system, abbreviated as DNL and symbolized mathematically as L_{dn}. The day night average sound level is the 24 hour average sound level, expressed in decibels, obtained after the addition of a 10 decibel penalty for sound levels which occur at night between 10 PM and 7 AM. This nighttime penalty is based on the fact that many studies have shown that people are much more disturbed by noise at night than at any other time. This is not unusual in that background noise is often much less at night and also people tend to be doing very noise sensitive things at night, such as trying to sleep.

Another feature of the DNL system that is very important is that it can be used to describe noise from all sources. Thus, using the DNL system, we can describe the total noise exposure at a site, something many other descriptor systems couldn't do.

The DNL system has been adopted by the EPA, the Department of Defense (DOD) and HUD, and more recently by the FAA, specifically for describing environmental impacts for airport actions. We expect that very soon it will be in almost universal use in the U.S.

Issues

The main issues involved in any noise analysis can be summarized briefly.

- How much noise is a site exposed to
- What types of activities are being affected and how severely
- Is it reasonable to redesign the site to relocate noise sensitive activities
- And, if not, how much protection can be provided through various attenuation measures.

Your approach to these issues will be affected in many ways by the location of the project in question. Projects in suburban or rural areas can be approached differently because the available mitigation options are greater and often the noise exposure itself is not so severe. In urban situations, however, the noise exposure is often more severe but at the same time the options for mitigation or resiting are more limited. In the urban setting innovative design and the use of advanced attenuation measures becomes critical. Fortunately our experience has shown that good design and construction can relieve or substantially reduce major noise problems.

Legal Provisions

General Legislation and Background

The Federal legislation which addresses noise issues is somewhat different from other environmental legislation. The Clean Air Act, for example, required the Environmental Protection Agency to set up actual mandatory standards for air quality which were supposed to be met by all jurisdictions. EPA even has the authority to take punitive steps against cities which are not making "reasonable further progress" towards achieving these air quality goals. There is no similar legislation that covers noise. The approach has been to tackle the noise problem at the source by controlling the amount of noise that can be emitted by the individual airplane engine or the individual jackhammer. Agencies like HUD or the Farmers Home Administration have developed regulations which are related to the overall community noise level, but they only affect their own programs and are not binding on local communities. The Veterans Administration program only relates to aircraft noise and also only affects its own programs.

The major pieces of Federal legislation related to noise include:

The Noise Control Act of 1972 directed EPA to promote an environment for all Americans free from noise that jeopardizes their health and welfare. It also included a requirement for EPA to set a criterion for noise level adequate to protect health and welfare with an adequate margin of safety but without regard to cost or feasibility.

Quiet Communities Act of 1978 amended The Noise Control Act of 1972 to encourage noise control programs at the State and community level.

Federal Aid Highway Act of 1970 established the requirement that noise control be a part of the planning and design of all federally aided highways.

Aviation Safety and Noise Abatement Act of 1979 requires FAA to develop a single system for measuring noise at airports and under certain conditions to prepare and publish noise maps.

HUD Regulations

While the Department of Housing and Urban Development has no specific responsibility to try to reduce the noise problem at the source the way the Environmental Protection Agency and the Federal Aviation Administration do, it does have the responsibility to be aware of the noise problem and its impact on the housing environment. The most basic mandate which drives the Department's involvement with the noise issue is the Housing Act of 1949 (Public Law 81-171) which sets forth the national goal of "a decent home and suitable living environment for every American family." This goal was affirmed by the Housing and Urban Development Act of 1968 (Public Law 90-448). The Department was tasked by the Housing and Urban Development Act of 1965 (Public Law 89-117) "to determine feasible methods of reducing the economic loss and hardships suffered by homeowners as a result of the depreciation in the value of their properties following the construction of airports in the vicinity of their homes." The Noise Control Act of 1972, in addition to its specific tasking to EPA, tasked all Federal agencies to administer their programs in ways which reduce noise pollution. Finally, the Department is tasked by Federal Management Circular 75-2: *Compatible Land Uses at Federal Airfields* to make sure that its actions do not promote incompatible land uses around Federal airfields.

All of these legislative and regulatory mandates combine to create a serious requirement for the Department of Housing and Urban Development to be aware of the problem of noise and to take positive steps to protect residential and other sensitive land uses from high noise levels.

The Department of Housing and Urban Development first issued formal requirements related specifically to noise in 1971 (HUD Circular 1390.2). These requirements contained standards for exterior noise levels along with policies for approving HUD supported or assisted housing projects in high noise areas. In general the requirements established three zones: an acceptable zone where all projects could be approved, a normally unacceptable zone where mitigation measures would be required and where each project would have to be individually evaluated for approval or denial, and an unacceptable zone in which projects would not, as a rule, be approved.

In 1979, the Department issued revised regulations (24 CFR Part 51B) which kept the same basic standards but adopted new descriptor systems which were considerably advanced over those in use under the old requirements.

HUD's regulations also require that recipients of Community Development Block Grants (CDBG) and Urban Development Action Grants (UDAG) take into consideration the noise criteria and standards in the environmental review process and consider ameliorative actions when noise sensitive land developments are proposed in noise exposed areas. If CDBG or UDAG activities are planned in a noisy area, and HUD assistance is contemplated later for housing and/or other noise sensitive activities, the HUD standards must be met for those activities.

Project Analysis

General

While most of the analysis for noise focuses on noise sources located around the project site, there are some characteristics of the project itself that you should know about. These characteristics will help you to determine what is called the noise assessment location (NAL) for site analysis. (The NAL is a representative point (or points) on the site where significant noise exposure is expected. All distances, etc. are measured from the NAL). This information will also be helpful later in evaluating the potential for mitigating or reducing the impact of noise. All of this data should be available from preliminary plans and specifications. If not, a quick phone call to the developer/sponsor should get you all the information you need.

Data Required

- Location of outdoor noise sensitive uses relative to the noise source.
- Location of buildings containing noise sensitive activities.
- Location of other buildings, particularly ones which might serve to shield sensitive buildings or areas from the noise source.
- Design and construction features of buildings, particularly features such as use of central air conditioning which could provide noise reduction benefits by permitting windows to be kept closed.

Analysis of Site and Environs

General

The primary focus of this impact analysis is on noise sources and the primary item to be determined is the noise level created by those sources. In many instances, particularly with airports, data on the noise levels generated by the source will have already been prepared by another agency such as the airport operator, the local or State highway/transportation department or other similar agency. (Figure 4 shows typical airport noise contours.) In those cases no site or environs analysis is necessary and one can proceed directly to impact analysis. For those instances where there are no current data already prepared, the Department of Housing and Urban Development has developed a handbook called the *Noise Assessment Guidelines* which contains a detailed desk top methodology for use by individuals to determine noise impacts (see Chapter 5). Included in the handbook is a complete listing of the data about the site and its environs that are necessary to conduct an analysis. We don't want to repeat all the detailed requirements here, but the following are some of the types of information you would have to collect if you were to do your own analysis. You might note that most of the information is related to the noise sources themselves.

For the purpose of analysis, the *Noise Assessment Guidelines* require that you consider all military/civilian airports within 15 miles of the project, all significant roads within 1000 feet and basically all railroads within 3000 feet.

es of Data Required

- number and type of vehicles
- operational data:
  - speed
  - daytime/nighttime split
- conditions where the vehicles are erated, i.e., freely flowing traffic rsus stop and go, level versus hilly, ded railroad track versus bolted road track.

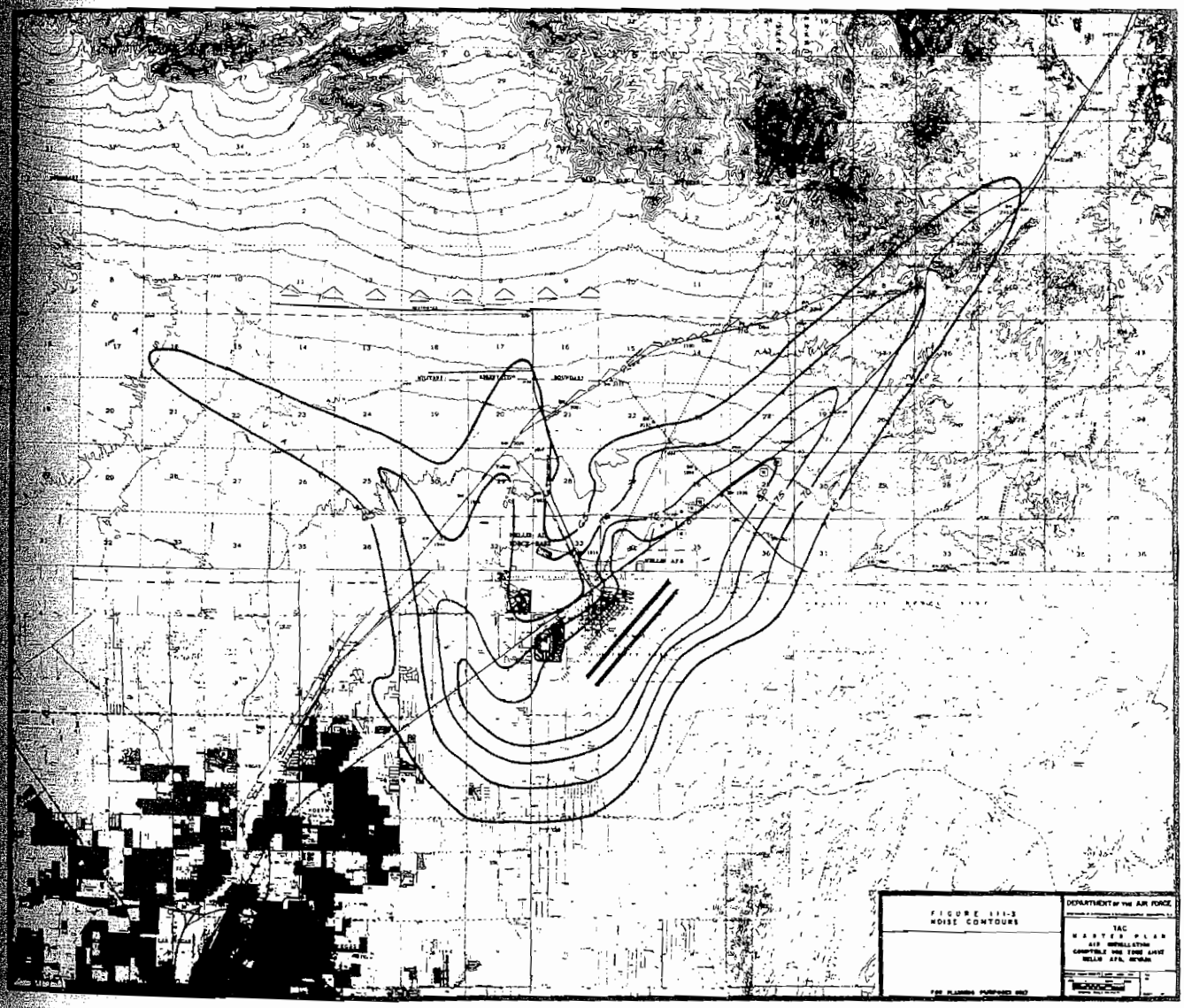
The *Noise Assessment Guidelines* contain guidance on sources for this data. Most of them are obtained from the "operator" of the transportation source. The *Guidelines* also contains model figures which can be used when actual data is unavailable. For example, if the actual number of vehicles traveling at night is not available then the *Guidelines* state that a figure of 15% should be used. Thus it is possible to make reasonably accurate noise level determinations even if some information is not available.

Determination of Impact

General

The specific procedures for determining the noise exposure levels for a site are clearly spelled out in the *Noise Assessment Guidelines*. The process is a fairly simple one in which the noise level from each source affecting the site is calculated and then combined to derive the overall exposure. If some kind of barrier exists or is proposed, the noise levels can be adjusted to reflect the mitigation provided by the barrier. The overall noise level is then compared to HUD's standards and the appropriate action, as spelled out in the regulations, is taken.

Figure 4
Noise Contours



Evaluation of Impact

HUD Regulations set forth the following exterior noise standards for new housing construction assisted or supported by the Department:

65 L_{dn} or less - Acceptable

Exceeding 65 L_{dn} but not exceeding 75 L_{dn} - Normally Unacceptable - appropriate sound attenuation measures must be provided: 5 decibels attenuation above the attenuation provided by standard construction required in 65 L_{dn} to 70 L_{dn} zone; 10 decibels additional attenuation in 70 L_{dn} to 75 L_{dn} zone.

Exceeding 75 L_{dn} - Unacceptable

HUD's regulations do not contain standards for interior noise levels. Rather a goal of 45 decibels is set forth and the attenuation requirements are geared towards achieving that goal. It is assumed that with standard construction any building will provide sufficient attenuation so that if the exterior level is 65 L_{dn} or less, the interior level will be 45 L_{dn} or less.

Once you have determined the overall noise exposure for the site you compare it to the above standards. If the overall site exposure is 65 L_{dn} or less the project is acceptable. If the exposure is between 65 L_{dn} and 75 L_{dn} you should consider alternative locations or providing adequate attenuation with the first preference, as we've noted, being for the construction of some kind of barrier to prevent noise from reaching the site. If providing adequate attenuation is impossible or impractical then the project should be considered unacceptable.

Suggested Mitigation

General Considerations

As discussed briefly earlier, there are three basic approaches for mitigating the high noise exposures. The first and best is to relocate noise sensitive uses out of the high noise area. The second is to prevent noise from reaching the noise sensitive user through some sort of barrier. And the third, and least desirable approach, is to provide attenuation for at least the interiors of any buildings located in the high noise areas.

Specific Considerations

Relocating Noise Sensitive Uses

By far the most desirable mitigation approach is to relocate noise sensitive uses out of the high noise area although. If the site is large enough it may be possible to locate non-noise sensitive uses between the source and the sensitive use, for example a parking lot might be located between a road and a park (see Figure 5). The workcharts in the *Noise Assessment Guidelines* can be used in reverse to tell you exactly how far away from the noise source you need to be.

When sites are small, very dense or when the source affects the entire site it is very difficult to mitigate by changing the site plan. Then the next option must be considered: erecting some type of barrier between the source and the receiver.

Barriers

Barriers are most effective for at or below ground level sources. They have no effect on noise from aircraft overflights and are limited in practical application with elevated sources such as elevated trains. The key to the effectiveness of a barrier is whether or not it breaks the line of sight between the source and the receiver. If a barrier does not completely break the line of sight either because it is not high enough, or not long enough then its effectiveness is greatly reduced.

Barriers can be actual walls, earthen mounds (called berms) or even other buildings. The use of other non-noise sensitive buildings as barriers is a particularly good approach in that it need not add to the cost of the project and may not create the aesthetic problem a large wall might create (see Figure 6).

Figure 5
The Audible Landscape

In cluster development, open space can be placed near the highway to reduce noise impacts on residences

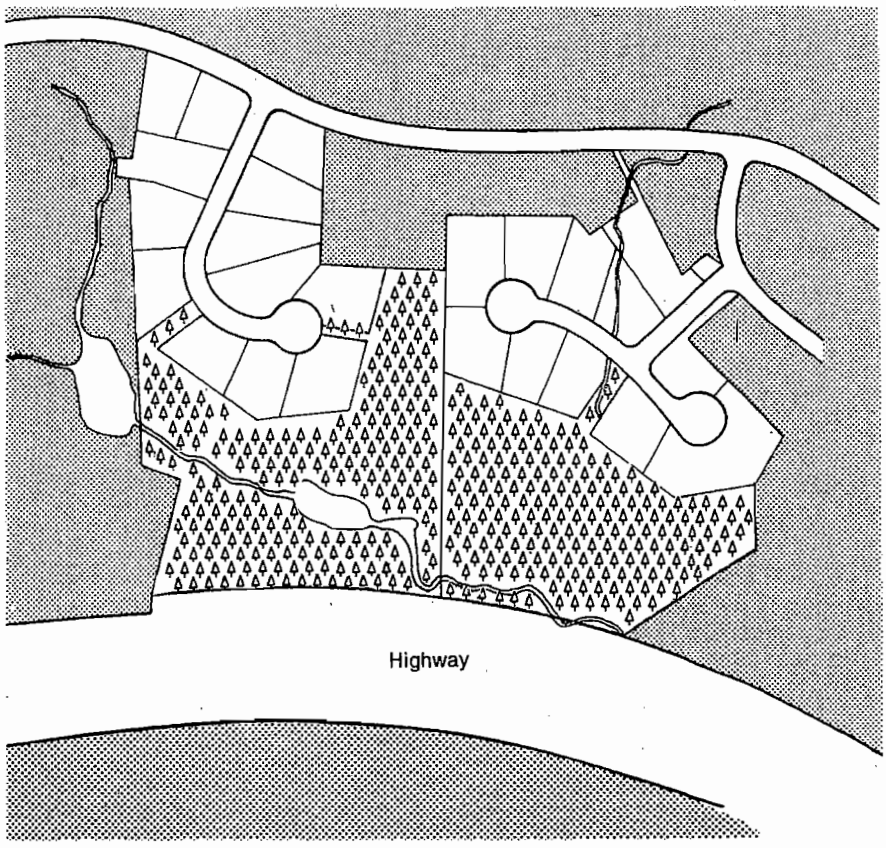


Figure 6
The Audible Landscape

Placement of noise compatible land uses near highway in Planned Unit Development

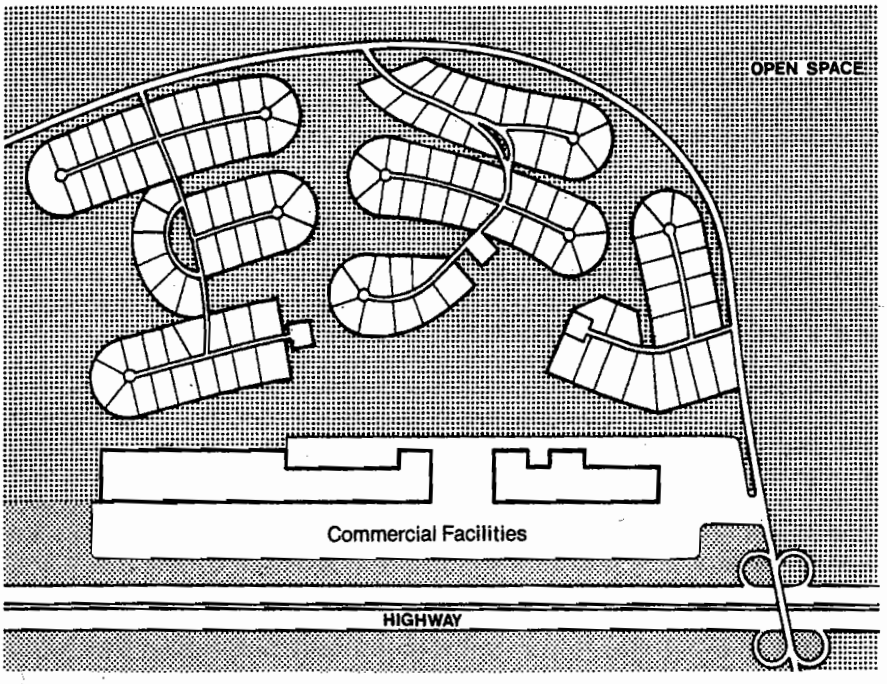
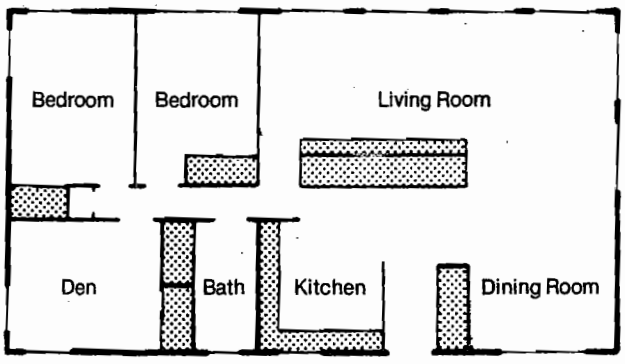


Figure 7
The Audible Landscape

Use of acoustical architectural design to reduce noise impacts on more noise sensitive living spaces



Highway

As pointed out earlier, the effectiveness of a barrier is determined in large part by its height and length. Some studies have shown that the effectiveness of a barrier can be reduced by as much as 50% if it isn't long enough. Again, the *Noise Assessment Guidelines* contain procedures for determining the effectiveness of barriers.

Incorporating Noise Attenuation Measures into the Building

If neither relocation or barriers is a reasonable noise attenuation option, the last resort is to incorporate noise attenuation measures into the buildings themselves. This is not considered the best solution because it leaves the outdoor areas, some of which may be for quiet recreation, exposed to high noise levels. But if development **must** take place and barriers are impossible, then the noise attenuation measures should be employed in building design and construction.

Without going into great technical detail, noise attenuation construction measures generally fall into four categories.

(1) Reducing the total area of windows or other acoustically weaker building elements

(2) Sealing off "leaks" around windows, doors, vents.

(3) Improving the actual sound attenuating properties of small building elements such as windows, doors, etc.

(4) Improving the actual sound attenuating properties of major building elements such as roof and wall construction.

In addition, noise attenuation in buildings can be provided by designing interior spaces so that "dead" spaces such as closets or corridors act as buffer zones (see Figure 7). And finally noise attenuation can be provided by reducing the need for open windows by providing air conditioning.

Many of the steps that would be taken to provide noise attenuation also help conserve energy. Good weatherstripping around windows and doors is one example. Another might be reducing window areas in walls if the noise source is to the north or west. Because many of these measures serve two purposes, they should not necessarily be considered a burdensome requirement but rather just good design and construction.

Information Resources

Publications

HUD Regulation 24 CFR Part 51 Subpart B – Noise Abatement and Control.

Noise Assessment Guidelines, HUD 1983, basic technical procedural resource.

Aircraft Noise Impact, HUD 1972, a bit dated but good overview of problem.

The Audible Landscape, DOT (FHWA) 1974, an excellent discusson of mitigation measures including land use planning and building design and construction.

Information on Levels of Environmental Noise Requisite to Protect Public health and Welfare With an Adequate margin of Safety, EPA, 1974. The "levels document" that explains basis for EPA standards.

Noise Barrier Design Handbook, Federal Highway Administration 1976. Good discussion of barriers, technical but readable.

Handbook of Noise Control, 2nd edition, 1979, McGraw Hill. A basic technical handbook covering all aspects of noise for those who wish to go into the subject further.

Experts

HUD environmental officers have been trained in the use of the *Noise Assessment Guidelines* and can help you work with them. Many architects are trained in acoustics and can help in development of noise attenuation strategies.

Quiz

Questions

1. Why is noise considered "unwanted sound"?
2. What is a community noise problem?
3. What are the three main contributors to a community noise problem?
4. What are the three components of a noise problem?
5. What are two key characteristics of the day-night average sound level descriptor system?
6. What are HUD's noise standards?
7. How do HUD's standards apply to CDBG recipients?
8. What are the three general mitigation measures available to HUD and the community and in what order of preference?
9. When are barriers effective and when are they not effective?
10. Describe how the *Noise Assessment Guidelines* can be used to determine appropriate mitigation measures.

Quiz

Answers

1. because it interferes with normal activities or causes physical or psychological damage
2. a community noise problem is where the combined effect of many individual sources creates an overall noise level that is unacceptable
3. highways, railroads and aircraft
4. the source, the path, the receiver
5. it is an average sound level and it can be used for all sources
6. 65 L_{dn} or below: Acceptable
   65 to 75 L_{dn}: Normally unacceptable, noise attenuation measures required,
   above 75 L_{dn}: Unacceptable
7. CDBG recipients must take into consideration the standards in their planning and environmental review. If they expect to use HUD assistance later for housing or other noise sensitive activities the standards must be met for those activities.
8. 1st relocate noise sensitive uses
   2nd reduce noise reaching receiver
   3rd redesign buildings
9. barriers are effective for at or below ground level sources. Are not effective for aircraft overflights or most elevated sources
10. can be used to determine separation distance required for relocation and the height and length of barriers required

Chapter 2

The Noise Regulation

Introduction

The basic foundation for and structure of the HUD noise program is set out in the noise regulation, 24 CFR 51B. The regulation establishes the actual standards, assigns implementation responsibilities, describes review and approval procedures, and identifies special situations which may warrant waivers of procedures or standards. Therefore, the key to your understanding and implementation of the HUD noise program is a clear understanding of the regulation.

There is no way to escape the task of sitting down and simply reading the regulations, over and over until you thoroughly understand them. We have however done two things that will help you apply the regulations. First, for quick reference, we have prepared a list of the key sections in the regulation and second we have prepared an annotated copy of the regulation.

The list of key sections was prepared to help you find the specific section you need for a specific question or issue. While the regulation itself is not really long, an index is always useful. We caution you, however, against using the index to avoid learning the regulations. The list was prepared for your convenience in applying the regulation once you have come to understand it.

We prepared the annotated regulation because, try as we might, it was impossible to anticipate all the questions, implementation problems and special situations that might arise and to address them in the regulation. So, now that we have had a few years' experience with the regulation, we have gathered together the important questions, notes, second thoughts etc. and prepared this annotated regulation. We hope it will give you further insight into what the regulation means when it is applied in the field.

Key Sections in Noise Regulation

Section	Subject
51.101(a)(2)	Application of Policy to Block Grants
51.101(a)(3)	Policy for New Construction
51.101(a)(4)	Policy for Existing Construction
51.101(a)(5)	Policy for Modernization and Rehabilitation
51.101(a)(8)	The Exterior Noise Goal
51.101(a)(9)	The Interior Noise Goal
51.102(a)	Authority to Approve Projects
51.103(a)	Identification of DNL as *The* Noise Descriptor to be Used
51.103(b)	How to Measure Loud Impulsive Noises
51.103(c)	The Noise Standards
51.104(a)	Attenuation Requirements Discussed
51.104(b)(1)	Special Approval and Environmental Review Requirements for the Normally Unacceptable Zone
51.104(b)(2)	Special Approval and Environmental Review Requirements for the Unacceptable zone
51.105(a)	Flexibility for Non-acoustic Benefits Provisions
51.106(a)	How to Tell If Existing Data on Noise Are Acceptable
51.106(a)(4)	Specific Review and Approval Procedures For Airport Noise Contours
51.106(d)	When Noise Measurements May be Used Instead of Calculated Levels
51.106(f)	When to Give Credit for Proposed Barriers

Part 51—Environmental Criteria and Standards

Subpart A—General Provisions

Subpart B—Noise Abatement and Control

Authority: Sec. 7(d). Department of HUD Act (42 U.S.C. 3535(d)).

Subpart B—Noise Abatement and Control

This regulation replaces HUD Circular 1390.2, Noise Abatement and Control, 1971, which is now cancelled, along with all instructions and clarifying memoranda pertaining to the circular.

§51.100 Purpose and authority.

(a) *Purpose.* The Department of Housing and Urban Development finds that noise is a major source of environmental pollution which represents a threat to the serenity and quality of life in population centers and that noise exposure may be a cause of adverse physiological and psychological effects as well as economic losses.

It is the purpose of this Subpart to:

(1) Call attention to the threat of noise pollution;

(2) Encourage the control of noise at its source in cooperation with other Federal departments and agencies;

(3) Encourage land use patterns for housing and other noise sensitive urban needs that will provide a suitable separation between them and major noise sources;

(4) Generally prohibit HUD support for new construction of noise sensitive uses on sites having unacceptable noise exposure;

(5) Provide policy on the use of structural and other noise attenuation measures where needed; and

(6) Provide policy to guide implementation of various HUD programs.

(b) *Authority.* Specific authorities for noise abatement and control are contained in:

(1) The Noise Control Act of 1972 (Pub. L. 92-574) which directs Federal agencies to administer their programs in ways which reduce noise pollution.

(2) The Quiet Communities Act of 1978 (Pub. L. 95-609) which amended Pub. L. 92-574.

(3) The General Services Administration, Federal Management Circular 75-2: *Compatible Land Uses at Federal Airfields* prescribes the Executive Branch's general policy with respect to achieving compatible land uses on either public or privately owned property at or in the vicinity of Federal airfields.

(4) Section 1113 of the Housing and Urban Development Act of 1965 (Pub. L. 89-117) directs the Secretary "* * * to determine feasible methods of reducing the economic loss and hardships suffered by homeowners as a result of the depreciation in the value of their properties following the construction of airports in the vicnity of their homes, including a study of feasible methods of insulating such homes from the noise of aircraft."

§51.101 General policy.

(a) It is HUD's general policy to provide minimum national standards applicable to HUD programs to protect citizens against excessive noise in their communities and places of residence.

(1) *Comprehensive planning assistance.* HUD requires that grantees give adequate consideration to noise exposures and sources of noise as an integral part of the urban environment in HUD assisted comprehensive planning, as follows:

(i) Particular emphasis shall be placed on the importance of compatible land use planning in relation to airports, highways and other sources of high noise.

(ii) Applicants shall take into consideration HUD environmental standards impacting the use of land as required in 24 CFR Part 600.

(iii) Environmental studies, including noise assessments, are allowable costs.

(2) *Community Development Block Grants.* Recipients of community development block grants under the Housing and Community Development Act of 1974 (Pub. L. 93-383), as amended by the Housing and Community Development Act of 1977 (Pub. L. 95-128), must take into

consideration the noise criteria and standards in the environmental review process and consider ameliorative actions when noise sensitive land development is proposed in noise exposed areas. Grant recipients shall address deviations from the standards in their environmental reviews as required in 24 CFR Part 58.

Where CDBG activities are planned in a noisy area, and HUD assistance is contemplated later for housing and/or other noise sensitive activities, the CDBG grantee risks denial of the HUD assistance unless the HUD standards are met. Environmental studies, including noise assessments, are allowable costs.

(3) *HUD support for new construction.* HUD assistance for the construction of new noise sensitive uses is prohibited generally for projects with Unacceptable noise exposures and is discouraged for projects with Normally Unacceptable noise exposure. (Standards of acceptability are contained in §51.103(c).) This policy applies to all HUD programs providing assistance, subsidy or insurance for housing, college housing, mobile home parks, nursing homes, hospitals, and all programs providing assistance or insurance for land development, new communities, redevelopment or any other provision of facilities and services which are directed to make land available for housing or noise sensitive development. The policy does not apply to research demonstration projects which do not result in new construction or reconstruction, flood insurance, interstate land sales registration, or any action or emergency assistance under disaster assistance programs which are provided to save lives, protect property, protect public health and safety, remove debris and wreckage, or assistance provided that has the effect of restoring facilities substantially as they existed prior to the disaster.

(4) *HUD support for existing construction.* Noise exposure by itself will not result in the denial of HUD support for the resale and purchase of otherwise acceptable existing buildings. However, environmental noise is a marketability factor which HUD will consider in determining the amount of insurance or other assistance that may be given.

Existing construction means units which are either more than 1 year old or for which this is the second or subsequent purchaser.

The old definition of major or substantial rehabilitation and modernization as being any project where cost is 75% or more of replacement cost no longer applies. Now the criteria contained in individual program guidance applies.

(5) *HUD support of modernization and rehabilitation.* For modernization projects located in all noise exposed areas, HUD shall encourage noise attenuation features in alterations. For major or substantial rehabilitation projects in the Normally Unacceptable and Unacceptable noise zones, HUD actively shall seek to have project sponsors incorporate noise attenuation features, given the extent of the rehabilitation being undertaken and the level of exterior noise exposure. In Unacceptable noise zones, HUD shall strongly encourage conversion of noise-exposed sites to land uses compatible with the high noise levels.

(6) *Research, guidance and publications.* HUD shall maintain a continuing program designed to provide new knowledge of noise abatement and control to public and private bodies, to develop improved methods for anticipating noise encroachment, to develop noise abatement measures through land use and building construction practices, and to foster better understanding of the consequences of noise. It shall be HUD's policy to issue guidance documents periodically to assist HUD personnel in assigning an acceptability category to projects in accordance with noise exposure standards, in evaluating noise attenuation measures, and in advising local agencies about noise abatement strategies. The guidance documents shall be updated periodically in accordance with advances in the state-of-the-art.

(7) *Construction equipment, building equipment and appliances.* HUD shall encourage the use of quieter construction equipment and methods in population centers, the use of quieter equipment and appliances in buildings, and the use of appropriate noise abatement techniques in the design of residential structures with potential noise problems.

(8) *Exterior noise goals.* It is a HUD goal that exterior noise levels do not exceed a day-night average sound level of 55 decibels. This level is recommended by the Environmental Protection Agency as a goal for outdoors in residential areas. The levels recommended by EPA are not standards and do not take into account cost or feasibility. For the purposes of this regulation and to meet other program objectives, sites with a day-night average sound level of 65 and below are acceptable and are allowable (see Standards in §51.103(c)).

(9) *Interior noise goals.* It is a HUD goal that the interior auditory environment shall not exceed a day-night average sound level of 45 decibels. Attenuation measures to meet these interior goals shall be employed where feasible. Emphasis shall be given to noise sensitive interior spaces such as bedrooms. Minimum attenuation requirements are prescribed in §51.104(a).

(10) *Acoustical privacy in multifamily buildings.* HUD shall require the use of building design and acoustical treatment to afford acoustical privacy in multifamily buildings pursuant to requirements of the Minimum Property Standards.

§51.102 Responsibilities.

(a) *Authority to approve projects.* (1) Decisions on proposed projects with acceptable noise exposures shall be delegated to the program personnel within field offices, including projects where increased noise levels are considered acceptable because of non-acoustic benefits under §51.105(a). Field office program personnel may also approve projects in normally unacceptable noise exposed areas where adequate sound attenuation is provided and where the project does not require an Environmental Impact Statement under §51.104(b).

(2) Other approvals in normally unacceptable noise exposed areas require the concurrence of the Regional Administrator.

(3) Requests for approvals of projects or portions of projects with unacceptable noise exposures shall be referred through the Regional Office to the Assistant Secretary for Community Planning and Development for approval pursuant to §51.104(b).

The Noise Control Act of 1972 required EPA to "publish information on the levels of environmental noise. . .which. . .are requisite to protect the public health and welfare with an adequate margin of safety." EPA has interpreted this to mean that the levels should not reflect technical feasibility or economic costs. "Health and welfare" is defined as being "complete physical, mental and social well-being and not merely the absence of disease and infirmity."

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(4) In cases where the Regional Administrator determines that an important precedent or issue is involved, such cases shall be referred with recommendations to the Assistant Secretary for Community Planning and Development.

(b) *Surveillance of noise problem areas.* Appropriate field staff shall maintain surveillance of potential noise problem areas and advise local officials, developers, and planning groups of the unacceptability of sites because of noise exposure at the earliest possible time in the decision process. Every attempt shall be made to insure that applicants' site choices are consistent with the policy and standards contained herein.

(c) *Notice to applicants.* At the earliest possible stage, HUD program administrators shall:

(1) Determine the suitability of the acoustical environment of proposed projects;

(2) Notify applicants of any adverse or questionable situations; and

(3) Assure that prospective applicants are apprised of the standards contained herein so that future site choices will be consistent with these standards.

(d) *Technical assistance.* Technical assistance in the measurement, estimation, interpretation, or prediction of noise exposure is available from the Office of Community Planning and Development and the Office of Policy Development and Research. Field office questions shall be forwarded through the Regional Office to the Assistant Secretary for Community Planning and Development or his designee.

(e) *Interdepartmental coordination.* Regional Administrators shall foster appropriate coordination between field offices and other departments and agencies, particularly the Environmental Protection Agency, the Department of Transportation, Department of Defense representatives, and the Veterans Administration. HUD staff shall utilize the acceptability standards in commenting on the prospective impacts of transportation facilities and other noise generators in the Environmental Impact Statement review process.

§51.103 Criteria and standards.

These standards apply to all programs as indicated in §61.101.

(a) *Measure of external noise environments.* The magnitude of the external noise environment at a site is determined by the value of the day-night average sound level produced as the result of the accumulation of noise from all sources contributing to the external noise environment at the site. Day-night average sound level, abbreviated as DNL and symbolized as L_{dn}, is the 24-hour average sound level, in decibels, obtained after addition of 10 decibels to sound levels in the night from 10 p.m. to 7 a.m. Mathematical expressions for average sound level and day-night average sound level are stated in the Appendix.

(b) *Loud impulsive sounds.* On an interim basis, when loud impulsive sounds, such as explosions or sonic booms, are experienced at a site, the day-night average sound level produced by the loud impulsive sounds alone shall have 8 decibels added to it in assessing the acceptability of the site (see Appendix). Alternatively, the C-weighted day-night average sound level (L_{Cdn}) may be used without the 8 decibel addition, as indicated in Section 51.106(a)(3).

Methods for assessing the contribution of loud impulsive sounds to day-night average sound level at a site and mathematical expressions for determining whether a sound is classed as "loud impulsive" are provided in the Appendix.

(c) *Exterior standards.* The degree of acceptability of the noise environment at a site is determined by the sound levels external to buildings or other facilities containing noise sensitive uses. The standards shall usually apply at a location 2 meters (6.5 feet) from the building housing noise sensitive activities in the direction of the predominant noise source. Where the building location is undetermined, the standards shall apply 2 meters (6.5 feet) from the building setback line nearest to the predominant noise source. The standards shall also apply at other locations where it is determined that quiet outdoor space is required in an area ancillary to the principal use on the site.

The noise environment inside a building is considered acceptable if (a) the noise environment external to the building complies with these standards, and (b) the building is constructed in a manner common to the area or, if of uncommon construction, has at least the equivalent noise attenuation characteristics.

This is because the reverberation effect of sound waves hitting the wall will increase the noise levels at the site. You won't pick this up unless you back off from the wall to measure.

Site Acceptability Standards

	Day-night average sound level (in decibels)	Special approvals and requirements
Acceptable	Not exceeding 65 dB(1)	None
Normally Unacceptable	Above 65 dB but not exceeding 75 dB	Special Approvals (2) Environmental Review (3) Attenuation (4)
Unacceptable	Above 75 dB	Special Approvals (2) Environmental Review (3) Attenuation (5)

Notes.—(1) Acceptable threshold may be shifted to 70 dB in special circumstances pursuant to Section 51.105(a)

(2) See Section 51.104(b) for requirements.

(3) See Section 51.104(b) for requirements.

(4) 5 dB additional attenuation required for sites above 65 dB but not exceeding 70 dB and 10 dB additional attenuation required for sites above 70 dB but not exceeding 75 dB. (See Section 51.104(a).)

(5) Attenuation measures to be submitted to the Assistant Secretary for CPD for approval on a case-by-case basis.

§51.104 Special requirements.

(a) *Noise attenuation.* Noise attenuation measures are those required in addition to attenuation provided by buildings as commonly constructed in the area, and requiring open windows for ventilation. Measures that reduce external noise at a site shall be used wherever practicable in preference to the incorporation of additional noise attenuation in buildings. Building designs and construction techniques that provide more noise attenuation than typical construction may be employed also to meet the noise attenuation requirements.

(1) *Normally Unacceptable noise zone.* Approvals in this zone require a minimum of 5 decibels additional sound attenuation for buildings having noise-sensitive uses if the day-night average sound level is greater than 65 decibels but does not exceed 70 decibels, or a minimum of 10 decibels of additional sound attenuation if the day-night average sound level is greater than 70 decibels but does not exceed 75 decibels.

(2) *Unacceptable noise zone.* Noise attenuation measures require the approval of the Assistant Secretary for Community Planning and Development (See §51.104(b)(2).)

(b) *Special Approvals and Environmental Review Requirements.* Environmental clearances shall be conducted pursuant to the requirements of HUD's Departmental Policies, Responsibilities and Procedures for Protection and Enhancement of Environmental Quality (38 FR 19182 as amended) or other environmental regulations which may be issued by the Department. The Special Clearance and Environmental Impact Statement (EIS) threshold requirements are hereby modified for all projects proposed in the Normally Unacceptable and Unacceptable noise exposure zones as follows:

(1) *Normally Unacceptable noise zone.* (i) All projects located in the Normally Unacceptable Noise Zone require a Special Environmental Clearance except an EIS is required for a proposed project located in a largely undeveloped area, or where the HUD action is likely to encourage the establishment of incompatible land use in this noise zone.

Berms and barriers are our first choice because they provide protection for yards, playgrounds, etc. Since outdoor activity is often very important to residents we want to protect the outdoor areas as much as possible.

By definition a barrier must be separate from the building or area it is providing attenuation for. After all barriers are preferred because they improve exterior as well as interior levels. Non-noise sensitive buildings can, however, be used as barriers for noise sensitive buildings or exterior areas.

Assumption is that standard construction provides an average of 20 L_{dn} attenuation. At 65 L_{dn} or below this amount of attenuation would be sufficient to meet interior level of 45 L_{dn}. Additional requirements are designed to meet this goal even when exterior noise levels are higher.

Substitute Environmental Assessment (with ECO concurrence) wherever you see Special Clearance.

(ii) When an EIS is required, the concurrence of the Regional Administrator is also required before a project can be approved. For the purposes of this paragraph, an area will be considered as largely undeveloped unless the area within a 2-mile radius of the project boundary is more than 50 percent developed for urban uses and infrastructure (particularly water and sewers) is available and has capacity to serve the project.

(iii) All other projects in the Normally Unacceptable zone require a Special Environmental Clearance, except where an EIS is required for other reasons pursuant to HUD environmental policies.

(2) *Unacceptable noise zone.* An EIS is required prior to the approval of projects with unacceptable noise exposure. Projects in or partially in an Unacceptable Noise Zone shall be submitted through the Regional Administrator to the Assistant Secretary for Community Planning and Development for approval. The Assistant Secretary may waive the EIS requirement in cases where noise is the only environmental issue and no outdoor sensitive activity will take place on the site. In such cases, a Special Environmental Clearance is required.

When the area in question is in a small community outside an SMSA and the application of the 2 mile radius rule would be unreasonable, an area can be considered largely developed if it is contiguous to existing development and infrastructure is available and has capacity to serve the project. The Assistant Secretary will review them on a case-by-case basis. In all other cases the 2 mile radius/50% rule still applies.

§51.105 Exceptions.

(a) *Flexibility for non-acoustic benefits.* Where it is determined that program objectives cannot be achieved on sites meeting the acceptability standard of 65 decibels, the Acceptable Zone may be shifted to L_{dn} 70 on a case-by-case basis if all the following conditions are satisfied:

(1) The project does not require an Environmental Impact Statement under provisions of section 104(b)(1) and noise is the only environmental issue.

(2) The project has received a Special Environmental Clearance and has received the concurrence of the Environmental Clearance Officer.

(3) The project meets other program goals to provide housing in proximity to employment, public facilities and transportation.

(4) The project is in conformance with local goals and maintains the character of the neighborhood.

(5) The project sponsor has set forth reasons, acceptable to HUD, as to why the noise attenuation measures that would normally be required for new construction in the L_{dn} 65 to L_{dn} 70 zone cannot be met.

Caution—every effort should be made to get official contours—particularly for military installations and large air carrier airports rather than trying to use the *Noise Assessment Guidelines*.

What this really means is that the 5db attenuation requirement for the 65–70 L_{dn} zone is waived. Primarily intended for urban areas where alternative sites are not available. Note that *all* conditions must be met.

These requirements are very important. Be careful with design hour values.

(6) Other sites which are not exposed to noise above L_{dn} 65 and which meet program objectives are generally not available.

The above factors shall be documented and made part of the project file.

§51.106 Implementation.

(a) *Use of available data.* HUD field staff shall make maximum use of noise data prepared by others when such data are determined to be current and adequately projected into the future and are in terms of the following:

(1) *Sites in the vicinity of airports.* The noise environment around airports is described sometimes in terms of Noise Exposure Forecasts, abbreviated as NEF or, in the State of California, as Community Noise Equivalent Level, abbreviated as CNEL. The noise environment for sites in the vicinity of airports for which day-night average sound level data are not available may be evaluated from NEF or CNEL analyses using the following conversions to DNL:

DNL ≈ NEF + 35

DNL ≈ CNEL

(2) *Sites in the vicinity of highways.* Highway projects receiving Federal aid are subject to noise analyses under the procedures of the Federal Highway Administration.

Where such analyses are available they may be used to assess sites subject to the requirements of this standard. The Federal Highway Administration employs two alternate sound level descriptors: (a) The A-weighted sound level not exceeded more than 10 percent of the time for the highway design hour traffic flow, symbolized as L_{10}; or (b) the equivalent sound level for the design hour, symbolized as L_{eq}. The day-night average sound level may be estimated from the design hour L_{10} or L_{eq} values by the following relationships, provided heavy trucks do not exceed 10 percent of the total traffic flow in vehicles per 24 hours and the traffic flow between 10 p.m. and 7 a.m. does not exceed 15 percent of the average daily traffic flow in vehicles per 24 hours:

DNL ≈ L_{10} (design hour)—3 decibels

DNL ≈ L_{eq} (design hour) decibels

Where the auto/truck mix and time of day relationships as stated in this Section do not exist, the HUD Noise Assessment Guidelines or other noise analysis shall be used.

(3) *Sites in the vicinity of installations producing loud impulsive sounds.* Certain Department of Defense installations produce loud impulsive sounds from artillery firing and bombing practice ranges. Noise analyses for these facilities sometimes encompass sites that may be subject to the requirements of this standard. Where such analyses are available they may be used on an interim basis to establish the acceptability of sites under this standard.

The Department of Defense uses day-night average sound level based on C-weighted sound level, symbolized L_{Cdn}, for the analysis of loud impulsive sounds. Where such analyses are provided, the 8 decibel addition specified in 51.103(b), is not required, and the same numerical values of day-night average sound level used on an interim basis to determine site suitability for non-impulsive sounds apply to the L_{Cdn}.

(4) *Use of areawide acoustical data.* HUD encourages the preparation and use of areawide acoustical information, such as noise contours for airports. Where such new or revised contours become available for airports (civil or military) and military installations they shall first be referred to the Regional Office (Environmental Clearance Officer) for review, evaluation and decision on appropriateness for use by HUD. The Regional Office shall submit revised contours to the Assistant Secretary of Community Planning and Development for review, evaluation and decison whenever the area affected is changed by 20 percent or more, or whenever it is determined that the new contours will have a significant effect on HUD programs, or whenever the contours are not provided in a methodology acceptable under §51.106(a)(1) or in other cases where the Regional Office determines that Headquarters review is warranted. For other areawide acoustical data, review is required only where existing areawide data are being utilized and where such data have been changed to reflect changes in the measurement methodology or underlying noise source assumptions.

Contours for future noise levels based on new construction, mission changes etc. which become available as part of the Environmental Impact Statement process shall not be used until the NEPA process is complete and a decision on the proposed action is made.

When new or revised contours are approved, make sure all interested people in local area are informed that HUD will be using different contours. Make a special effort to inform the most active developers in area or developers who have worked with HUD before.

This is also required for noise studies for developers by consultants, whether to provide original data, or to contest existing data or a HUD analysis. It is particularly important to make sure the same traffic, vehicle or operational data were used for each study, when one study is being contested.

Requests for determination on usage of new or revised areawide data shall include the following:

(i) Maps showing old, if applicable, and new noise contours, along with brief description of data source and methodology.

(ii) Impact on existing and prospective urbanized areas and on development activity.

(iii) Impact on HUD-assisted projects currently in processing.

(iv) Impact on future HUD program activity. Where a field office has determined that immediate approval of new areawide data is necessary and warranted in limited geographic areas, the request for approval should state the circumstances warranting such approval. Actions on proposed projects shall not be undertaken while new areawide noise data are being considered for HUD use except where the proposed location is affected in the same manner under both the old and new noise data.

(b) *Site assessments.* Compliance with the standards contained in §51.103(c) shall, where necessary, be determined using noise assessment guidelines, handbooks, technical documents and procedures issued by the Department.

(c) *Variations in site noise levels.* In many instances the noise environment will vary across a site, with portions of the site being in an Acceptable noise environment and other portions in a Normally Unacceptable noise environment. The standards in §51.103(c) shall apply to the portions of a building or buildings used for residential purposes and for ancillary noise sensitive open spaces.

(d) *Noise measurements.* Where noise assessments result in a finding that the site is borderline or questionable, or is controversial, noise measurements may be performed. Where it is determined that noise measurements are required, such measurements will be conducted in accordance with methods and measurement criteria established by the Department. Locations for noise measurements will depend on the location of noise sensitive uses that are nearest to the predominant noise source (see §51.103(c)).

(e) *Projections of noise exposure.* In addition to assessing existing exposure, future conditions should be projected. To the extent possible, noise exposure shall be projected to be representative of conditions that are expected to exist at a time at least 10 years beyond the date of the project or action under review.

(f) *Reduction of site noise by use of berms and/or barriers.* If it is determined by adequate analysis that a berm and/or barrier will reduce noise at a housing site, and if the barrier is existing or there are assurances that it will be in place prior to occupancy, the environmental noise analysis for the site may reflect the benefits afforded by the berm and/or barrier.

In the environmental review process under §51.104(b), the location height and design of the berm and/or barrier shall be evaluated to determine its effectiveness, and impact on design and aesthetic quality, circulation and other environmental factors.

This provision should be used with caution. Very clear and strong assurances that berms or barriers will be constructed should be obtained in writing before approval.

Again also note that by definition a barrier must be physically separate from the building or area it is providing attenuation for.

The *Noise Assessment Guidelines* contain procedures for evaluating barrier effectiveness.

Appendix to Subpart B—definition of acoustical quantities

1. *Sound Level.* The quantity in decibels measured with an instrument satisfying requirements of American National Standard Specification for Type 1 Sound Level Meters S1.4–1971. Fast time-averaging and A-frequency weighting are to be used, unless others are specified. The sound level meter with the A-weighting is progressively less sensitive to sounds of frequency below 1,000 hertz (cycles per second), somewhat as is the ear. With fast time averaging the sound level meter responds particularly to recent sounds almost as quickly as does the ear in judging the loudness of a sound.

(2) *Average Sound Level.* Average sound level, in decibels, is the level of the mean-square A-weighted sound pressure during the stated time period, with reference to the square of the standard reference sound pressure of 20 micropascals.

When projections for airports are based on new construction or similar actions the likelihood that such major action will actually take place should be carefully evaluated. This is particularly important if local funding is required. Check to see if initial actions such as land purchases, bonds etc. been taken. If projections are just based on expanded traffic levels make sure they are reasonable for the area. Projections for smaller communities are often overly optimistic.

$$L_{dn} = 10 \log_{10} \left[\frac{1}{86400} \left(\int_{0000}^{0700} 10^{[L_A(t)+10]/10}\, dt + \int_{0700}^{2200} 10^{L_A(t)/10}\, dt + \int_{2200}^{2400} 10^{[L_A(t)+10]/10}\, dt \right) \right]$$

Time t is in seconds, so the limits shown in hours and minutes are actually interpreted in seconds. $L_A(t)$ is the time varying value of A-weighted sound level, the quantity in decibels measured by an instrument satisfying requirements of American National Standard Specification for Type 1 Sound Level Meters S1.4–1971.

3. *Loud Impulsive Sounds.* When loud impulsive sounds such as sonic booms or explosions are anticipated contributors to the noise environment at a site, the contribution to day-night average sound level produced by the loud impulsive sounds shall have 8 decibels added to it in assessing the acceptability of a site.

A loud impulsive sound is defined for the purpose of this regulation as one for which:

(i) The sound is definable as a discrete event wherein the sound level increases to a maximum and then decreases in a total time interval of approximately one second or less to the ambient background level that exists without the sound; and

(ii) The maximum sound level (obtained with slow averaging time and A-weighting of a Type 1 sound level meter whose characteristics comply with ANSI S1.4–1971) exceeds the sound level prior to the onset of the event by at least 6 decibels; and

(iii) The maximum sound level obtained with fast averaging time of a sound level meter exceeds the maximum value obtained with slow averaging time by at least 4 decibels.

Issued at Washington, D.C., on July 5, 1979.

Patricia Roberts Harris,
Secretary of Housing and Urban Development.

[FR Doc. 79–21481 Filed 7–11–79, 8:45 am]

BILLING CODE 4210–01–11

Quiz on the Noise Regulations

Questions

1. What is the HUD policy on support for existing constructon in high noise areas?
2. What is the definition of "major or substantial rehabilitation"?
3. What is HUD's Interior noise goal?
4. What project approval authority does the Field Office have?
5. Who approves projects in the Unacceptable Zone?
6. What noise descriptor is used to express noise levels in the regulation?
7. How are loud impulsive sounds to be evaluated?
8. At what point on a building's exterior are sound levels to be determined?
9. What is the basic assumption behind the attenuation levels required?
10. What type of attenuation measures are preferred?
11. When should building attenuation measures be considered?
12. When are EIS's required?
13. When is an area considered "largely undeveloped"?
14. What is "Flexibility for Non-Acoustic Benefits"?
15. Six conditions are listed for waiving the attenuation requirement under the Flexibility for Non-Acoustic Benefits provision, how many must be met for the waiver to be granted?
16. Who has the authority to grant the attenuation requirements waiver under the "flexibility" provision?
17. What noise descriptors other than DNL are acceptable for aircraft noise contours?
18. Who normally approves areawide noise data such as airport noise contours?
19. If a site is partially in the Unacceptable Zone and partially in the Normally Unacceptable Zone, which review and approval procedures apply?
20. When should noise measurements be used in lieu of areawide data or *Noise Assessment Guidelines* calculations?

Quiz on the Noise Regulations

Answers

1. Noise exposure can not, by itself, be the basis for denying support for resale and purchase of existing buildings. (Section 51.101(a)(4))
2. "Major or substantial rehabilitation" is defined in individual program guidance. There is no single definition. (51.101(a)(5) marginal note)
3. 45 L_{dn} (Section 51.101(a)(9))
4. projects in Acceptable Zone; also projects in Normally Unacceptable Zone provided that
   - adequate sound attenuation is provided
   - no EIS is required

   (Section 51.102(a)(1))
5. The Assistant Secretary for Community Planning and Development.

   (Section 51.102(A)(3) and 51.104(b))
6. The day night average sound level system (DNL). (Section 51.103(a))
7. Two ways:
   - If plain DNL levels have been calculated or measured, add a 8 decibel penalty.
   - Alternatively, the C weighted day night average sound level system (L_{Cdn}) can be used as is.

   (Section 51.103(b))
8. Two meters (6.5 feet) away from the building exterior, moving towards the predominant noise source.

   (Section 51.103(c))
9. That current construction practices provide about 20 db attenuation. Thus in a 65 L_{dn} or lower area the interior goal of 45 L_{dn} would be met with standard construction. The additional attenuation required is the increment over that provided by standard construction necessary to achieve the interior goal of 45 L_{dn}. (Section 51.104(a) marginal note)
10. Measures which reduce **exterior** noise levels. (51.104(a))
11. Only after it has been determined that berms and barriers or site redesign are not practical alternatives. (Section 51.104(a))
12. When the project is located in the Unacceptable Zone or the project is located in a largely undeveloped area and the project is in the Normally Unacceptable Zone.

    (Section 51.104(b))
13. When the area within a 2 mile radius of the project is less than 50% developed for urban uses and infrastructure is not in place and available to serve the project. (Section 51.104(b)(1)(ii))
14. A provision in the regulations which allows the attenuation requirements for the 65–70 L_{dn} zone to be waived. (Section 51.105(a) and marginal note)
15. **All** six conditions must be met. (Section 51.105(a))
16. The field office. (Section 51.102(a))
17. NEF and CNEL. (Section 51.106(a)(1))
18. The Regional Office. (Section 51.106(a)(4))
19. The review and approval procedures for projects in the Unacceptable Zone apply. (Section 51.104(b)(2))
20. Only when the noise assessment indicates that the site is on the borderline between Acceptable and Unacceptable, or when the site is controversial. (Section 51.106(d))

Chapter 3

Major Policy and Implementation Questions Related to the Noise Regulation

As regulations are applied in the field, it is inevitable that questions will arise. It is, after all, very difficult to anticipate every situation when preparing a regulation. Sometimes the questions relate to specific and unique situations of limited interest to anyone but the office involved. Other questions, however, raise issues of more general concern. In this section we have brought together the most important and most relevant questions that have arisen since the noise regulation went into effect in August of 1979. We have used a question and answer format for your convenience.

The following are the topics included:

1. Noise projections for civil airports
2. Definition of infill for small towns
3. Areawide EIS waivers
4. Requirements for modernization and rehabilitation projects
5. Use of berms and barriers as attenuation measures
6. New and revised airport noise contours

Questions and Answers

1. How valid and useful are civil airport noise projections that show significant reductions in the amount of land exposed to high noise levels? Should we be suspicious?

Contours that show significant reductions in the area exposed to high noise levels may seem questionable, but, according to the Environmental Protection Agency, they may be quite accurate. The EPA does expect to see some significant reductions in the number of people exposed to high levels of aircraft noise over the next 15 years. In their report *Aviation Noise: The Next Twenty years*, EPA stated that they expected to see the number of people exposed to levels of 65 Ldn or greater to drop from a 1975 figure of 5,550,000 to about 2,650,000 in the year 2000. Much of this reduction would occur during the period 1980–1985 with more modest decreases thereafter. The reductions are expected to result from the Federal Aviation Administration's current noise certification requirements, even with up to 100% increases in aircraft operations. (Current certification requirements are for all new aircraft to achieve stage three noise levels and all older aircraft to achieve stage two levels by 1985. Progress has been good in meeting these requirements.)

In general then, you should not be surprised to see significant reductions in contour size if the following conditions are met:

- the decrease in size is no more than 50%;
- the increase in operations is no more than 100%; and
- FAR stage 3 aircraft, such as the B757 and B767, are included in the fleet mix, but not to the total exclusion of all other aircraft.

Assuming that the contours are otherwise technically correct, significantly smaller contours should be acceptable.

2. Many small towns aren't big enough for a project to meet the definition of infill contained in section 51.104 (b)(1)(ii). However, a project located in the heart of town can hardly be considered to be in a largely undeveloped area. Must an EIS be prepared?

Not necessarily. If the jurisdiction in which the project is located is not part of a standard metropolitan area, a project may be considered infill if it is within or contiguous to the already developed area and infrastructure (particularly water and sewer) is available and has the capacity to serve the project. It must also be clear that the project will not encourage the establishment of other incompatible land uses in the normally unacceptable noise zone.

If you believe a project meets these criteria, submit documentation to the Office of Environment and Energy for their review and determination.

3. What can we do to reduce the procedural burden when, for a variety of reasons, the Department expects to be considering a number of projects in an unacceptable noise zone? Most of the projects would probably qualify for an EIS waiver, but how can we avoid filling repetitive, individual requests?

While the number of cases where the Department would be seriously considering a number of projects exposed to unacceptable noise levels in the same jurisdiction is likely to be limited, there is an alternative to individual processing in those situations. The alternative is to issue an areawide waiver for the entire affected jurisdiction. Such a waiver can be useful when the unacceptable noise zone heavily impacts a substantially developed community with limited site alternatives. (In most cases we would expect that the noise source would be aircraft, but in very small towns it is possible that a heavily used rail line could create a large unacceptable noise zone.)

An areawide EIS waiver would, of course, have to have a more detailed environmental assessment than an individual project request, and there are other special processing steps.

But if you have a situation where you think the Department has a good reason to expect to process a number of projects within the unacceptable noise zone, there is an alternative to individual EIS waivers. Contact the Office of Environment and Energy for details on how to request the areawide waiver.

4. What exactly are the processing requirements and general policies for modernization and rehabilitation projects? Does secton 51.104 apply to them as well as to new construction? The noise regulation is a bit confusing on this.

Yes, the noise regulation is a bit confusing on this question. We have seen several instances where field offices have mistakenly applied the provisions of Section 51.104 to modernization and rehabilitation projects. We believe that this happens because section 51.104 is not as clearly titled as it might have been. It would be better if it read "special requirements for new construction" rather than simply "special requirements".

The only parts of the regulation that apply to modernization and rehabilitation projects are sections 51.101 (a)(5) and the definitions of normally unacceptable and unacceptable noise zones contained in the table in section 51.103. None of the other proessing or policy provisions of the table or of sections 51.102 and 51.104 apply. Therefore:

- modernization and rehabilitation projects are to be processed by the field offices regardless of the noise zone.
- EIS's are not required for modernization and rehabilitation projects unless mandated by other applicable environmental regulations.

You must however continue to encourage attenuation features in modernization and rehabilitation projects, in accordance with the general policy stated in section 51.101(a)(5).

5. We know that berms and barriers are the preferred type of noise attenuation because of the protection they provide for outdoor living areas, but we need some further guidance on when they are really the best choice.

While barriers can be an effective noise attenuation technique, they must, indeed, be used with caution and common sense because they can create more problems than they solve. Very high noise barriers can create significant aesthetic and financial problems relative to the noise benefit to be achieved. Barriers can block light, hinder natural ventilation, create an unpleasant sense of being walled in, and can be very unattractive. In addition, barriers do require continuing maintenance and can be very costly to build.

It is important to remember that the noise regulation says that "measures that reduce external noise at a site shall be used **wherever practicable.**" Is it practicable to propose a 20 foot high barrier only 15 feet from the rear of a two-story building? Granted it would certainly protect the building from noise, but what about the blocked light, the reduced ventilation, the visual impact, and the cost? The purpose of a barrier is primarily to reduce the noise levels in those outdoor areas that people use. The secondary purpose is to reduce the need for structural attenuation. Therefore, the barrier should only be as high as is necessary to protect those areas. Structural attenuation should be required for the parts of the building not protected by the barrier. And if there aren't any outdoor areas where low noise levels are important, barriers shouldn't be required unless they would be more cost effective than building attenuation measures.

6. What should we be doing once we have processed new or revised aircraft noise contours and they have been approved for use?

The most important thing you can do once new or revised aircraft noise contours have been approved for use is to tell the people who are most likely to be affected by the change. If you have a newsletter that you regularly publish, that is one way to get the word out. At the very least you should specifically notify the affected jurisdictions and the builders/developers who are known to be active in the vicinity of the noise impacted areas. Make sure you notify builders and developers who have large scale projects that you have been processing in sections. Go back and check your files to find them. Even though you should have done an overall environmental review of the project at the time the first section was submitted, the approval of individual sections is dependent on the noise levels at the time that section is submitted.

Chapter 4

Noise Attenuation

Introducton

HUD's noise policy (24 CFR 51B) clearly requires that noise attenuation measures be provided when proposed projects are to be located in high noise areas. The requirements set out in Section 51.104(a) are designed to insure that interior levels do not exceed the 45 L_{dn} level established as a goal in Section 51.101(a)(9). Thus, in effect, if the exterior noise level is 65 L_{dn} to 70 L_{dn}, 25 db of noise attenuation must be provided; if the exterior noise level is between 70 and 75 L_{dn}, then 30 db of attenuation is required. Likewise, for projects proposed for areas where noise levels exceed 75 L_{dn}, sufficient attenuaton must be provided to bring interior levels down to 45 L_{dn} or below.

There are three basic ways to provide the noise attenuation required:

1. the use of barriers or berms
2. site design
3. acoustical construction

Of these, only the first two provide any improvement in the exterior environment. Because HUD considers a quiet exterior environment to be important, we prefer the use of those measures that reduce exterior levels as well as interior levels. The use of acoustical construction by itself is, therefore, the least preferred alternative since it only affects the interior levels. While we recognize that in many cases barriers or site design cannot provide all the attenuation necessary, you should combine them with acoustical construction whenever possible.

Your responsibility as a HUD staff member is to:

- make sure the project sponsor or developer is aware of the attenuation requirements for the project.
- make the sponsor aware of the options available

and

- review attenuation proposals to make sure they are adequate.

While it is not your responsibility to provide detailed design assistance to the sponsor or developer, you should know enough about the attenuation options to give him or her a basic understanding of what must be done. In many cases, you may be able to reassure the sponsor or developer that the necessary attenuation can be achieved through the use of common construction techniques or materials. Or you may be able to point out how a simple site design change can achieve the desired result without additional cost.

The following sections are designed to provide you with the information you will need to fulfill your responsibilities. Each attenuation approach is discussed both in terms of basic concepts and in terms of what to look for in reviewing attenuation proposals. The discussion does assume that you have a working knowledge of the *Noise Assessment Gujidelines*. If you have not worked with the *Guidelines* before or not recently you may want to go back and review them, particularly the section on calculating the effects of barriers.

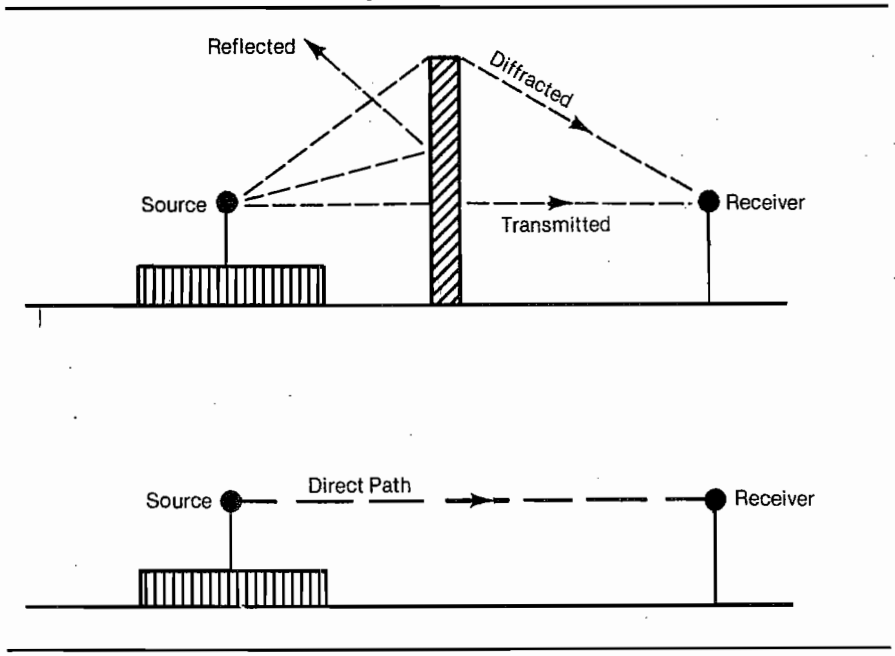
Barrier Noise Reduction Concepts

(The following, with some editing and with some additional graphics, is taken from the Federal Highway Administration's *Noise Barrier Design Handbook*.[1])

When no obstacles are present between [a source] and adjoining areas, sound travels by a **direct** path from the "sources"... to [the] "receivers"..., as shown in Figure 1. Introduction of a barrier between the source and receiver redistributes the sound energy into several [indirect] paths: a **diffracted** path, over the top of the barrier; a **transmitted** path, through the barrier; and a **reflected** path, directed away from the receiver. These paths are also illustrated in Figure 1.

[1] *Noise Barrier Design Handbook* US Department of Transportation, Federal Highway Administration, February 1976. (FHWA-RD-76-58).

Figure 1
Alteration of Noise Paths by a Barrier



Barrier Diffraction and Attenuation

Consider an infinitely long, infinitely massive noise barrier placed between a highway and the receiver. Figure 2 illustrates a cross-section through such a configuration. [In] this example, the only way that sound can reach the receiver is by bending over the top of the barrier; as shown in the figure. The bending of sound waves in this manner over an obstacle is known as diffraction. The area in which diffraction occurs behind the barrier is known as the "shadow zone." The straight path from the source over the top of the barrier forms the boundary of this zone.

All receivers located in the shadow zone will experience some sound attenuation; the amount of attenuation is directly related to the magnitude of the diffraction angle ϕ. As ϕ increases, the barrier attenuation increases. The angle ϕ will increase if the barrier height increases, or if the source or receiver are placed closer to the barrier. Clearly then the barrier attenuation is a function of the geometrical relationship between the source, receiver, and barrier. One way of relating these parameters to the barrier attenuation is to define the path-length difference as shown in Figure 3. This parameter is the difference in distance that the sound must travel in diffracting over the top of the barrier rather than passing directly through it.

In the preceding discussion it was assumed that the barrier was "infinite"; i.e., long enough to shield the receiver from all sound sources up and down the highway. For short barriers, the attenuation can be seriously limited by the sound from sections of highway beyond the barrier's ends, which are unshielded from the receiver, as shown in Figure 4. Similarly, when there are large gaps in the barrier (to permit access, for example), sound from the unshielded section of highway adjacent to the gap can greatly compromise barrier attenuation, especially for those receivers close to the opening.

Figure 2
Barrier Diffraction

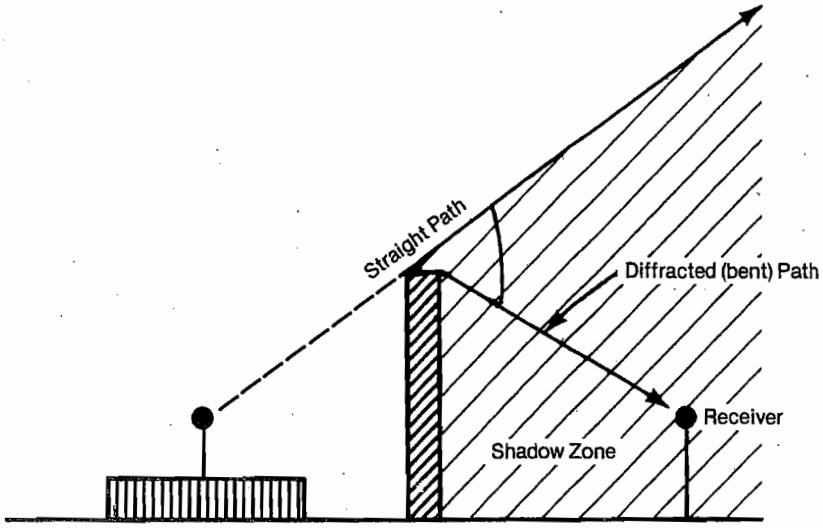


Figure 3
Path Length Difference $\delta = A + B - d$

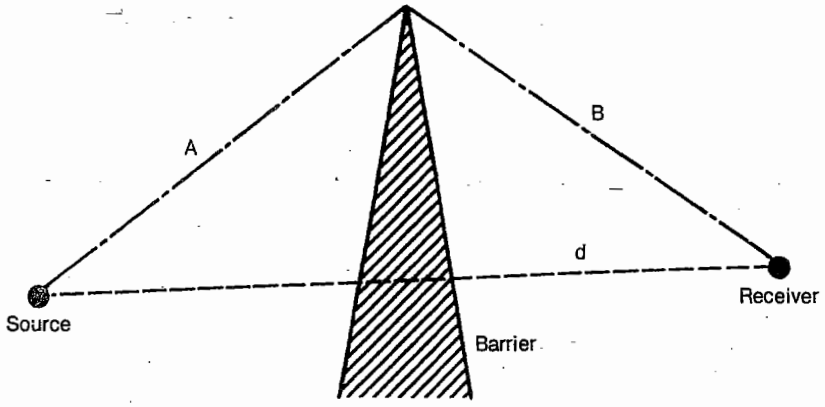
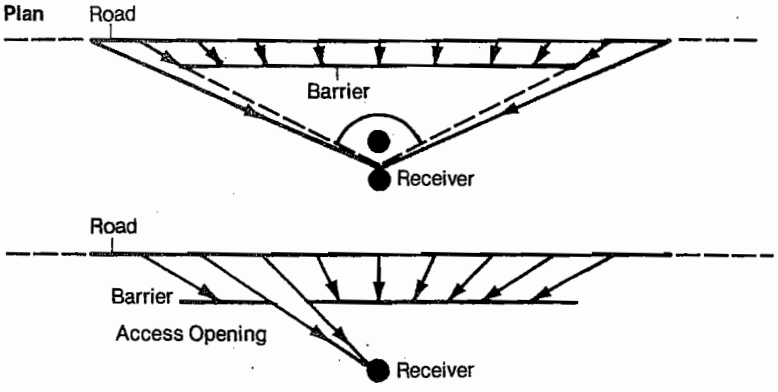


Figure 4
Short-circuit of Barrier Around Ends and Through Openings



It should be mentioned that the use of barrier walls with sloped sides (forming angles of grater than 10–15 degrees from the vertical) will also generally eliminate multiple reflections. Use of earth berms is particularly appropriate to accomplish this. Sloped barrier walls will require more material to achieve a desired height than a vertical wall, while berms will require greater right-of-way than a thin wall.

Ground Effects

Consider again the direct path of sound from the source to receiver as illustrated in Figure 1 in the absence of any obstacles. For sources and receivers located close to the ground, in addition to this direct path sound energy may reach the receiver by reflecting off the ground. When the terrain is relatively hard and flat, such a reflection will add to the noise from the direct path to increase the level at the receiver. However, when the ground is soft, there may be a phase reversal upon reflection such that the noise from the ground reflection path will destructively interfere with the noise from the direct path resulting in a significant reduction in noise levels at the receiver.

This reduction in level, known as ground-effect attenuation, is in excess of the 3 dB per doubling of distance propagation loss for a line source of noise and occurs only above soft absorptive ground (such as normal earth and most ground with vegetation). Over hard ground (such as concrete, stone and very hard-packed earth) these effects do not occur. These effects are most apparent for receivers on the ground floor, and decrease rapidly as receiver height above ground increases.

While ground absorption effects are not completely understood, it is generally believed that these effects account for the 4.5 dB per doubling of distance propagation loss observed over soft ground, as compared to the 3 dB propagation loss observed over hard ground. The implication with regard to barrier design is that placement of a barrier over soft ground between source and receiver will re-direct the sound over the top of the barrier, thus destroying the ground reflection and the additional 1.5 dB per doubling of distance attenuation. Thus, the barrier must be designed to provide more reduction than would otherwise be necessary, to compensate for the lost ground effects over absorptive ground.

Summary

(From: *Design Guide*, National Bureau of Standards[1])

In summary, the following can be said about noise barriers.

- If a barrier does not block the line-of-sight between the source and receiver, the barrier will provide little or no attenuation.
- If a barrier is constructed of a material with a surface weight density greater than 4 lb/ft^2 and there are no openings through the barrier, transmitted sound will usually be negligible.
- If there are openings totaling over 10 percent or more of the barrier area, barrier attenuation will be negligible.
- Diffracted sound is usually the most important aspect in estimating barrier attenuation.
- Reflected sound can be important for receivers on the source side of a barrier, but it normally is not a factor for receivers on the side opposite from the source. Hence reflected sound is usually not important to your building and site.
- Transmission of sound around the ends of the barrier can be critical if the barrier included angle is less than 170°.
- Barrier attenuations greater than an A-weighted sound level difference of 10 dB are difficult to obtain.
- For two or more barriers "in series," consider only the "dominant" barrier.
- Assume no attenuation for a receiver located beyond the end of a barrier.

Reviewing Barrier Proposals

An effective barrier is one which reduces the noise level behind the barrier to 65 L_{dn} or lower. If a barrier can reduce the exterior noise level to 65 L_{dn}, then standard construction techniques should be sufficient to insure an interior level of 45 L_{dn} or below. Therefore, if you determine that a proposed barrier is adequate to reduce the exterior noise level to 65 L_{dn} then no additional attenuation measures should be necessary.

There are four things to check when determining the adequacy of a proposed barrier:

1. Is it high enough?
2. Is it long enough?
3. Is it made of the right materials?
4. Is it properly constructed?

Is it High Enough?

In order for a barrier to be effective it must be at least high enough to break the line of sight between the source and the receiver. In the *Noise Assessment Guidelines* you will find the procedure for determining how much attenuation is provided by a barrier of a given height.

In general, barriers and berms are most effective for one and two story buildings because a relatively low barrier can often provide the attenuation needed. The height that might be required to provide attenuation for much taller buildings is often not feasible for either cost or aesthetic reasons. However, even if a barrier can not be made high enough to attenuate the upper floors of a multistory building, it may still be able to provide some protection for outdoor recreational areas. Before discarding the barrier idea check for this possibility.

If you find that the barrier as proposed is too short to be effective but the sponsor or developer tells you that he or she can not make the barrier any higher, there are some alternatives you can suggest. There are ways to get more attenuation out of each foot of overall height.

As a general rule, barriers work better the closer they are to the source. Figure 6 shows a barrier that does not block the line of sight at all when it is located next to the receiver, yet is quite tall enough when located next to the source. Thus, if the sponsor or developer can not make the barrier any taller, perhaps he or she can move it closer to the source.

Another way to get more attenuation without increasing overall barrier height is to bend the top of the barrier towards the source. Figure 7 shows a case where a barrier built perfectly straight provides 8 dB of attenuation. A barrier with the same overall height but with a 45 degree bend towards the source provides 9.5 dB of attenuation. Thus if the project sponsor or developer wants to keep the overall height of the barrier down, he or she can still increase the attenuation provided simply by bending the top.

[1] *Design Guide for Reducing Transportation Noise in and Around Buildings*, US Department of Commerce, National Bureau of Standards, April 1978. (Building Science Series 84)

Figure 6
Effect of Moving the Barrier Closer to the Source

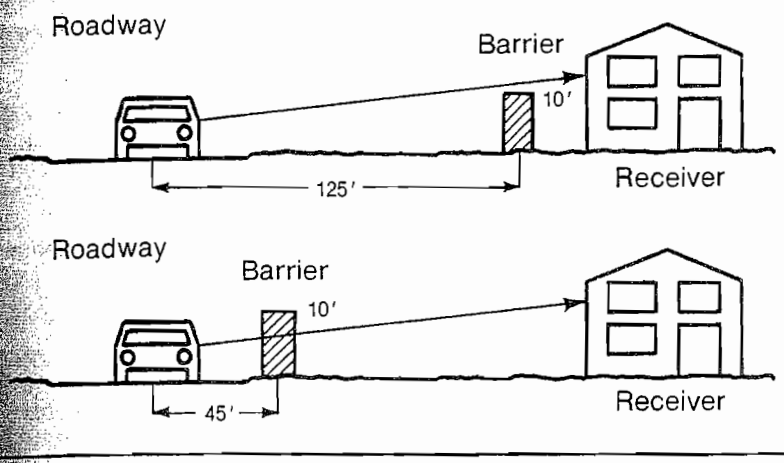
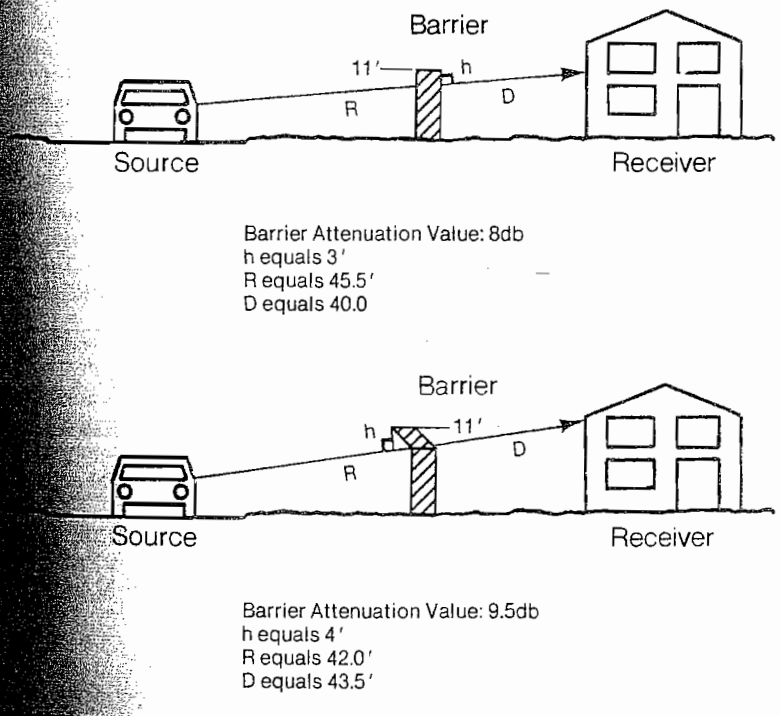


Figure 7
Effect of Bending the Top of the Barrier Towards the Source



Thus, if your review of a proposed barrier shows it to be too short, but it can not be made any higher, suggest that the barrier be moved closer to the source or that it be bent at the top, or both.

Is It Long Enough?

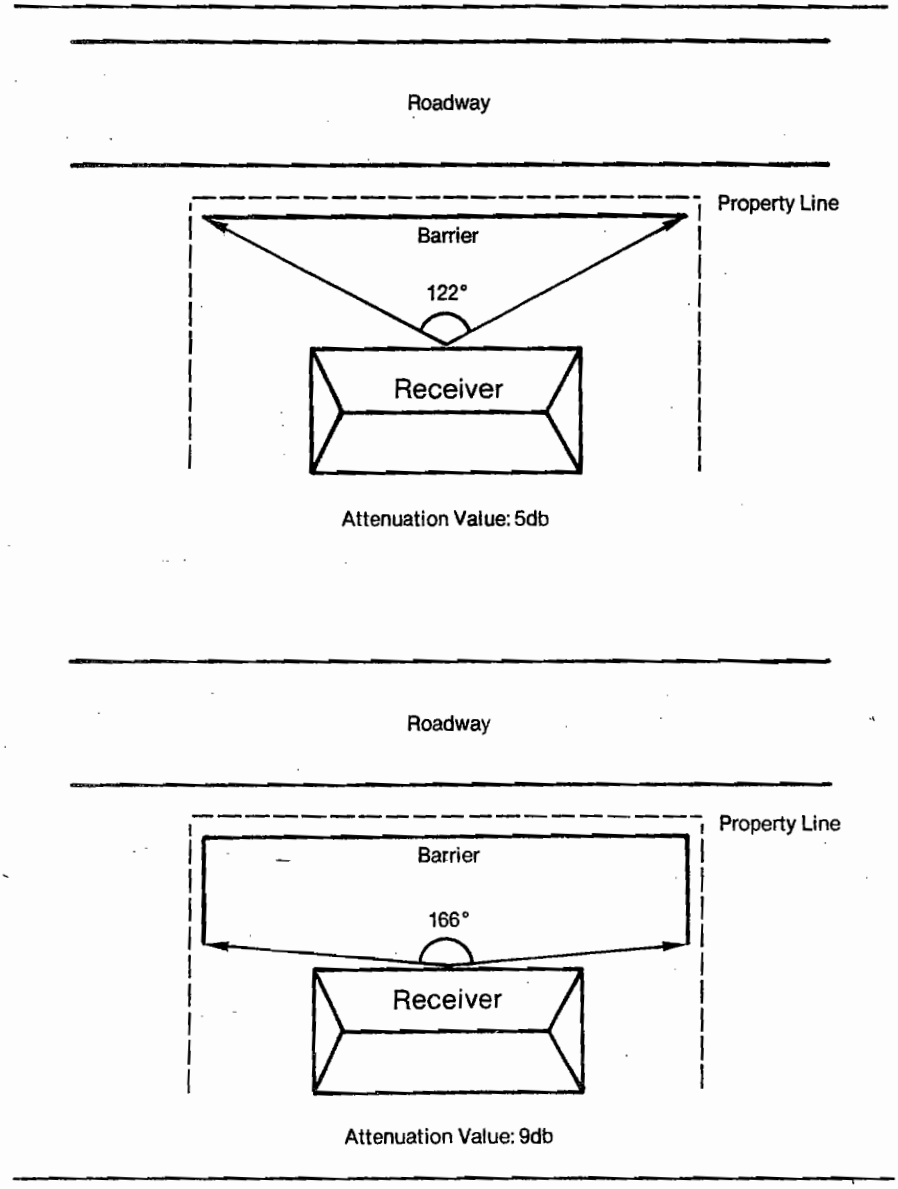
Once you have established how much attenuation the barrier provides due to its height, you must determine if the length of the barrier compromises that attenuation level. Again, *the Noise Assessment Guidelines* contain a procedure for calculating the effect of barrier length.

If you find that the barrier is too short but that there are limitations on how long it can be made, there are, as there were with barrier heights, some recommendations you can make on how to improve the effectiveness of the barrier.

Again, if you bend the edges of the barrier, this time towards the **receiver** not the source, you will increase the effectiveness of the barrier. Figure 8 shows how much a barrier's effectiveness can be improved by bending the edges.

You can also improve the effectiveness of the barrier by moving it closer to the receiver. Figure 9 shows how much a barrier's effectiveness can be increased by moving it closer to the receiver. Now obviously, this creates a conflict with what we said earlier about moving the barrier closer to the source. Clearly each case will require a different compromise. If height is not a limiting factor but length is, you might recommend to the project sponsor or developer that the barrier be moved closer to receiver and the height increased as necessary. If the reverse is true, you would want to recommend the opposite. If both height and length are limited, then the sponsor or developer must find that optimum point where the effeciveness of both the barrier height and the barrier length is as high as possible.

Figure 8
Effect of Bending the Edges of Barrier Towards Receiver
(Both Barriers have Potential Value of 10db)



Is It Made of The Right Materials?

Even if a barrier is high enough and long enough, its effectiveness can be severely reduced if it is made up of lightweight materials that easily transmit sound waves. In the preceding section on barrier concepts we talked about how if the transmission loss value for the barrier material was not at least 10 db higher than the attenuation value of the barrier based on length and height there would be a significant reduction in the effectiveness of the barrier.

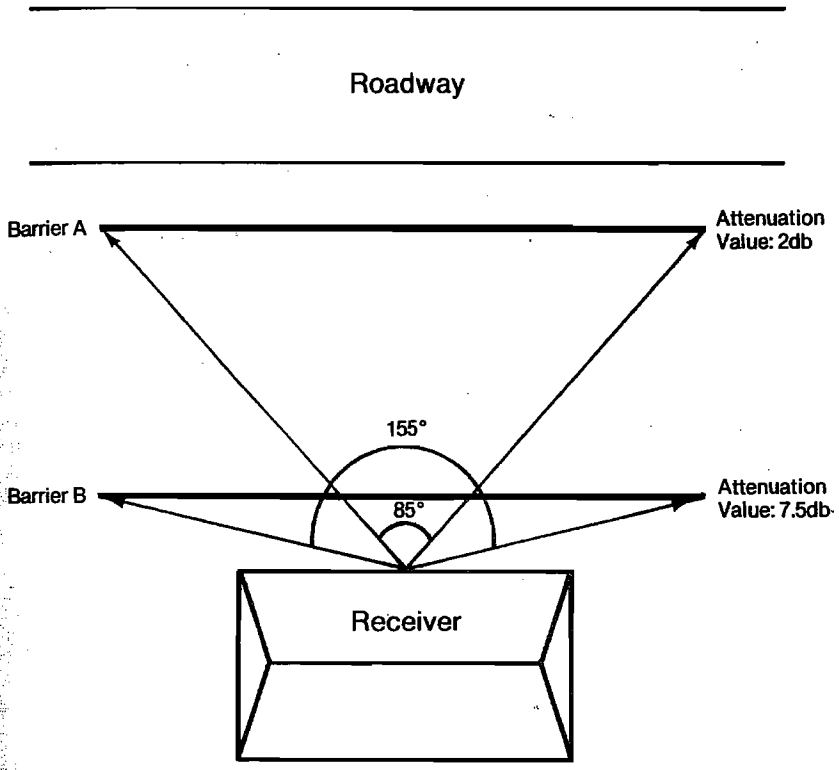
Therefore, once you have calculated the basic attenuation potential of the barrier, you must check to make sure the proper material is being used to build the barrier. Table 1 lists the transmission loss values for materials commonly used in barrier construction. Once you have found the transmission loss value for the material being used, go to Table 2. Read down the column with the transmission loss for the material at its top and across the line that has the attenuation potential for the barrier listed. Where the two intersect you will find the actual attenuation capability of the barrier.

If you find that the choice of material has severely reduced the effectiveness of the barrier, you should recommend that the sponsor or developer select another material.

Is It Properly Constructed?

Holes or openings can substantially reduce the effectiveness of a barrier. A barrier that has openings totaling 50% or more of its total area will provide no attenuation. A barrier that has openings totaling 10% of its total area has a maximum attenuation value of approximately 4db. That is 4db no matter how high, how long or how thick the barrier. So you can see that it is very important that the barrier is made of solid materials and that it is tightly constructed. In general the intended openings in a barrier should equal no more than 1% of total area and the construction specifications should require that all joints are tightly sealed.

Figure 9
Effect of Moving Barrier Closer to Receiver



A Final Note

One thing should have become clear to you as you have been reading this section, and that is that in order for you to adequately review a project sponsor or developer's proposed barrier you must be given fairly specific information about the exact dimensions of the proposed barrier, the type and thickness of the barrier material, and the exact design of the barrier including construction specifications. Without this information you will be unable to do any more than a cursory evaluation, an evaluation that could be far from accurate. Make sure you make it clear to the developer or sponsor what you need to have.

Table 1
Transmission Loss Value for Common Barrier Materials

Material	Thickness, (Inches)	Transmission Loss, dBA (1)
Wood		
	1/2	17
	1	20
	2	24
	1/2	16
	1	19
	2	23
Plywood	1/2	16
	1	19
	2	23
	1/2	15
	1	18
	2	22
Wood	1/2	20
	1	23
Fiberboard		
	1/2	20
Metals		
Aluminum	1/16	23
	1/8	25
	1/4	27
	24 ga	18
	20 ga	22
	16 ga	15
	1/16	28
Concrete, Masonry, etc.		
Light Concrete	4	36
	6	39
Dense Concrete	4	40
Concrete Block	4	32
	6	36
Cinder Block (Hollow Core)	6	28
Brick	4	33
Granite	4	40
Composites		
Aluminum Faced Plywood	3/4	21-23
Aluminum Faced Particle Board	3/4	21-23
Plastic Lamina on Plywood	3/4	21-23
Plastic Lamina on Particle Board	3/4	21-23
Miscellaneous		
Glass (Safety Glass)	1/8	22
	1/4	26
Plexiglass (Shatterproof)		22-25
Masonite	1/2	20
Fiberglass/ Resin	1/8	20
Stucco on Metal Lath	1	32
Polyester with Aggregate Surface	3	20-30

[1]A-weighted TL based on generalized truck spectrum. Source: *Noise Barrier Design Handbook*, FHWA

Table 2
Noise Reduction of a Barrier as a Function of its Transmission Loss

Designed Attenuation, dB (from height) and length)	Tramission Loss, dB of Materials				
	10	15	20	25	30
5	3.8	4.6	4.9	5.0	5.0
6	4.5	5.5	5.8	6.0	6.0
7	5.2	6.4	6.8	6.9	7.0
8	5.9	7.2	7.7	7.9	8.0
9	6.5	8.0	8.7	8.9	9.0
10	7.0	8.8	9.6	9.9	10.0
11	7.5	9.5	10.5	10.8	11.0
12	7.9	10.2	11.4	11.8	11.9
13	8.2	10.9	12.2	12.7	12.9
14	8.5	11.5	13.0	13.7	13.9
15	8.8	12.0	13.8	14.6	14.9
16	9.0	12.5	14.5	15.5	15.8
17	9.2	12.9	15.2	16.7	16.8
18	9.4	13.2	15.9	17.2	17.7
19	9.5	13.5	16.5	18.0	18.7
20	9.6	13.8	17.0	18.8	19.6

Source: *Noise Barrier Design Handbook, FHWA*

Acoustical Site Planning Concepts

(This section, with some editing, is from *The Audible Landscape*, FHWA.[1])

The arrangement of buildings on a site can be used to minimize noise impacts. If incompatible land uses already exist, or if a noise sensitive activity is planned, acoustical site planning often provides a successful technique for noise impact reduction.

Many site planning techniques can be employed to shield a residential development from noise. These can include:

1. increasing the distance between the noise source and the receiver;
2. placing noise compatible land uses such as parking lots, maintenance facilities, and utility areas between the source and the receivers. Playgrounds and parks are not necessarily noise compatible activities.
3. locating barrier-type buildings parallel to the noise source or the highway; and
4. orienting the residences away from the noise.

The implementation of many of the above site planning techniques can be combined through the use of cluster and planned unit development techniques.

Distance

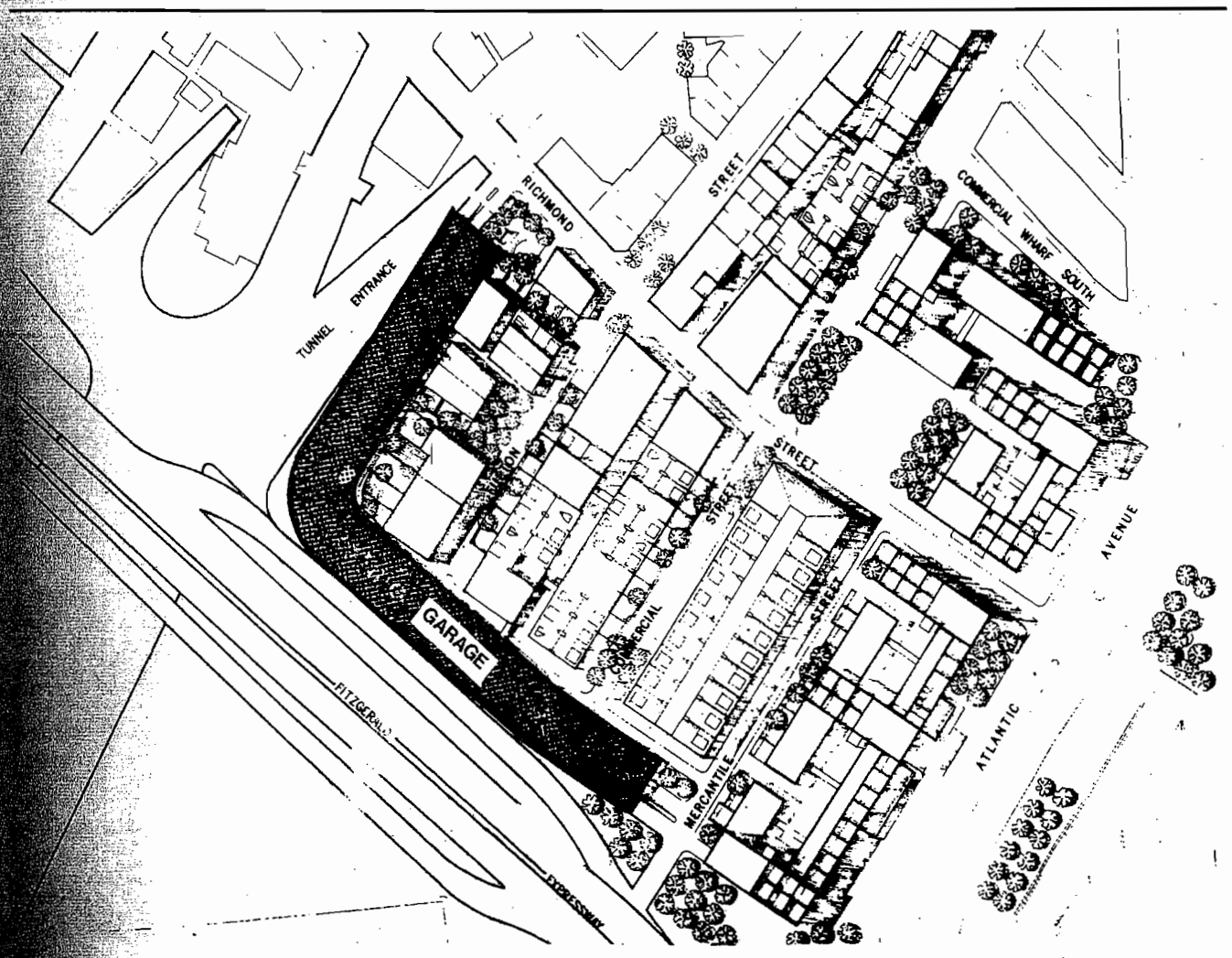
Noise can be effectively reduced by increasing the distance between a residential building and a highway. Distance itself reduces sound: doubling the distance from a noise source can reduce its intensity by as much as 3 dBA. In the case of highrise buildings, distance may be the only means, besides acoustical design and construction, of reducing noise impacts. This is because it is nearly impossible to provide physical shielding for the higher stories from adjacent noise.

Noise Compatible Land Uses as Buffers

Noise protection can be achieved by locating noise-compatible land uses between the highway and residential units. Whenever possible, compatible uses should be nearest the noise source. Figure 10 shows a proposed parking garage along two sides of a development in Boston. Both the

[1] *The Audible Landscape: A Manual for Highway Noise and Land Use*, US Department of Transportation, The Federal Highway Administration, November 1974. (GPO Stock Number: 5000-00079.)

Figure 10
Use of a Parking Garage to Shield a Residential Area



Fitzgerald Expressway and the entrance to the Callahan Tunnel which are shown on the site plan are major and noisy traffic routes. In addition to protecting the residential development from the noise and dirt of highway traffic, the parking garage provides needed facilities for the residents.

Buildings as Noise Shields

Additional noise protection can be achieved by arranging the site plan to use buildings as noise barriers. A long building, or a row of buildings parallel to a highway can shield other more distance structures or open areas from noise.

If the building being used as a barrier is sensitive to highway noise, the building itself must first be soundproofed. This technique was used in a housing project in England where a 3,900 foot long, 18 foot wide and 45-70 foot high wall (depending on the terrain) serves as both residence and a sound shield. The wall/building will contain 387 apartments in which the kitchens and bathrooms are placed towards the noise, and the bedrooms and living rooms face away from the highway. The wall facing the highway will be soundproofed and windows, when they exist, are sealed. Substantial noise reductions are expected.

Orientation

The orientation of buildings or activities on a site affects the impact of noise, and the building or activity area may be oriented in such a way as to reduce this impact.

Noise impacts can be severe for rooms facing the roadway since they are closest to the noise source. The noise impact may also be great for rooms perpendicular to the roadway because (a) the noise pattern can be more annoying in perpendicular rooms and (b) windows on perpendicular walls do not reduce noise as effectively as those on parallel walls because of the angle of the sound. Road noise can be more annoying in perpendicular rooms because it is more extreme when it suddenly comes in and out of earshot as the traffic passes around the side of the building, rather than rising and falling in a continuous sound, as it would if the room were parallel to passing vehicles.

Whether the noise impact is greater on the perpendicular or the parallel wall will depend on the specific individual conditions. Once the most severely impacted wall or walls are determined, noise impacts may be minimized by reducing or eliminating windows from these walls.

Buildings can also be oriented on a site in such a way as to exploit the site's natural features. With reference to noise, natural topography can be exploited and buildings placed in low noise pockets if they exist. If no natural noise pockets exist, it is possible to create them by excavating pockets for buildings and piling up earth mounds between them and the noise. Such a structure would obstruct the sound paths and reduce the noise impacts on the residences.

Cluster and Planned Unit Development

A cluster subdivision is one in which the densities prescribed by the zoning ordinance are adhered to but instead of applying to each individual parcel, they are aggregated over the entire site, and the land is developed as a single entity. A planned unit development, or P.U.D., is similar but changes in land use are included, such as apartments and commercial facilities in what would otherwise be a single-family district.

From Figure 11 it can be seen how the conventional grid subdivision affords no noise protection from the adjacent highway. The first row of houses bears the full impact of the noise. In contrast, the cluster and P.U.D. techniques enable open space and commercial uses respectively to serve as noise buffers. Examples of this are shown in Figures 12 and 13. A word of caution is necessary: in a cluster development, the required open space can be located near the highway to minimize noise to the residences. However, many recreation uses are noise sensitive, and when one takes advantage of the flexibility of cluster development to minimize noise, care must be taken not to use all of the available open space in

Figure 11
Conventional Grid Subdivision

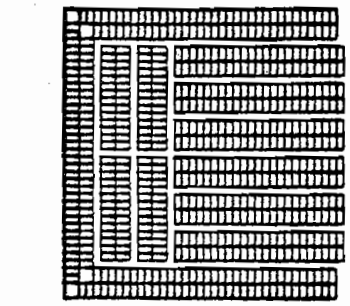
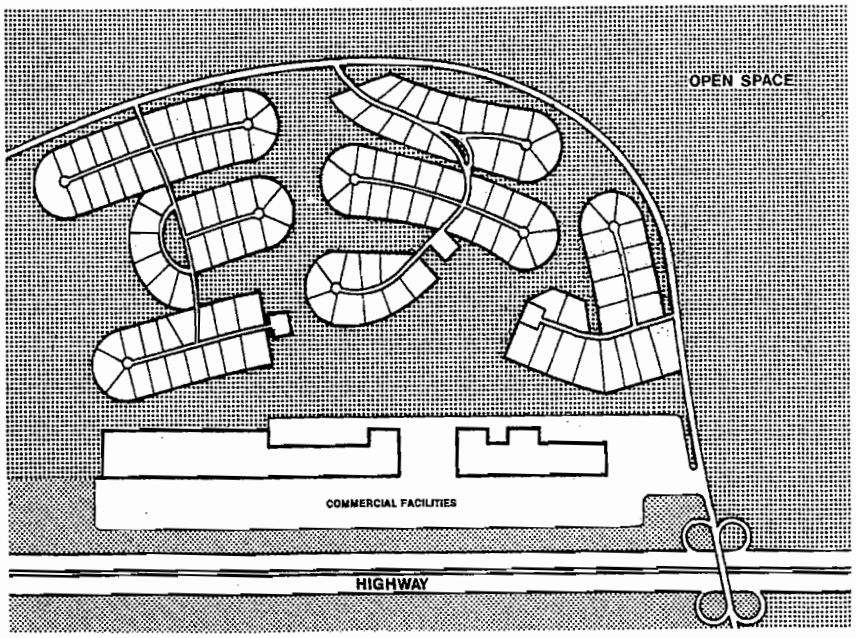


Figure 12
Placement of Noise Compatible Uses Near a Highway in a PUD



buffer strips, thus depriving the development of a significant open space area. Where high noise levels exist, a combination of buffer strips and other techniques (such as berms and acoustical sound proofing) can be employed.

The flexibility of the cluster and planned unit development techniques allows many of the above site planning techniques to be realized and effective noise reduction achieved.

Reviewing Site Plans

There are two main things to check when reviewing site plan changes to determine if the revised site plan provides adequate attenuation for the noise sensitive uses:

1. Is the separation between the source and the receiver great enough?
2. If noise-compatible buildings are being used as barriers for other buildings, are they adequate barriers, i.e. are they long enough and are they high enough? (And, if the buildings being used as barriers contain noise sensitive activities, have the buildings been properly soundproofed.)

In order to determine whether the proposed site plan changes will provide adequate separation between the source and the receiver, you simply go back to the *Noise Assessment Guidlines* procedures. You can use the *Guidelines* both to determine if the proposed separation distance is sufficient or to determine the necessary separation distance. You should at this point check to make sure that the uses being located in the "buffer zone" between the source and the receiver are indeed noise compatible uses. If parks or playgrounds are located in the buffer zone, make sure they are not the only ones associated with the project.

To determine whether the noise compatible buildings being proposed as barriers are adequate, you simply use the procedures outlined in the preceding section. Determine whether the building is high enough to properly break the line of sight between the receiver and the source. Then determine if the building is long enough. It is not necessary to check to make sure it is made of the proper materials or that it is properly constructed since the building will be inherently thick enough not to have any problems. Again, however, if the building being proposed as a barrier contains noise sensitive uses you must first verify that it is properly soundproofed. (See the next section for guidance on acoustical construction.) If the building is not properly soundproofed then it can not be used as a barrier for other buildings.

As you review the site plan check to see that the building locations will not aggravate noise problems. Figure 14 shows how building arrangement can make the noise problem worse.

Figure 13
Open Space Placed Near a Highway in a Cluster Development

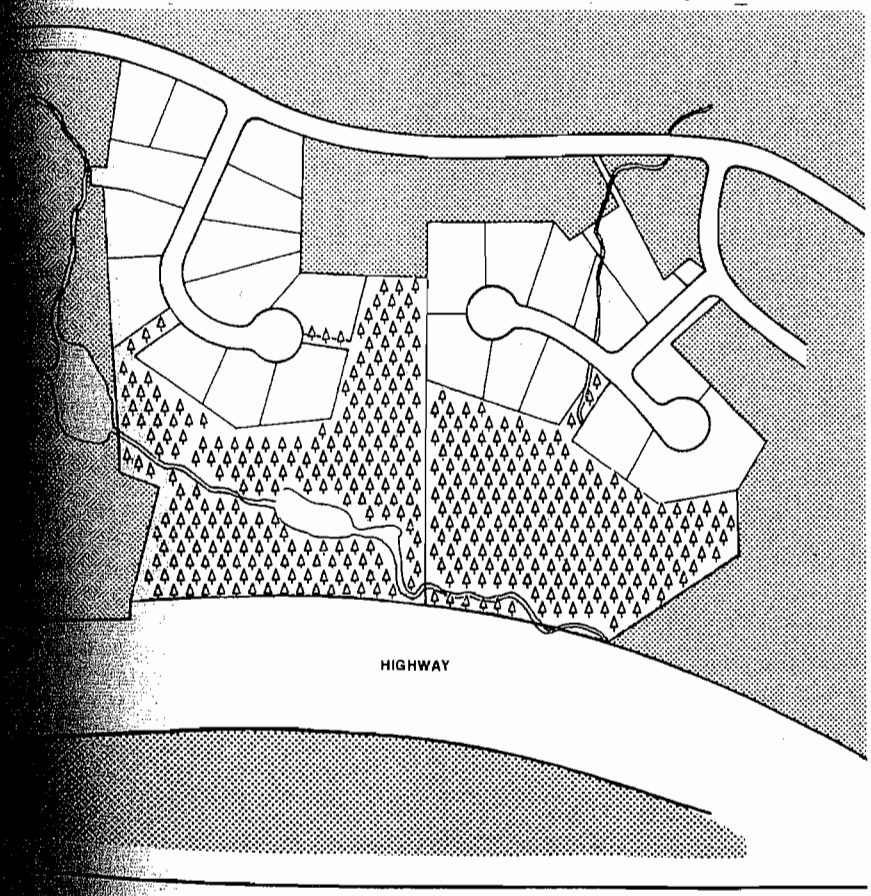
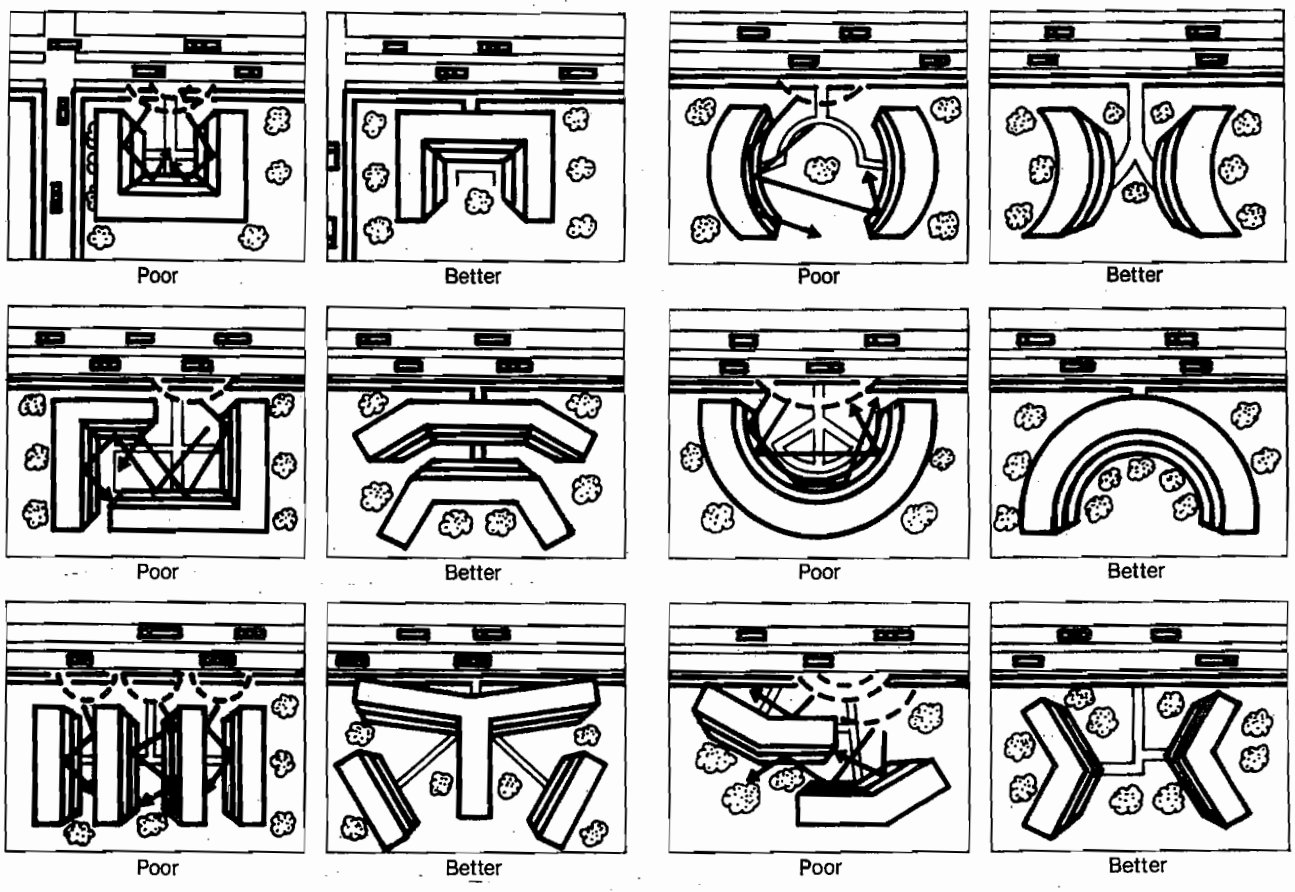


Figure 14
Orientation of Buildings on Sites



Acoustical Construction Concepts

(This section, with some editing is taken from the *Audible Landscape, FHWA.*[1])

Noise can be intercepted as it passes through the walls, floors, windows, ceilings, and doors of a building. Examples of noise reducing materials and construction techniques are described in the pages that follow.

To compare the insulation performance of alternative constructions, the Sound Transmission Class (STC) is used as a measure of a material's ability to reduce sound. Sound Transmission Class is equal to the number of decibels a sound is reduced as it passes through a material. Thus, a high STC rating indicates a good insulating material. It takes into account the influence of different frequencies on sound transmission, but essentially the STC is the difference between the sound levels on the side of the partition where the noise originates and the side where it is received. For example, if the external noise level is 85 dB and the desired internal level is 45 dB, a partition of 40 STC is required. The Sound Transmission Class rating is the official rating endorsed by the American Society of Testing and Measurement. It can be used as a guide in determining what type of construction is needed to reduce noise.

The use of the STC rating system for transportation noise is a subject of some debate. The STC rating was originally intended primarily for use with interior partitions and relates to the "subjective impressions of the sound insulation provided against the sounds of speech, radio, television, music, and similar sources of noise in offices and dwellings."[2] However, since it remains the only widely used noise reduction rating system for materials the STC system is very often used even with transportation noise. When STC ratings are used for transportation noise you should be aware that the STC ratings may be a few dB too high. For example, the STC rating for a standard frame 2 × 4 wall with exterior siding, and sheathing and interior sheetrock may be 37 dB.[3] If rated specifically for transportation noise the dB reduction rating might drop to 34 dB.[4] All this really means, however, is that you should use the STC ratings with a bit of caution and remain aware of the possible 2-3 dB overstating that you may get with the STC rating system. Throughout this text we will be talking in terms of STC ratings for materials and assemblies.

[1] *The Audible Landscape: A Manual for Highway Noise and Land Use*, US Department of Transportation, the Federal Highway Administration, November 1974. (GPO Stock #5000-00079).

[2] *Acoustical and Thermal Performance of Exterior Residential Walls, Doors, and Windows*, US Department of Commerce, National Bureau of Standards, November 1975. (NBS Building Science Series 77) page 21.

[3] Ibid., p. 29

[4] *Design Guide for Reducing Transportation Noise In and Around Buildings*, p. 137.

Walls

Walls provide building occupants with the most protection from exterior noise. Different wall materials and designs vary greatly in their sound insulating properties. Figure 15 provides a visual summary of some ways in which the acoustical properties can be improved:

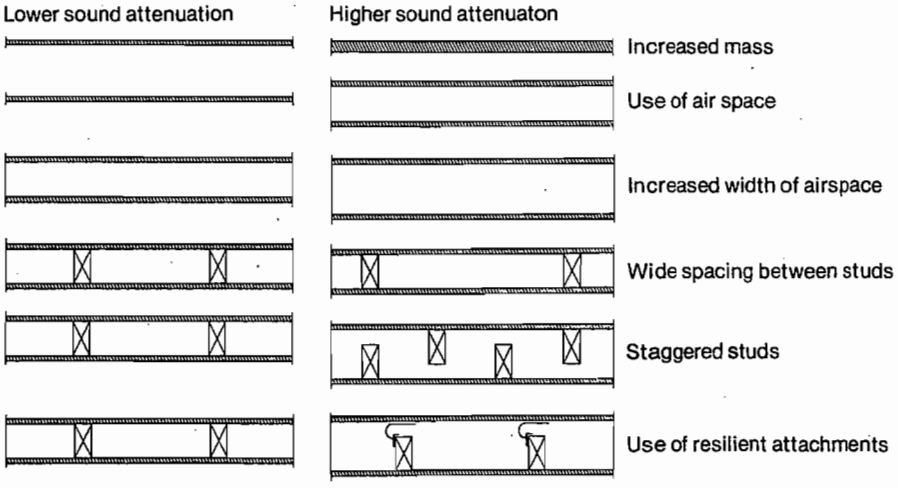
Increase the mass and stiffness of the wall. In general, the denser the wall material, the more it will reduce noise. Thus, concrete walls are better insulators than wood walls of equal thickness. Increasing the thickness of a wall is another way to increase mass and improve sound insulation. Doubling the thickness of a partition can result in as much as a 6 dB reduction in sound.[1] However, the costs of construction tend to limit the feasibility of large increases in wall mass.

The relative stiffness of the wall material can influence its sound attenuation value. Care must be taken to avoid wall constructions that can vibrate at audible frequencies and transmit exterior sounds.

[1] R. K. Cooke and P. Chrzanowski, "Transmission of Noise Through Walls and Floors," Cyril Harris, ed., Handbook of Noise Control, McGraw-Hill Book Company, Inc. (New York, 1957).

Figure 15
The Audible Landscape

Factors which influence sound attenuation of walls



Use cavity partitions. A cavity wall is composed of two or more layers separated by an airspace. The airspace makes the cavity wall a more effective sound insulator than a single wall of equal weight, leading to cost savings.

Increase the width of the airspace. A three inch airspace provides significant noise reduction, but increasing the spacing to six inches can reduce noise levels by an additional 5 dBA. Extremely wide airspaces are difficult to design.

Increase the spacing between studs. In a single stud wall, 24 inch stud spacing gives a 2-5 dB increase in STC over the common 16 inch spacing.[2]

Use staggered studs. Sound transmission can be reduced by attaching each stud to only one panel and alternating between the two panels.

[2]Leslie T. Doelle, Environmental Acoustics (New York, McGraw-Hill Book Company, 1972), pp. 232-233.

Use resilient materials to hold the studs and panels together. Nails severely reduce the wall's ability to reduce noise. Resilient layers such as fiber board and glass fiber board, resilient clips, and semi-resilient attachments are relatively inexpensive, simple to insert, and can raise the STC rating by 2-5 dB.[1]

Use dissimilar layers. If the layers are made of different materials and/or thickness, the sound reduction qualities of the wall are improved.[2]

Add acoustical blankets. Also known as isolation blankets, these can increase sound attenuation when placed in the airspace. Made from sound absorbing materials such as mineral or rock wool, fiberglass, hair felt or wood fibers, these can attenuate noise as much as 10 dB.[3] They are mainly effective in relatively lightweight construction.

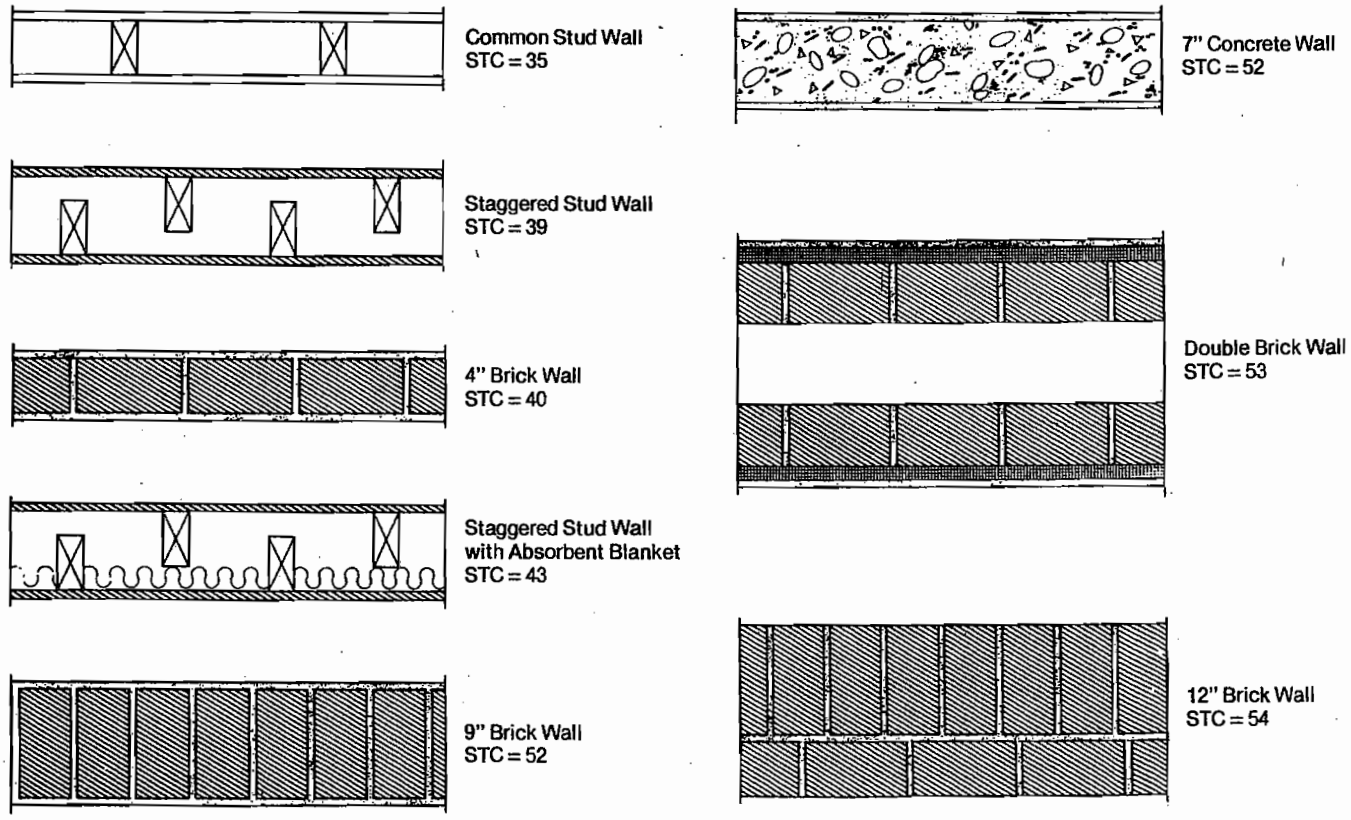
Seal cracks and edges. If the sound insulation of a high performance wall is ever to be realized, the wall must be well sealed at the perimeter. Small holes and cracks can be devastating to the insulation value of a wall. A one-inch square hole or a 1/16 inch crack 16 inches long will reduce a 50 STC wall to 40.[4]

Figure 16 shows a sample of wall types ranging from the lowest to the highest sound insulation values.

Remember that the effectiveness of best wall construction will be substantially reduced if you permit vents, mail slots or similar openings in the walls. If vents are permitted the ducts must be specially designed and insulated to make sure noise does not reach the inside. The best approach is simply to eliminate all such openings on impacted walls.

[1]Ibid, p. 172
[2]Ibid, p. 162
[3]Doelle, p. 20
[4]United States Gypsum, Sound Control Construction, Principles and Performance (Chicago, 1972), p. 66

Figure 16
Walls



Windows

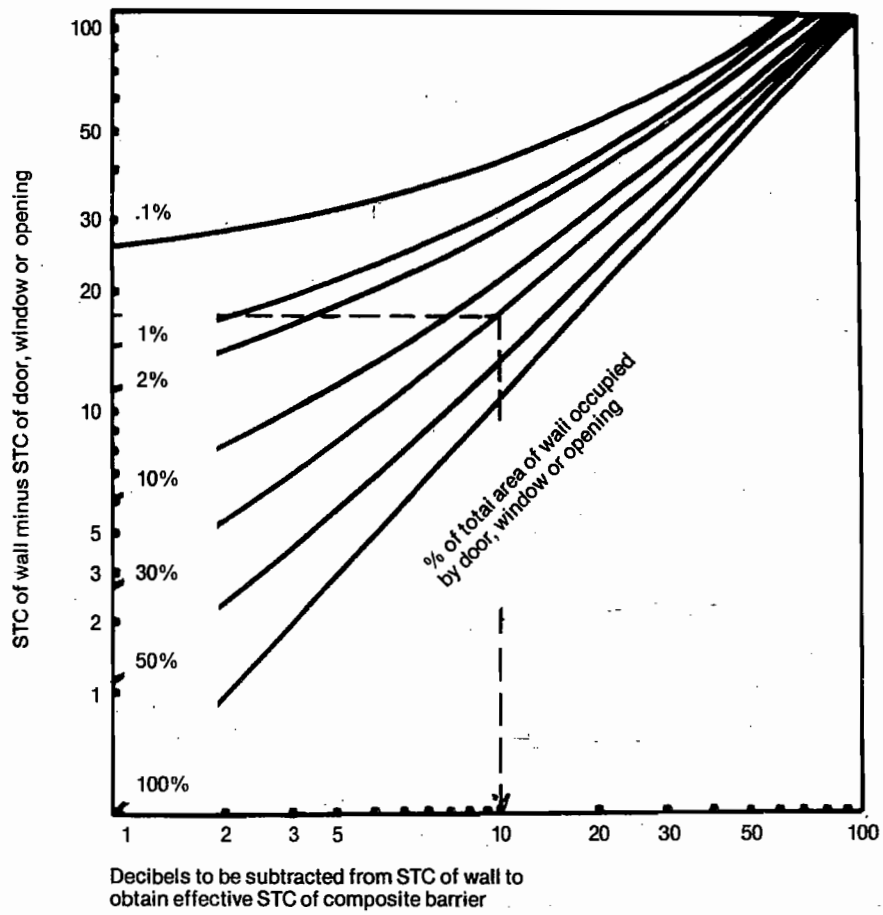
Sound enters a building through its acoustically weakest points, and windows are one of the weakest parts of a wall. An open or weak window will severely negate the effect of a very strong wall. Whenever windows are going to be a part of the building design, they should be given acoustical consideration. Figure 17 illustrates the effects of windows on the sound transmission of walls. For example, if a wall with an STC rating of 45 contains a window with an STC rating of 26 covering 30% of its area, the overall STC of the composite partition will be 35, a reduction of 10 dB.

The following is a discussion of techniques that can be used to reduce noise in a building by means of its windows. These techniques range from a blocking of the principal paths of noise entry to a blocking of the most indirect paths.

Close windows. The first step in reducing unwanted sound is to close and seal the windows. The greatest amount of sound insulation can be achieved if windows are permanently sealed. However, openable acoustical windows have been developed which are fairly effective in reducing sound.[1] Whether or not the sealing is permanent, keeping windows closed necessitates the installation of mechanical ventilation systems. If you are dealing with single family houses and some of the windows are facing away from all noise sources, a whole house fan may be better and cheaper than air conditioning. In multifamily housing or where all windows are exposed to the noise sources you will have to go with the air conditioning. If windows must be openable, special seals are available which allow windows to be opened.[2]

Reduce window size. The smaller the windows, the greater the transmission loss of the total partition of which the window is a part. Reducing the window size is a technique that is used because (a) it precludes the cost of expensive acoustical windows, and (b) it saves money by cutting down the use of glass. The problems with this technique are (a) it is not very effective in reducing noise; e.g., reducing the proportion of window to wall size from 50% to 20% reduces noise by only 3 decibels; and (b) many building codes require a minimum window to wall size ratio.

Figure 17
STC



Increase glass thickness. If ordinary windows are insufficient in reducing noise impacts in spite of sealing techniques, then thicker glass can be installed. In addition, this glass can be laminated with a tough transparent plastic which is both noise and shatter resistant. Glass reduces noise by the mass principle; that is, the thicker the glass, the more noise resistant it will be. A 1/2-inch thick glass has a maximum STC rating of 35 dB compared to a 25 dB rating for ordinary 3/16 inch glass.

Instructions on use of graph

1. Subtract the STC value of the door, window or opening from the STC value of the wall.
2. Enter the vertical axis of the graph at the point that matches the value from step 1.
3. Read across to the curve that represents the percentage of the total area of the wall that is taken up by the door, window, or opening.
4. Read down to the horizontal axis.
5. Subtract the value on the horizontal axis from the original STC value of the wall. The result is the composite STC value of the wall and the door, window or opening.

[1]U.S. Department of Housing and Urban Development, A Study of Techniques to increase the Sound Insulation of Building Elements, Report No. WR 73-5, Washington, D.C., June 1973.

[2]Los Angeles Department of Airports, *Guide to the Soundproofing of Existing Homes Against Exterior Noise.* Report No. WRC 70-2, March 1970, pp. 9-11, 22-30. In this report, the function and performance of a number of operable seals are described.

However, glass thicknesses are only practical up to a certain point, when STC increases become too insignificant to justify the cost. For example, a 1/2 inch thick glass can have an STC of 35; increasing the thickness to 3/4 inch only raises the STC to 37. However, a double glass acoustical window consisting of two 3/16 inch thick panes separated by an airspace will have an STC of 51 and can cost less than either solid window.

In addition to thickness, proper sealing is crucial to the success of the window. To prevent sound leaks, single windows can be mounted in resilient material such as rubber, cork, or felt.

Install Double-Glazed Windows. Double-glazed windows are paired panes separated by an airspace or hung in a special frame. Generally, the performance of the double-glazed window may be increased with:

- increased airspace width
- increased glass thickness
- proper use of sealings
- slightly dissimilar thicknesses of the panes
- slightly non-parallel panes

In general the airspace between the panes should not be less than 2–4 inches if an STC above 40 is desired. If this is not possible, a heavy single-glazed window can be used. The use of slightly non-parallel panes is a technique employed when extremely high sound insulation is required, such as in control rooms of television studios.

The thickness of double-glazed panes may vary from 1/8 to 1/4 inch or more per pane. Although thickness is important, the factors which most determine the noise resistance of the window is the use of sealant and the width of the airspace.

As in the case of all windows, proper sealing is extremely important. To achieve an STC above 43, double-glazed windows should be sealed permanently. If the windows must be openable, there are available special frames and sealers for openable windows which allow a maximum STC of 43.[1]

Permanently sealed double-glazed windows often require an air pressure control system to maintain a constant air pressure and minimal moisture in the airspace. Without this system, the panes may deflect, and, in extremely severe cases, pop out of the frames.

To further insure isolation of noise between double-glazed panes, the panes could be of different thicknesses, different weights, and slightly non-parallel to each other. This prevents acoustical coupling and resonance of sound waves.

Doors

Acoustically, doors are even weaker than windows, and more difficult to treat. Any door will reduce the insulation value of the surrounding wall. The common, hollow core wood door has an STC rating of 17 dB. Taking up about 20% of the wall, this door will reduce a 48 STC wall to 24 STC. To strengthen a door against noise, the hollow core door can be replaced by a heavier solid core wood door that is well sealed[1] and is relatively inexpensive. A solid core wood door with vinyl seal around the edges and carpeting on the floor will reduce the same 48 STC wall to only 33 dB.[2] An increased sound insulation value can be achieved if gasketed stops or drop bar threshold closers are installed at the bottom edge of the door. (See Figure 18)

The alternative solution to doors is to eliminate them whenever possible from the severely impacted walls and place them in more shielded walls.

In any case no mail slots or similar openings should be allowed in exterior doors.

Roofs

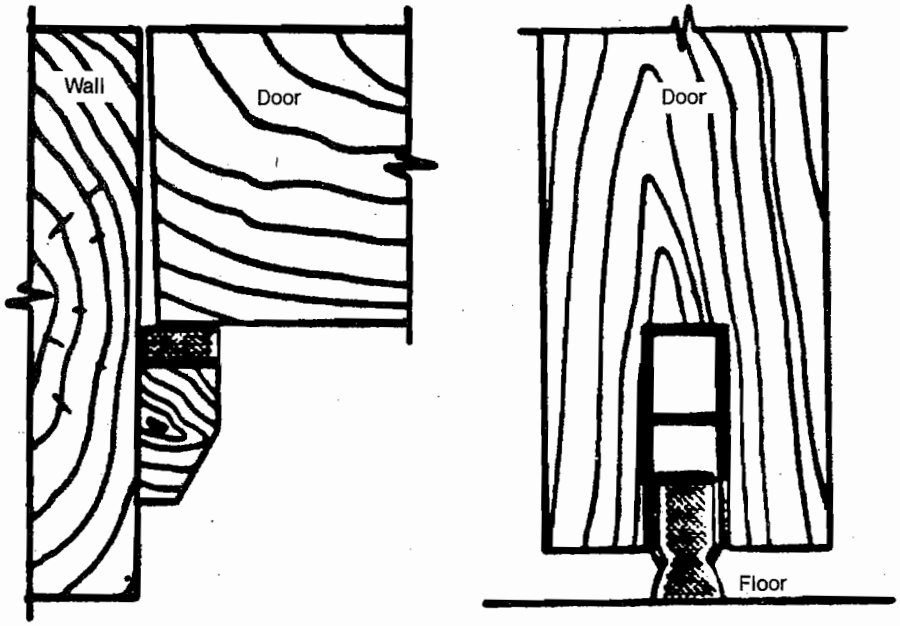
Acoustical treatment of roofs is not usually necessary unless the noise is extremely severe or the noise source is passing over the building. The ordinary plaster ceiling should provide adequate sound insulation except in extremely severe cases. An acoustically weak roof which is likely to require treatment is the beamed ceiling.[3] Beamed ceilings may be modified by the addition of a layer of fiberglass or some other noise resistent material. Suspended ceilings are the most effective noise reducers but they are also the most expensive.

[1]D.E. Bishop and P.W. Hirtle, "Notes on the Sound Transmission Loss of Residential-Type Windows and Doors," Journal of the Acoustical Society of America, 43:4 (1968).

[2]U.S. Gypsum, Sound Control... p. 100.

[3]Ibid p. 15.

Figure 18



Gasketed door stop

Drop bar threshold closer

[1]Ibid.

Floors

In the case of highway noise, floors would only require acoustical treatment if the highway were passing under the building. In this case, flooring would have to provide protection against structural vibrations as well as airborne sound.

Two ways to insulate a floor from noise are to install a solid concrete slab at least 6 inches thick or install a floating floor. In general, the floating floor gives the greatest amount of sound and vibration insulation; however, it is extremely expensive. Basically, a floating floor consists of a wood or concrete slab placed over the structural slab, but separated by a resilient material. The resilient material isolates the surface slab from the structural slab and the surrounding walls.

What to Look for When Reviewing Plans

The number of possible combinations of the building materials that go into walls, ceilings, windows and doors, is, no doubt, considerably short of infinite. It is however still a very large number, large enough that it would be impossible to compile a list of all the possible combinations. Therefore, do not expect to find in this section, or anywhere else for that matter, a neat table showing the STC ratings for all the types of construction you may encounter. In fact, it is not really your responsibility to determine the precise STC ratings for the walls, ceilings, windows and doors in the projects you review. Your job is simply to review the attenuation levels claimed by the sponsor/developer and determine whether or not they are reasonable.

To enable you to perform the above described task, we have prepared a list of the most common types of construction for which we have STC ratings. By comparing the type of construction proposed to one of these "model" types you should be able to tell whether the claimed STC rating is reasonable. For example, the sponsor/developer submits a description of his building stating that a 2 x 6 stud wall with standard sheathing, insulation, wood siding, and 1/2" gypsum board achieves a STC rating of 48. You look at Table 3 and find that the closest "model" wall is a 2 x 4 stud wall with wood siding, sheathing, insulation, and 1/2" gypsum board. This wall has a STC rating of 39. An 9 dB difference is quite significant considering that the walls are really quite similar. You would probably want to go back to the developer/sponsor and ask for some supporting data that proves that the 2 x 6 wall he proposes will indeed provide 48 dB of noise attenuation.

In order to make it easier to review the attenuation levels provided by the proposed construction, we suggest that you ask the developer/sponsor to complete a form such as shown in Figure 19. Such a form will give you all the information you need in a properly organized format that will facilitate your review. You could fill in the first part and simply have the developer/sponsor fill out the second part and return it with the developer certification or other project documents.

As you will recall from the previous section, most walls provide pretty good attenuation by themselves. It is the presence of windows and doors and openings such as vents that reduces the attenuation capability of the wall. Thus, after you have determined whether the basic wall itself has a reasonable STC, you must review the impact of the windows and doors. You do this by using Figure 17. First you determine the difference between the STC ratings for the wall and the windows. You enter the vertical axis of Figure 17 with that number. You read across until you intersect the line that represents the percentage of the wall taken up by the windows. Then you read down to the horizontal axis where you wil find the value to be subtracted from the basic STC value of the wall. The resulting number is the combined STC value for the wall. If the wall also contains a door, repeat the same procedure, only start out with the modified STC rating for the wall. If the wall has doors only, then obviously you start with the basic wall STC rating. Finally you compare the number you have derived with that listed by the developer/sponsor. If they are fairly close, you need not pursue it further. If there is a substantial difference, you should ask for an explanation or documentation from the developer.

Once again, we caution you about borderline cases. If the attenuation required is 30 dB and the STC rating for the proposed construction is exactly 30 dB, you may want to ask the developer to provide even more attenuation. Remember that we discussed how the STC rating may overstate the actual attenuation provided by as much as 3 dB. If an additional 3 dB can be achieved at minimum cost, we would strongly urge that you seek it from the developer/sponsor.

Finally check to make sure the developer has provided some form of mechanical ventilation. If it's a single family house and a whole house fan is the means of ventilation being provided make sure that there are operable windows on walls which do not face the noise source(s) nor are perpendicular to the source(s). Otherwise the residents will have to open windows on the exposed wall, thus cancelling out much of the attenuation achieved.

Table 3
STC Ratings for Typical Building Components[1]

Building Component	Description	STC Rating
Frame Wall	a. 5/8" x 10" Redwood Siding b. 1/2" Insulation Board Sheathing c. 2 x 4 studs 16" o.c. d. Fiberglass Building Insulation e. 1/2" Gypsum Board attached directly to studs	39 dB
Stucco/Frame Wall	a. 7/8" Stucco b. No. 15 felt Building Paper and 1" Wire Mesh c. 2 x 4 Studs 16" o.c. d. Fiberglass Building Insulation e. 1/2" Gypsum Board attached directly to studs	46
Brick Veneer Wall	a. Face Brick b. 1/2" Airspace with metal ties c. 3/4" Insulation Board Sheathing d. 2 x 4 Studs 16" o.c. e. Fiberglass Building Insulation f. 1/2" Gypsum Board attached directly to studs	56
Masonry Wall	a. 1" Stucco b. 8" thick Hollow Concrete Block c. 1/2" Gypsum Board attached to furring strips	49 (estimated)
Windows	Wood double hung, closed but unlocked, single glazing	23
	Aluminum sliding, latched, single glazing	24
	Wood double hung, closed but unlocked, glazed with 7/16" insulating glass	22
	Aluminum single hung, closed, glazed with 7/16" insulating glass	25
	Wood, double hung, sealed, glazed with 7/16" insulating glass with single glazed storm sash–2 1/8" separation	35
	Aluminum sliding, closed, single glazed with single glazed storm sash, 1/8" separation	22
Exterior Doors	Wood, flush solid core, with brass weather stripping	27
	Wood, flush solid core, plastic weather stripping, aluminum storm door	34
	Wood, French door, brass weather stripping	26
	Steel, flush, with urethane foam core, with magnetic weather stripping	28
Roof	Shingle Roof with attic, 1/2" gypsum wall board ceiling framed independently of roof	43 (estimated)

[1]Except as noted, all STC ratings are from: *Acoustical and Thermal Performance of Exterior Residential Walls, Doors and Windows*, National Bureau of Standards.

Figure 19
Description of Noise Attenuation Measures
(Acoustical Construction)

Part I

Project Name _____

Location _____

Sponsor/Developer _____

Noise Level (From NAG) _____ Attenuation Required _____

Primary Noise Source(s) _____

Part II

1. For Walls (s) facing and parallel to the noise source(s) (or closest to parallel):
   a. Descripton of wall construction* _____

   _____

   b. STC rating for wall (rated for nb windows or doors): _____

   c. Description of Windows: _____

   _____

   d. STC rating for window type _____

   e. Description of doors _____

   _____

   f. STC rating for doors _____

   g. Percentage of wall (per wall, per dwelling unit) composed of windows _____ and doors _____

   h. Combined STC rating for wall component _____

2. For walls perpendicular to noise source(s):
   a. Description of wall construction* _____

   _____

   b. STC rating for wall (rated for no windows or doors) _____

   c. Description of windows _____

   _____

   d. STC rating for windows _____

   e. Description of doors _____

   _____

f. STC rating for doors _____

g. Percentage of wall (per wall, per dwelling unit) composed of windows _____ and doors _____

h. Combined STC rating for wall component _____

3. Roofing component (if overhead attenuation is required due to aircraft noise):
   a. Description of roof construction _____

   _____

   b. STC rating (rated as if no skylights or other openings) _____

   c. Descripton of skylights or overhead windows _____

   _____

   d. STC rating for skylights or overhead windows _____

   e. Percentage of roof composed of skylights or windows (per dwelling unit) _____

   f. Percentage of roof composed of large uncapped openings such as chimneys _____

   g. Combined STC rating for roof component _____

4. Description of type of mechanical ventilation provided _____

   _____

Prepared by _____

Date: _____

*If walls contain vents or similar openings, attach a description of duct arrangement and insulation and a statement of how much the wall STC is reduced by the presence of the vent.

Figure 19
Description of Noise Attenuation Measures
(Acoustical Construction)

Part I

Project Name PARADISE HOMES

Location ANYTOWN

Sponsor/Developer JOAN DOE + ASSOC. INC.

Noise Level (From NAG) 73 Attenuation Required 30d6

Primary Noise Source(s) HIGHWAY

Part II

1. For Walls (s) facing and parallel to the noise source(s) (or closest to parallel):
   a. Descripton of wall construction* 3/8" FIR PLYWOOD SIDING, 2 X 4 STUDS 16"o.c. 3½" FIBERGLASS INSULATION
   b. STC rating for wall (rated for no windows or doors): 37
   c. Description of Windows: WOOD DOUBLE HUNG, INSULATING GLASS
   d. STC rating for window type 22
   e. Description of doors WOOD, FLUSH, SOLID CORE
   f. STC rating for doors 30
   g. Percentage of wall (per wall, per dwelling unit) composed of windows 10% and doors 5%
   h. Combined STC rating for wall component 30d6
2. For walls perpendicular to noise source(s):
   a. Description of wall construction* SAME AS ABOVE
   b. STC rating for wall (rated for no windows or doors) 37
   c. Description of windows SAME AS ABOVE
   d. STC rating for windows 22
   e. Description of doors NO DOORS

SAMPLE

f. STC rating for doors —

g. Percentage of wall (per wall, per dwelling unit) composed of windows 10% and doors 0

h. Combined STC rating for wall component 30

3. Roofing component (if overhead attenuation is required due to aircraft noise):
   a. Description of roof construction N/A

   b. STC rating (rated as if no skylights or other openings) _____

   c. Descripton of skylights or overhead windows _____

   d. STC rating for skylights or overhead windows _____

   e. Percentage of roof composed of skylights or windows (per dwelling unit) _____

   f. Percentage of roof composed of large uncapped openings such as chimneys _____

   g. Combined STC rating for roof component _____

4. Description of type of mechanical ventilation provided CENTRAL AIR Conditioning

Prepared by _____

Date: _____

*If walls contain vents or similar openings, attach a description of duct arrangement and insulation and a statement of how much the wall STC is reduced by the presence of the vent.

...on Noise Attenuation

...stions

...What are the three basic ways to ...ide noise attenuation?
...What are the responsibilities of ... personnel regarding noise ...enuation?
...When a barrier is introduced ...een a source and a receiver the ...d energy is redistributed along 3 ...rect paths. What are these three ...s?
...What is "Path Length Difference" ...ow does it affect the attenuation ...provided by a barrier?
...What are "Transmission Loss ...s?"
...ow does the transmission loss ... of barrier material affect the ...ation capability of the barrier?
...s a general rule, what ...mission loss values should you ...or?
...you have more than one barrier ...en the source and the receiver ...amount of attenuation ...sed substantially?
...What are the four things to check ...reviewing a proposed barrier?
...st 3 ways to make a barrier more ...e without increasing its overall
11. List 3 ways to make a barrier more effective without increasing its overall length.
12. What is the maximum percentage of the total area of a barrier that can be made up of openings without a significant loss in barrier effectiveness?
13. List 3 site planning techniques that are used to shield residential developments.
14. When are parks and playgrounds not noise compatible uses that can be employed as buffers?
15. What are the two main things to look for when reviewing site plan changes?
16. What are some of the building orientations which can aggravate noise problems?
17. What is the Sound Transmission Class (STC) rating?
18. Which is better a high STC or a low STC rating?
19. What kinds of conditions were STC ratings originally developed for?
20. What should you do when using STC ratings in a transportation noise situation?
21. List 5 ways to improve the attenuation capability of a wall.
22. Windows are one of the acoustically weakest components in a wall. List 3 ways to reduce the negative effects of windows.
23. What is the best way to reduce the effect of doors?

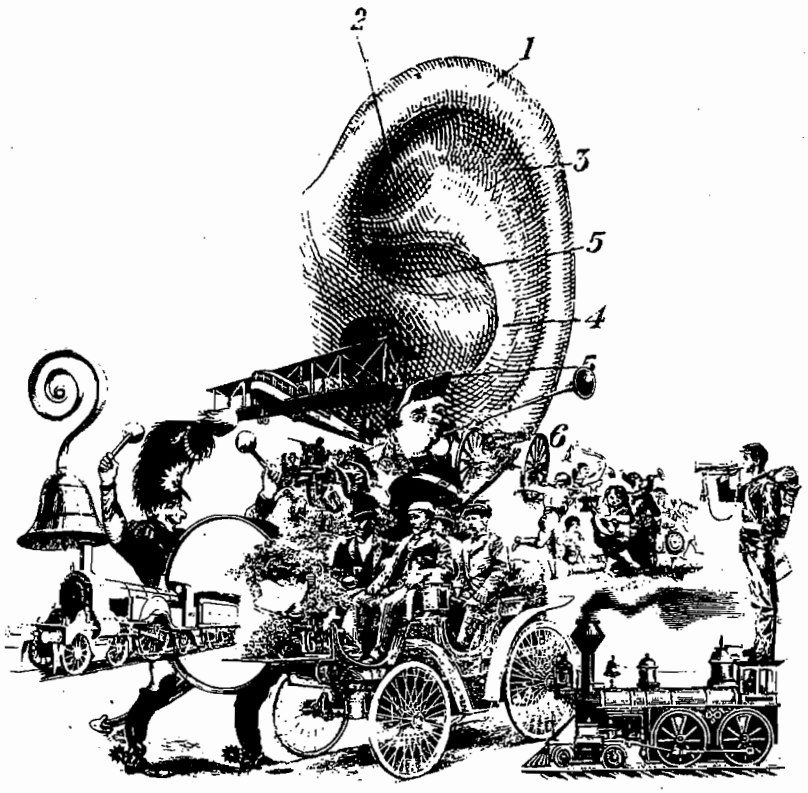
Quiz on Noise Attenuation

Answers

1. a. barriers or berms
   b. site design
   c. acoustical construction
2. a. to make sure the project sponsor/developer is aware of the attenuation requirements
   b. provide sponsor/developer with an overview of available options
   c. review attenuation proposals to make sure they are adequate
3. a. A **diffracted** path over the top of the barrier
   b. A **transmitted** path through the barrier
   c. A **reflected** path away from the receiver
4. "Path Length Difference" is the difference in distance that sound must travel diffracting over the barrier rather than passing directly through it. Since sound energy decreases over distance, the greater the path length distance the greater the attenuation.
5. "Transmission Loss Values" represent the amount noise levels will be reduced when the sound waves pass through a barrier.
6. Since the attenuation provided by a barrier is a function of both the sound energy that goes over the top **and** the energy that goes through the barrier, if the transmission loss value is low then the effectiveness of the barrier will be greatly reduced.
7. If the transmission loss value of the barrier material is at least 10dB greater than the attenuation level provided by diffraction (i.e. barrier height) there shouldn't be any problem.
8. No. The combined effect of multiple barriers does not normally provide significantly greater attenuation than a single barrier. For design purposes, the general procedure is to assume the attenuation of the most effective barrier.
9. a. Is it high enough?
   b. Is it long enough?
   c. Is it made of the right material?
   d. Is it properly constructed?
10. a. move the barrier closer to the source
    b. bend the top of the barrier towards the source
    c. do both
11. a. move it closer to the receiver
    b. bend the ends toward the receiver
    c. do both
12. 1 percent
13. Any 3 of the below:
    a. increasing the distance between the source and the receiver
    b. placing noise compatible land uses between the source and the receiver
    c. locating barrier type buildings parallel to the source
    d. orienting residences away from the noise
14. when they are the only ones associated with the project
15. a. is the separation between the source and receiver great enough
    b. If a noise compatible building is being used as a barrier is it tall and long enough?
16. Building orientations which trap noise and cause it to reverberate off building walls. This would include shapes where a court is open to the source or where a series of buildings are arranged perpendicular to the source.
17. The STC rating is equal to the number of decibels a sound is reduced as it passes through a material.
18. A high STC rating is better.
19. The STC ratings were originally intended primarily for use with interior partitions and for noise such as speech, radios, television.
20. Recognize that the STC rating may overstate the effectiveness of the materials by 2-3db.
21. Any of the 9 below:
    a. increase the mass and stiffness of the wall
    b. use cavity partitions
    c. increase the width of the airspace
    d. increase the spacing between studs
    e. use staggered studs
    f. use resilient materials to hold the studs and finish materials together
    g. use of dissimilar layers (leaves)
    h. add acoustical blankets
    i. seal cracks and edges
22. Any of the 4 below:
    a. close the windows and provide mechanical ventilation
    b. reduce window size
    c. increase glass thickness
    d. install double glazed windows
23. Eliminate them from severely impacted walls

U.S. Department of Housing and Urban Development
Office of Policy Development and Research

Noise Assessment Guidelines

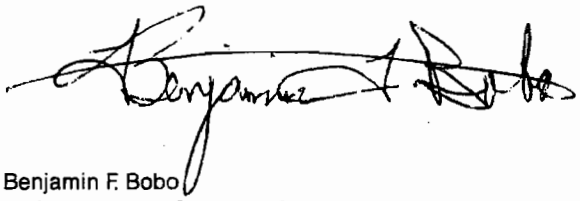


Noise Assessment Guidelines

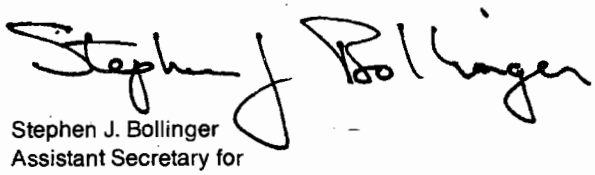
Foreword

In choosing among alternative sites for housing, potential noise problems are prominent among the issues that must be examined. These Noise Assessment Guidelines were developed to provide HUD field staff, interested builders, developers, and local officials with an easy-to-use method of evaluating noise problems with a minimum of time and effort.

We believe that this set of tools will simplify the process of balancing the goal of environmental protection with those of efficiency and reduced housing costs. We hope you will find them useful, and invite your comments.



Benjamin F. Bobo
Acting Assistant Secretary for
Policy Development and Research



Stephen J. Bollinger
Assistant Secretary for
Community Planning and
Development

Preface

The Department of Housing and Urban Development, in its efforts to provide decent housing and a suitable living environment, is concerned with noise as a major source of environmental pollution and has issued Subpart B on Noise Abatement and Control to Part 51 of Title 24 of the Code of Federal Regulations.

The policy established by Subpart B embodies HUD objectives to make the assessment of the suitability of the noise environment at a site: (1) easy to perform; (2) uniformly applicable to different noise sources; and (3) as consistent as possible with the assessment policies of other Federal departments and agencies. In furtherance of these objectives, the Office of Policy Development and Research has sponsored research to provide site analysis techniques. These *Noise Assessment Guidelines* do not constitute established policy of the Department but do provide a methodology whose use is encouraged by HUD as being consistent with its objectives. The *Guidelines* provide a means for assessing separately the noise produced by airport, highway, and railroad operations, as well as the means for aggregating their combined effect on the overall noise environment at a site.

This booklet has been prepared by Bolt Beranek and Newman Inc., under Contract No. H-2243R for the U.S. Department of Housing and Urban Development. It is a revision of an earlier edition published in August 1971. With the exception of changes made by the Department, the contractor is solely responsible for the accuracy and completeness of the data and information contained herein.

Contents

Introduction

These guidelines are presented as part of a continuing effort by the Department of Housing and Urban Development to provide decent housing and a suitable living environment for all Americans.

The procedures described here have been developed so that people without technical training will be able to assess the exposure of a housing site to present and future noise conditions. In this context, the site may hold only one small building, in which case the noise assessment is straightforward. Larger sites may hold larger buildings, or many buildings, and the noise level may be different at different parts of the site (or building). Assessments of the noise exposure should be made at representative locations around the site where significant noise is expected. These are designated as "Noise Assessment Locations," abbreviated NAL in the following text.

The only materials required are a map of the area, a ruler (straight edge), a protractor and a pencil. Worksheets and working figures are provided separately.

All of the information you need can be easily obtained – usually by telephone. For convenience, this information is listed at the beginning of each section under headings that indicate the most likely source. While you are obtaining this information, be sure to ask about any approved plans for future changes that may affect noise levels at the site – for example: land-use changes, changes in airport runway traffic, widening of roads, and so forth. In all evaluations, you should assess the condition that will have the most severe or most lasting effect on the use of the site.

Wherever possible, you should try to assess noise environments expected at least ten years in the future.

The degree of acceptability of the noise environment at a site is determined by the outdoor day-night average sound level (DNL) in decibels (dB). The assessment of site acceptability is presented first as an evaluation of the site's exposure to three major sources of noise – aircraft, roadways, and railways. These are then combined to assess the total noise at a site. Worksheets are provided at the back of these Guidelines to use in summarizing your evaluations.

The noise environment at a site will come under one of three categories:

Acceptable (DNL not exceeding 65 decibels) The noise exposure may be of some concern but common building constructions will make the indoor environment acceptable and the outdoor environment will be reasonably pleasant for recreation and play.

Normally Unacceptable (DNL above 65 but not exceeding 75 decibels) The noise exposure is significantly more severe; barriers may be necessary between the site and prominent noise sources to make the outdoor environment acceptable; special building constructions may be necessary to ensure that people indoors are sufficiently protected from outdoor noise.

Unacceptable (DNL above 75 decibels) The noise exposure at the site is so severe that the construction cost to make the indoor noise environment acceptable may be prohibitive and the outdoor environment would still be unacceptable.

When measuring the distance from the site to any noise source, measure from the source to the nearest points on the site where buildings having noise-sensitive uses are located. These points define the Noise Assessment Locations for the site. The relevant measurement location for buildings is a point 2 meters (6.5 feet) from the facade.

If at any point during the assessment the site's exposure to noise is found to be Unacceptable or Normally Unacceptable, every effort should be made to improve the condition, e.g., the location of the proposed dwellings can be changed or some shielding can be provided to block the noise from that source.

Where quiet outdoor space is desired at a site, distances should be measured from the important noise sources to the outdoor area in question and the combined noise exposure should be assessed.

Frequently, the locations of dwellings have not yet been specified at the time the noise assessment of a site is made. In these instances, distances used in the noise assessment should be measured as 2 meters less than the distance from the building setback line to the major sources of noise.

Combining Sound Levels in Decibels

The noise environment at a site is determined by combining the contributions of different noise sources. In these Guidelines, Workcharts are provided to estimate the contribution of aircraft, automobile, truck, and train noise to the total day-night average sound level (DNL) at a site. The DNL contributions from each source are expressed in decibels and entered on Worksheet A. The combined DNL from all the sources is the DNL for the site and is the value used to determine the acceptability of the noise environment.

Sound levels in decibels *are not combined by simple addition!* The following table shows how to combine sound levels:

Table

Difference in Sound Level	Add to Larger Level
0	3.0
1	2.5
2	2.1
3	1.8
4	1.5
5	1.2
6	1.0
7	0.8
8	0.6
9	0.5
10	0.4
12	0.3
14	0.2
16	0.1
greater than 16	0

Use the table by first finding the numerical difference in sound level between two levels being combined. Entering the table with this value, find the value to be added to the larger of the two levels, add this value to the larger level to determine the total. Where more than two levels are to be combined, use the same procedure to combine any two levels; then use this subtotal and combine it with any other level, and so on. Fractional numerical values may be interpolated from the table; however, the final result should be rounded to the nearest whole number.

...ple 1: In performing a site evaluation, ...parate DNL values for airports, road ...nd railroads have been listed on ...eet A as 56, 63, and 61 decibels. In ...complete the final evaluation of the ...se separate DNL values must be ...d. The difference between 63 and ...om the table you find that 0.8 should ...d to 63, for a subtotal of 63.8. The ...e between 63.8 and 61 is 2.8; from ...you interpolate that approximately ...d be added to 63.8 for a total of 65.7 ...when rounded to whole numbers. ...mple shows how noise from different ...day be Acceptable, individually, at a ...hen combined, the total noise en... may exceed the Acceptable DNL ... decibels.

Aircraft

Necessary Information

To evaluate a site's exposure to aircraft noise, you will need to consider all airports (civil and military) within 15 miles of the site. The information required for this evaluation is listed below under headings that indicate the most likely source. Before beginning the evaluation, you should record the following information on Worksheet B:

From the FAA Area Office or the Military Agency in charge of the airport:

- Are current DNL or NEF (Noise Exposure Forecast) contours available? Noise contours are available for almost all military airports. These contours have been developed and published as part of the Air Installation Compatible Use Zone (AICUZ) program of the Department of Defense. The contours are published normally as part of an AICUZ report. Noise contours are also available for many civil airports. When available, they are superimposed on a map with an appropriately marked scale (see Figure 1, page 4).
- Any available information about approved plans for runway changes (extensions or new runways).

From the FAA Control Tower or Airport Operations (if DNL or NEF contours are *not* available):

- The number of nighttime jet operations (10 p.m. - 7 a.m.)
- The number of daytime jet operations (7 a.m. - 10 p.m.)
- The flight paths of the major runways.
- Any available information about expected changes in airport traffic, e.g., will the number of operations increase or decrease in the next 10 or 15 years.

In making your evaluation, use the data for the heaviest air traffic condition, whether present or future.

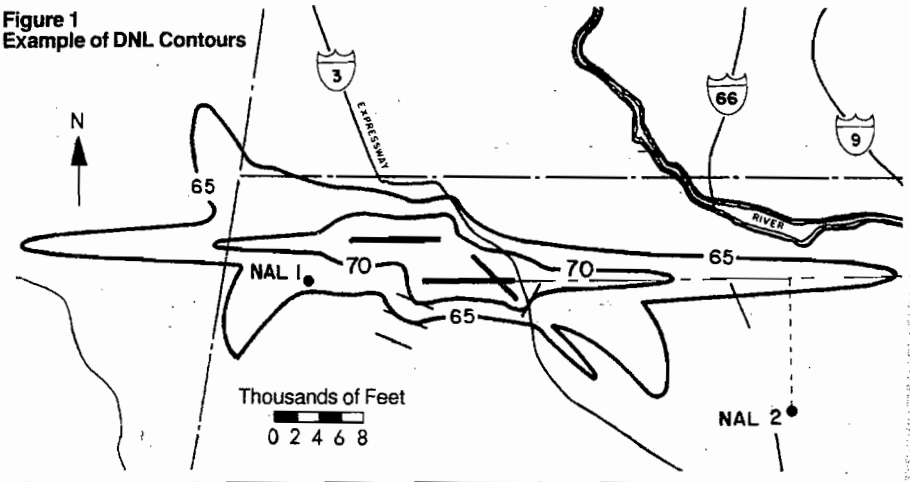
Evaluation of Site Exposure to Aircraft Noise

If current DNL (or NEF) contours are available (as in Figure 1 page 4), locate the site on the map by referring to the marked distance scale. If there are no other noise sources in the area, you do not need to do anything else. If there are other noise sources affecting the site, you will need to find the precise DNL value so you can combine it with the other sources. Obtain the DNL at the appropriate NAL on the site by interpolation between the contours on either side of the NAL. If NEF contours are used, estimate DNL by adding 35 decibels to the NEF values. Note that contours are usually provided in 5 decibel increments. (See Example 2 on page 4.) When supersonic aircraft operations are present, DNL contours are *required* for the assessment.

If DNL or NEF contours are *not* available, the DNL at a site may be estimated in several different ways:

- An FAA Handbook (Reference 1) can be used to estimate DNL contours for sites in general aviation airport vicinities. General aviation airports exclude commercial jet transports but may include business jets.
- A handbook available from EPA (Reference 2 at the back of this Guide) can be used to calculate DNL at individual points.
- A procedure for constructing approximate DNL contours for sites near commercial jet

Figure 1
Example of DNL Contours



Example 2: The illustration in Figure 1 at the top of page 4 shows the NAL's on a map that has DNL contours. We find that NAL number 1 lies between the 65 and 70 dB contours and that NAL number 2 lies outside the 65 dB contour.

We find the DNL at NAL number 1 by interpolation from the distances between the NAL and the 65 and 70 dB contours.

By scaling off the map, we find that the distance from the NAL, measured perpendicularly to the contours, is 800 feet to the 65 dB contour and 2400 feet to the 70 dB contour. The distance between the 65 and 70 dB contours is 2400 + 800 =3200 feet. We find the DNL at the NAL number 1 to be 65 decibels plus 800/3200 x 5 decibels = 66.3 decibels.

Example 3: The illustration in Figure 2 at the bottom of page 5 shows an airport for which DNL or NEF contours are not available. The airport has 10 nighttime and 125 daytime jet operations.

To construct the approximate contours, we determine the effective number of operations as follows:

10 (nighttime) x 10 = 100

Add to this the actual number of daytime operations:

100 + 125 (daytime) = 225

To determine the distances A and B in relation to the runway (see Figure 3, page 5), enter the effective number of operations on the horizontal scales of the charts in Figure 3;

airports without supersonic aircraft is as follows:

Determine the "effective" number of jet operations at the airport by first multiplying the number of nighttime jet operations by 10.

Then add the number of daytime jet operations to obtain an effective total (see Example 3, page 4).

On a map of the area showing the principal runways, mark the location of the site and, using the diagram and charts of Figure 3 on page 5, construct approximate DNL contours of 65, 70, and 75 dB for the major runways and flight paths most likely to affect the site. (see Figure 2, page 5.)

Although a site may be Acceptable for exposure to aircraft noise; exposure to other sources of noise, when combined with the aircraft noise, may make the site Unacceptable. Therefore, if necessary, values of aircraft noise exposure less than 65 dB can be estimated from Table 2. Scale the shortest distance D^2 from the NAL to the flight path, as in Figure 2. Scale the distance D^1 from the 65 dB contour to the flight path. Divide D^2 by D^1 and enter this value into the following table to find the approximate DNL at the NAL.

Table 2

$\frac{D2}{D1}$	DNL dB
1.00	65
1.12	64
1.26	63
1.41	62
1.58	61
1.78	60
2.00	59
2.24	58
2.51	57
2.82	56
3.16	55

Figure 2
Example of Approximate DNL Contours for an Airport with 225 Effective Number of Operations

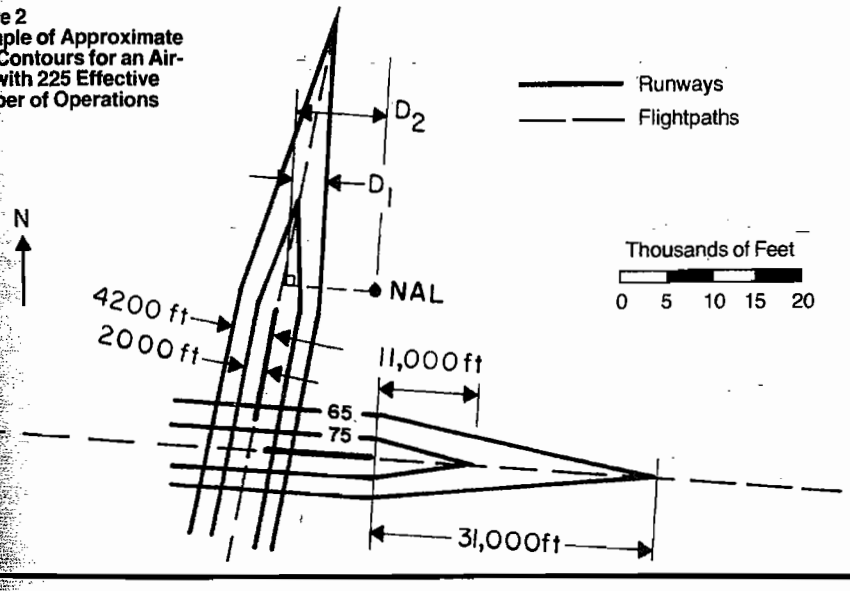
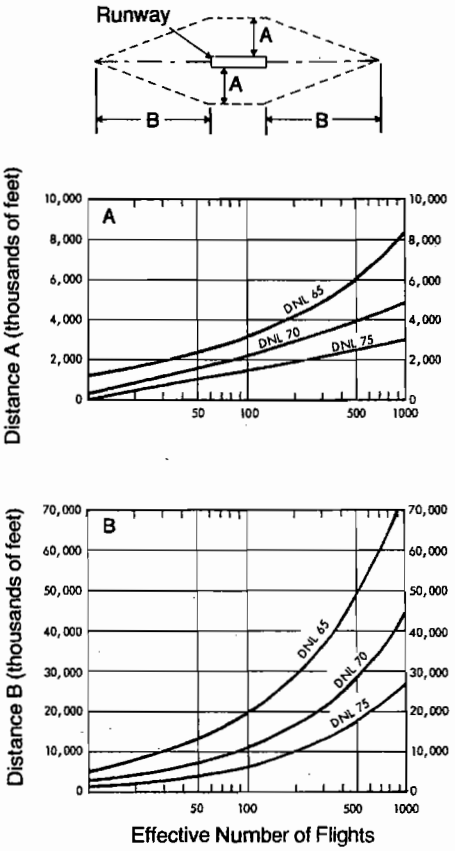


Figure 3
Charts for Estimating DNL for Aircraft Operations



...up to the DNL curves; read across the ...t to the left to obtain distances A and B ...the vertical scales on the charts. ...we find from Figure 3, for example, that for ...effective operations, distance A is 4200 ...for the 65 dB contour and 2000 feet for ...75 dB contour. Distance B is 31,000 feet ...the 65 dB contour and 11,000 feet for the ...dB contour.

Example 4a: The NAL shown in Figure 2 is outside the 65 dB contour. The distance D^2 from the NAL to the flight path is 9700 feet. The distance D^1 from the 65 dB contour to the flight path, measured perpendicularly from the contour, is 3700 feet. The ratio D^2/D^1 is 9700/3700 = 2.62. From Table 2 we find the DNL from the airport to be 56.6 dB. We do not know whether the site is Acceptable or not, however, since we must also assess the contribution of roadway and train noise to the total DNL at the site.

Example 4b: We observe that the perpendicular distance (D^2) from NAL number 2 (Figure 1) to the flight path is more than 3 times the distance (D^1) from the 65 dB contour to the flight path. From Table 2 we find that the contribution of the airport to the DNL at NAL number 2 is less than 55 decibels. We need not consider the airport further in accessing the noise environment at this site.

Roadways

Necessary Information

To evaluate a site's exposure to roadway noise, you will need to consider all roads that might contribute to the site's noise environment; roads farther away than 1000 feet normally may be ignored.

Before beginning the evaluation, determine if roadway noise predictions already exist for roads near the site. Also try to obtain all available information about approved plans for roadway changes (e.g., widening existing roads or building new roads) and about expected changes in road traffic (e.g., will the traffic on this road increase or decrease in the next 10 to 15 years).

If noise predictions have been made, they should be available from the City (County) Highway or Transportation Department. If not, record the following information on page 1 of Worksheet C:

- The distances from the NAL's for the site to the near edge of the nearest lane and the far edge of the farthest lane for each road.
- Distance to stop signs.
- Road gradient, if 2 percent or greater.
- Average speed.
- The total number of automobiles for both directions during an average 24-hour day. Traffic engineers refer to this as ADT, Average Daily Traffic (or sometimes AADT, meaning Annual Average Daily Traffic).
- The number of trucks during an average 24-hour day in each direction.

If possible, separate trucks into "heavy trucks" – those weighing more than 26,000 pounds with three or more axles – and "medium trucks" – those between 10,000 and 26,000 pounds. (Each medium truck is counted as equal to 10 automobiles.) Trucks under 10,000 pounds are counted as automobiles. Count buses capable of carrying more than 15 seated passengers as "heavy" trucks – others, as "medium" trucks. If it is not possible to separate the trucks into those that are heavy and those that are not, treat *all* trucks as though they are "heavy."

Note: If the road has a gradient of 2 percent of more, record the numbers for uphill and downhill traffic separately since these figures will be needed later; otherwise, simply record the total number of trucks. Most often you will have to assume that the uphill and downhill traffic are equally split.

- The fraction of ADT that occurs during nighttime (10 p.m. to 7 a.m.). If this is unknown, assume 0.15 for both trucks and autos.

Evauation of Site Exposure to Roadway Noise

Traffic surveys show that the amount of roadway noise depends on the percentage of trucks in the total traffic volume. To account for this effect, you must evaluate automobile and truck traffic separately and then combine the results.

The noise environment at each site due to traffic noise is determined by utilizing a series of Workcharts to define the contribution of automobiles and trucks from one or more roads at that site. Each noise source yields a separate DNL value.

Workchart 1 provides a graph for assessing a site with respect to the noise from automobiles, light and medium trucks; Workchart 2 provides a similar graph for assessment of heavy truck noise. These values are combined for each road affecting the noise environment at the site to obtain the total contribution of roadway noise. Remember, the noise from aircraft and railways must also be considered before determining the suitability of this site's noise environment.

Effective Distance

Before proceeding with these separate evaluations, however, determine the "effective distance" to each road from the dwelling or outdoor residential activity (the NAL's for the site) by averaging the distances to the nearest edge of the nearest lane and to the farthest edge of the farthest lane of traffic. (See Example 5, page 6, and Figure 4, page 7.)

Note: For roads with the same number of lanes in both directions, the effective distance is the distance to the center of the roadway (or median strip, if present).

Automobile Traffic

Workchart 1 was derived with the following assumptions:

- There is line-of-sight exposure from the site to the road; i.e., there is no barrier which effectively shields the site from the noise of the road.
- There is no stop sign within 600 feet of the site; traffic lights do not count because there is usually traffic moving on one street or the other.
- The average automobile traffic speed is 55 mph.
- The nightime portion of ADT is 0.15.

If each road meets these four conditions, proceed to Workchart 1 for the evaluation. Enter the horizontal axis with the effective distance from the roadway to the NAL; draw a vertical line upward from this point. Enter the vertical axis with the effective automobile ADT; draw a horizontal line across from this point. (The "effective" automobile ADT is the sum of automobiles, light trucks, and 10 times the number of medium trucks in a 24-hour day.) Read the DNL value from Workchart 1 where the vertical and horizontal lines intersect. Record this value in column 16, Worksheet C.

But:

If any of the four conditions is different, make

Example 5: The site shown in Figure 4 is exposed to noise from three major roads: Road No. 1 has four lanes, each 12 feet wide, and a 30-foot wide median strip which accommodates a railroad track. Road No. 2 has four lanes, each 12 feet wide. Road No. 3 has six lanes, each 15 feet wide, and a median strip 30 feet wide.

The distance from NAL No. 1 to the near edge of Road No. 1 is 300 feet. The distance to the far edge of Road No. 1 is 300 feet, plus the number of lanes times the lane width, plus the width of the median strip. Thus, the distance to the farthest edge of the road is:

$$300 + (4 \times 12) = 378 \text{ ft}$$

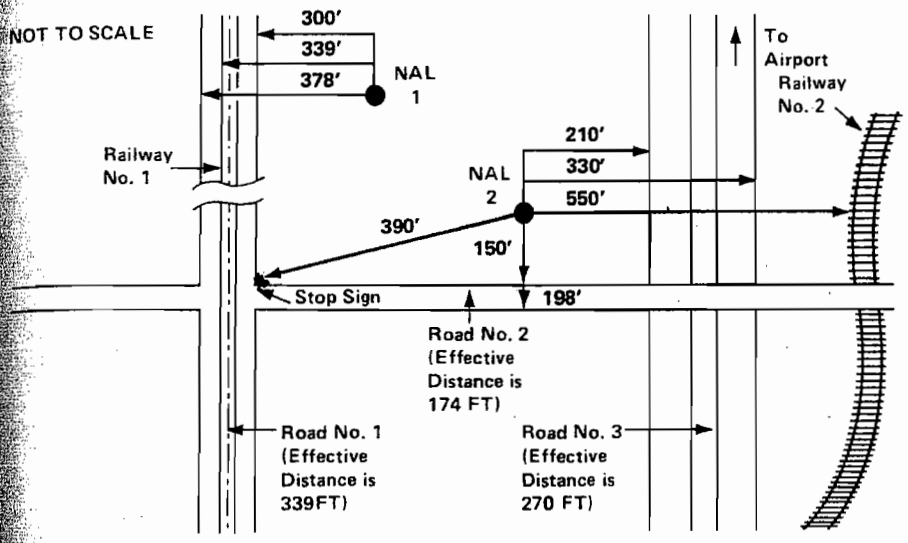
The effective distance is

$$\frac{378 + 300}{2} = 339 \text{ ft}$$

This is the value to be entered on line 1c of Worksheet C. The effective distances from the appropriate NAL's to Road No. 2 and Road No. 3 are found by the same method.

The distances shown in Figure 4 will be used for all roadway examples in this booklet.

Figure 4
Plan View of Site showing How Distance Should Be Measured from the Noise Assessment Location (NAL) of the Dwelling Nearest to the Source

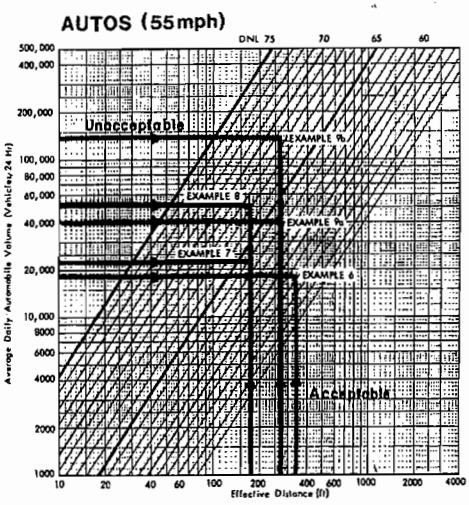


the necessary adjustments (on page 2, Worksheet C) listed below and *then* use Workchart 1 for the final evaluation.

First, a few general words about adjustments as they are applied in these Guidelines. Each Workchart has been derived for a baseline condition which is often found in practical cases. Where conditions differ from the baseline, they are accounted for by a series of one or more adjustment factors.

The adjustment factors are used as multipliers times the average number of vehicles operating during a 24-hour day. If more than one adjustment is required, it is not necessary that each be multiplied times the basic traffic flow separately; all adjustment factors are multiplied together, and them multiplied times the original traffic flow data. This will become clearer as you examine the Worksheets at the back of these Guidelines and work through the examples. After you have become familiar with the Guidelines, you will be able to work examples directly from the worksheets without referring back to the text. To simplify your work, all the adjustment factors are summarized at the back of these Guidelines.

Figure 5
Use of Workchart 1 To Evaluate Automobile Traffic Noise



Adjustments for Automobile Traffic

Stop-and-Go Traffic:
If there is a stop sign (not a traffic signal) within 600 feet of the NAL so that the flow of traffic is completely interrupted on the road under consideration, find the stop-and-go adjustment factor for automobiles from Table 3. Enter this value in column 9 on Worksheet C.

Table 3

Distance from NAL to Stop Sign In Feet	Automobile Stop-and-Go Adjustment Factor
0	0.10
100	0.25
200	0.40
300	0.55
400	0.70
500	0.85
600	1.00

Average Traffic Speed:
If the average automobile speed is other than 55 mph, enter the appropriate adjustment from Table 4 in column 10 of Worksheet C.

Table 4

Average Traffic Speed	Auto Speed Adjustment Factor
20 (mph)	0.13
25	0.21
30	0.30
35	0.40
40	0.53
45	0.67
50	0.83
55	1.00
60	1.19
65	1.40
70	1.62

Example 6: Road No. 1 meets the four conditions that allow for an immediate evaluation. In obtaining the information necessary for the evaluation, it was found that the automobile ADT is 18,000 vehicles (Line 5c of Worksheet C). On Workchart 1 we locate on the vertical scale the point representing 18,000 and on the horizontal scale the point representing 339 feet (see Figure 5). (Note that we must estimate the location of this point.) Using a straight-edge we draw lines to connect these two values and find that the noise exposure to automobile noise from this road is a DNL of 58 dB, as read from the scale at the top of the graph.

Example 7: Road No. 2 has a stop sign at 390 feet from NAL No. 2. The automobile ADT is reported as being 32,500 vehicles (line 5c of Worksheet C). From Table 3 we interpolate between 300 and 400 feet to find the adjustment factor for stop-and-go traffic to be 0.69. The adjusted traffic ADT is

0.69 × 32,500 = 22,425 vehicles per day

and with an effective distance of 174 feet from NAL No. 2, we find from Workchart 1 that the approximate value of DNL is 64 dB.

Example 8: Suppose that the stop sign on Road No. 2 were replaced by a traffic signal for which no stop-and-go adjustment is made and that the ADT increases to 75,000 vehicles. In addition, assume that the average speed is 45 mph instead of 55 mph. You adjust the new automobile ADT of 75,000 vehicles by the Auto Speed Adjustment Factor from Table 4

0.67 × 75,000 = 50,250 vehicles

and at an effective distance of 174 feet find from Workchart 1 that the approximate value of DNL is 67 dB.

Nighttime Adjustment.

DNL values are affected by the proportion of traffic volume that occurs during "daytime" (7 a.m. to 10 p.m.) and "nighttime" (10 p.m. to 7 a.m.). The graph on Workchart 1 assumes that 15 percent of the total ADT occurs during nighttime. If a different proportion of the traffic occurs at night, find the appropriate nighttime adjustment factor from Table 5. Record your answer in column 11 of Worksheet C.

Table 5

Nighttime Fraction of ADT	Nighttime Adjustment Factor
0	0.43
0.01	0.46
0.02	0.50
0.05	0.62
0.10	0.81
0.15	1.00
0.20	1.19
0.25	1.38
0.30	1.57
0.35	1.77
0.40	1.96
0.45	2.15
0.50	2.34

Once you have selected all the appropriate adjustment factors and entered them on page 2 of Worksheet C, multiply all the factors together, then multiply by the automobile ADT (column 12) for 24 hours, found on page 1 of Worksheet C. The resulting adjusted ADT should be entered in column 13. This is the ADT value to be used, in conjunction with the effective distance from the NAL to the road, to find the DNL value from Workchart 1. Enter this DNL value in column 14 of Worksheet C. Remember this is the DNL from automobile (as well as light and medium truck) noise; you must still find the DNL contribution from heavy truck noise in order to obtain the total DNL produced by the roadway you are assessing.

Attenuation of Noise by Barriers:

This adjustment reduces the noise produced by automobiles and trucks on the same road. Instructions for this adjustment appear after the noise assessment for truck traffic below.

Truck Traffic

Wherever possible, separate the average daily volume of trucks into heavy trucks (more than 26,000 pounds vehicle weight and three or more axles); medium trucks (less than 26,000 pounds but greater than 10,000 pounds), light trucks (counted as if they are automobiles). You should already have accounted for medium and light trucks in your automobile evaluation. Do not forget that buses that can carry more than 15 seated passengers are counted as heavy trucks. Heavy trucks (including buses) must be analyzed separately because they have quite different noise characteristics. If it is not possible to separate the trucks into those that are heavy and those that are not, treat *all* trucks as though they are "heavy."

Workchart 2, which is used to evaluate the site's exposure to heavy truck noise, was derived with the following assumptions:

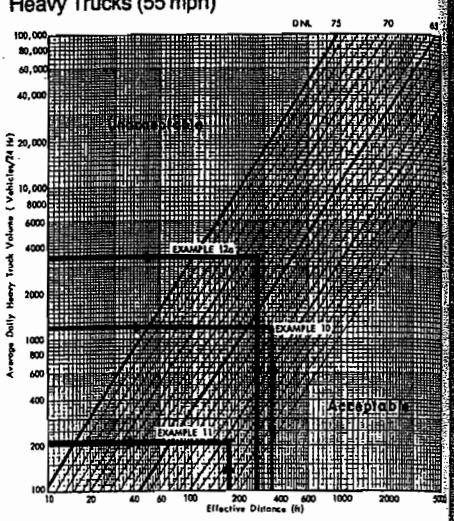
- There is line-of-sight exposure from the site to the road; i.e., there is no barrier which effectively shields the site from the road noise.
- The road gradient is less than 2 percent.
- There is no stop sign (traffic signals are permissible) within 600 feet of the site.
- The average truck traffic speed is 55 mph.
- The nighttime fraction of ADT is 0.15.

If the road meets these five conditions, proceed to Workchart 2 for an immediate evaluation of the site's exposure to heavy truck noise from that road.

But:

If any of the conditions is different, make the necessary adjustment(s) listed below and *then* use Workchart 2 for the evaluation.

Figure 6.
Use of Workchart 2 to Evaluate Heavy Truck Noise



Adjustments for Heavy Trucks

Road Gradient:

If there is a gradient of 2 percent or more, find the appropriate adjustment factor, for heavy trucks going uphill only, as shown in Table 6. List this factor in column 17 of Worksheet C.

Table 6

Percent of Gradient	Adjustment Factor
2	1.4
3	1.7
4	2.0
5	2.3
6 or more	2.5

Example 9a: Road No. 3 is a limited access highway with no stop signs and the average speed is 55 mph. Current traffic data indicate an automobile ADT of 40,000 vehicles of which 15 percent occurs during nighttime hours (10 p.m. to 7 a.m.). With an effective distance of 270 feet to NAL No. 2, Workchart 1 is used to show that the DNL for existing automobile traffic is between 63 and 64 dB. Round off to 64 dB.

Example 9b: However, traffic projections estimate that in 10 years the ADT will increase to 100,000 vehicles at an average speed of 55 mph and nighttime usage will increase to 25 percent. For future traffic, you must adjust the future ADT of 100,000 for the effect of increased nighttime use. From Table 5, you find an adjustment factor of 1.38. The adjusted ADT is

$1.38 \times 100{,}000 = 138{,}000$

and at an effective distance of 270 feet you find from Workchart 1 that the DNL will increase to 69 dB; therefore, provision for extra noise control measures should be explored. We will examine in Example 13 the effect of terrain as a shielding barrier that provides sound attenuation.

Example 10: Road No. 1 on Figure 4 meets the four conditions that allow for an immediate evaluation. The ADT for heavy truck flow is 1200 vehicles. Workchart 2 shows that the exposure to truck noise from this road at an effective distance of 339 feet is a DNL of 63 dB at NAL No. 1.

Average Traffic Speed:

Make this adjustment if the average speed differs from 55 mph. If the average truck speed differs with direction, treat the uphill and downhill traffic separately. Select the appropriate adjustment factors from Table 7 below, entering them in column 18 of Worksheet C.

Table 7

Average Traffic Speed MPH	Heavy Truck Speed Adjustment Factor
50 or less	0.81
55	1.00
60	1.17
65	1.38

Once you have found the speed adjustment factor, you can combine the uphill and downhill traffic. For uphill traffic, multiply the gradient factor times the speed adjustment factor times uphill traffic volume (truck ADT column 19) (assuming one half the total 24-hour average number of trucks unless specific information to the contrary exists), entering the product in column 20. Multiply the speed adjustment factor for downhill traffic times the downhill traffic volume (truck ADT/2 column 19). Add the values for uphill and downhill traffic, entering this sum in column 21. You may now complete the assessment of heavy truck noise without regard to uphill and downhill traffic separation.

Stop-and-Go Traffic:

If there is a stop sign (remember, not a traffic signal) within 600 feet of an NAL for the site on the road being assessed, find the adjustment factor determined according to Table 8. Enter it in Column 22 of Worksheet C.

Table 8

Heavy Truck Traffic Volume per Day	Heavy Truck Stop-and-Go Adjustment Factor
Less than 1200	1.8
1201 to 2400	2.0
2401 to 4800	2.3
4801 to 9600	2.8
9601 to 19,200	3.8
More than 19,200	4.5

Nighttime Adjustment

After all the above adjustments are made, do not forget to adjust for nighttime operations if they are not 15 percent of the total ADT, using the factors obtained from Table 5 just as for automobiles. Enter this value in column 23 of Worksheet C.

At this point, multiply the adjustment factors for nighttime and stop-and-go traffic times the heavy truck traffic volume in column 21 to find the adjusted heavy truck ADT, entering the product in column 24. Use this value and the effective distance from the NAL to the road to find the truck DNL from Workchart 2, entering your answer in column 25 of Worksheet C. If no shielding barriers are to be considered, combine the DNL from heavy trucks with the DNL from automobiles (column 14). The result is the DNL from the road being assessed and should be entered on Worksheet C.

But:

If a shielding barrier is to be considered for the site, make the analysis described below separately for automobiles and then for heavy trucks *before* combining the DNL values. This step is necessary since barriers are far more effective for automobiles than for heavy trucks. Once you have found the amount of attenuation provided by the barrier for automobiles, enter it in column 15. Find the value of barrier attenuation for heavy trucks and enter it in column 25. Subtract these attenuation values from the DNL values obtained previously (columns 14 and 24), entering the reduced DNL values in columns 16 and 27. Combine the automobile and heavy truck DNL values, reduced by the attenuation provided by the barrier, to find the final DNL produced by the roadway at the site.

Remember to combine the contributions to DNL of *all* roads that affect the noise environment at each NAL for the site to obtain the total DNL from all roadways. Enter this DNL on both Worksheet C and the summary Worksheet A.

Attenuation of Noise by Barriers

Noise barriers are useful for shielding sensitive locations from ground level noise sources. For example, a barrier may be the best way to deal with housing sites at which the noise exposure is not acceptable because of nearby roadway traffic.

A barrier may be formed by the road profile, by a solid wall or embankment, by a continuous row of noise-compatible buildings, or by the terrain itself. To be an *effective* shield, however, the barrier must block all residential levels from line of sight to the road; it must not have any gaps that would allow noise to leak through.

Some Preliminary Matters:

In evaluating noise barrier performance, you will be working with different kinds of "distances" between the sound source, the observer, and the barrier.

Actual Distance – the existing distance that would be measured using a tape measure with no corrections or adjustments. This may mean one of two things, *depending on the application;* either the:

- *slant distance* – the actual distance,

Example 11: Road No. 2 has a stop sign at 390 feet from NAL No. 2. There is also a road gradient of 4 percent. No heavy trucks are allowed on this road, but a schedule shows an average of 12 large buses pass along the road per hour between 7 a.m. and 10 p.m., although no buses are scheduled during the remaining nighttime period. The buses are equally divided in each direction along the road. (Remember large buses, those that carry over 15 seated passengers, count as heavy trucks.)

We find the ADT for the "heavy trucks" (the buses in this case) by multiplying the average number of vehicles per hour by the number of hours between 7 a.m. and 10 p.m. That is, 12 x 15 = 180, or 90 vehicles in each direction. We find from Table 6 that the gradient adjustment factor for uphill traffic is 2.0. We find the truck volume adjusted for gradient is

uphill: $90 \times 2.0 = 180$
downhill: $= 90$
total (column 21) $= 270$ *vehicles*

From Table 8, we find the adjustment factor for stop-and-go traffic to be 1.8.

We also remember that we have no buses in the nighttime period and find the factor in Table 5 on page 8 for zero nighttime operations to be 0.43.

Our final adjusted ADT is (column 24)

$1.8 \times 0.43 \times 270 = 209$ *Vehicles*

From Workchart 2, with an effective distance of 174 feet, we find a DNL of 59 dB.

Example 12a: Road No. 3 is a depressed highway and the profile shields all residential levels of the housing from line of sight to the traffic. The average truck speed is 50 mph. The ADT for heavy trucks is 4400 vehicles. We adjust for average speed (from Table 7)

$4400 \times 0.81 = 3564$

and find from Workchart 2 that, with an effective distance of 270 feet, the DNL from truck noise would be 69 dB if no barrier existed. We proceed to analyze the barrier attenuation.

measured along the line of sight between two points; or the

- *map distance* – the actual distance, measured on a horizontal plane, between the two points, as on a map or on the project plan.

For an observer high in an apartment tower, the slant distance to the road may be much longer than the map distance.

Barrier effectiveness is expressed in terms of noise attenuation in decibels (dB), determined with the aid of Workchart 6. This numerical value is subtracted from the previously calculated DNL in order to find the resultant DNL at the Noise Assessment Location.

Note: A noise barrier can be considered as a means of protecting a site from noise even if it cannot wrap around the site to shield from view practically all of the source of noise at every sensitive location on the site. It must be recognized, however, that such a barrier is much less effective than an ideal barrier. (See Workchart 7 and Step 6 below.)

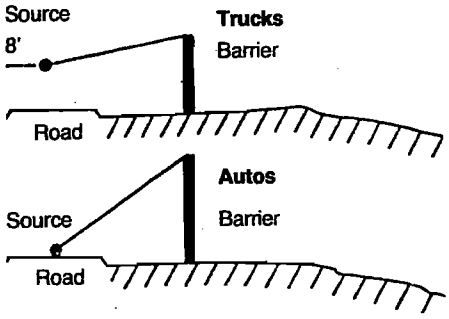
Barriers of reasonable height cannot be expected to protect housing more than a few stories above ground level. Barriers will generally protect the ground and the first two or three floors, but not the higher floors. If there are to be frequently occupied balconies on the upper levels, one solution is to move the building farther from the noise source and face the sensitive areas away from the noise.

Steps to Evaluate a Barrier

1. For the observer's position, use the mid-height of the highest residential level. For the source position, use the following heights (see Figure 7):

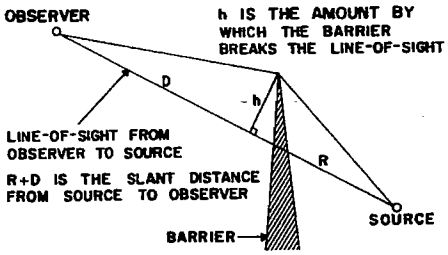
- autos, medium trucks, railway cars – the road or railway surface height
- heavy trucks – 8 feet above the road surface
- diesel locomotives or trains using horns or whistles at grade crossings – 15 feet above the rails.

Figure 7.
Source Heights to Be Used in Roadway Barrier Designs



Get accurate values for the following quantities: h, the shortest distance from the barrier top to the line of sight from source to observer; R and D, the slant distances along the line of sight from the barrier to the source and observer, respectively (see Figure 8).

Figure 8.
Generalized Geometry of Acoustical Barrier



Specifically, R and D are the two segments into which h breaks the line of sight. Note that h is *not* the height of the barrier above the ground but the distance from the barrier top to the line of sight.

2. Enter at the top of Workchart 6 with the value of h on the left-hand scale; move right to intersect the curve corresponding to R (or D, whichever is *smaller*).

3. Move down to intersect the curve corresponding to the value of D/R (or R/D, whichever is *smaller).*

4. Move right to intersect the vertical scale in order to find the barrier shielding value A in decibels.

5. Interruption of the line of sight with a barrier between the noise source and an observer reduces the amount of sound attenuation provided by the ground. Find the amount of this loss B from the table on Workchart 6 by entering the table with the value of D/R. Find the barrier attenuation value S corresponding to an ideal barrier that completely hides the noise source from view by subtracting B from the value of A obtained in Step 4.

6. If the barrier exists along only a part of the road so that unshielded sections of the road would be visible from the site, the barrier is less effective than an ideal barrier. On a plan view of the site, locate the two ends of the barrier and draw lines from these points to the Noise Assessment Location. Use a protractor to measure the angle formed at the NAL by the two lines. Enter the horizontal scale of Workchart 7 with the values of this angle; read up to the curve having the value of S determined from Step 5 (interpolating if necessary); read left across to the vertical scale labeled "actual barrier performance" to find the value of FS to use for the actual barrier in question.

7. Subtract the barrier attenuation value S (or FS if adjusted for finite barrier length according to Workchart 7) from the value of DNL previously determined to reevaluate the site with the noise barrier in place.

Example 12b: (Refer to Figure 9.) Six stories are planned for the housing where the site has an elevation of 130 feet. The effective elevation for the highest story is found by multiplying the number of stories by 10 feet, adding the site elevation, and subtracting 5 feet.

(6 × 10) + 130 - 5 = 185 feet

The barrier, which in this case is formed by the road profile, has no "height" other than the elevation of the natural terrain above the noise sources traveling on the roadway. The important dimensions are indicated in Figure 9.

Some people with a technical background will be able to fit the geometric diagram to the site situation readily, working from the project drawings and a scratch sheet.

But if you are *not* confident of your geometry, Workchart 5 gets you the values of R, D, and h from the map distances and elevations of the site. We illustrate that procedure in this example.

First, enter the elevations of the source (S), the observer (O), and the top of the barrier (H), as well as the map distances from the barrier to the source (R') and observer (D'), at the top right of Workchart 5. Then, follow the steps on that Workchart to derive the values of h, R, and D that are needed in using Workchart 6.

Entering Workchart 6 at the upper left with the value of h (5.5 feet), we move horizontally

Figure 9.
Detail of Site Showing Measurements Necessary for a Barrier Adjustment

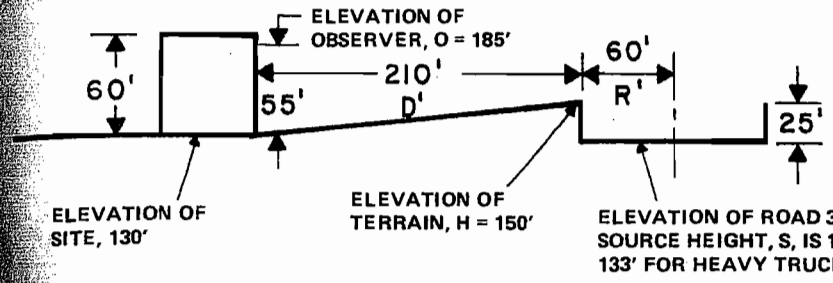
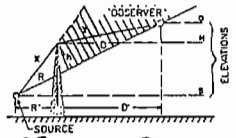


Figure 10.
Use of Workchart 5 to Determine Barrier Dimensions in Example 12b

Workchart 5
Noise Barrier
To find R, D and h from Site Elevations and Distances

Enter the values for:
H= 150 R'= 60
S= 133 D'= 210
O= 185



Carry out the following worksheet (all quantities are in feet):

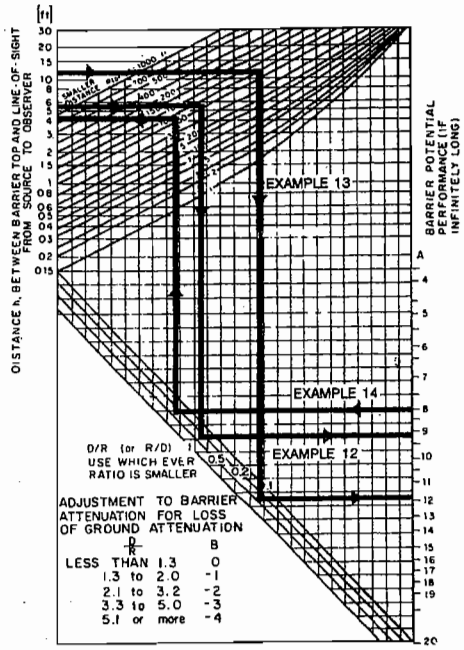
1. Elevation of barrier top minus elevation of source	[11 150] − [5 133]	= [1 17]	
2. Elevation of observer minus elevation of source	[0 185] − [5 133]	= [2 52]	
3. Line distance between source and observer (R' + D')		[3 270]	
4. Line distance between barrier and source (R')		[4 60]	
5. Line 2 divided by line 3	[2 52] ÷ [3 270]	= [5 0.19]	
6. Square the quantity on line 5 (i.e., multiply it by itself); always positive	[5 0.19] × [5 0.19]	= [6 0.04]	
7. 0.4 times line 6	[0.4] × [6 0.04]	= [7 0.016]	
8. 1.0 minus line 7	[1.0] − [7 0.016]	= [8 0.984]	
9. 9.5 times line 4 (will be negative if line 2 is negative)	[5 0.19] × [4 60]	= [9 11.4]	
10. Line 1 minus line 9	[1 17] − [9 11.4]	= [10 5.6]	
11. 10 times line 8	[10 5.6] × [8 0.984]	= [11 5.5]	= h
12. 9.5 times line 10	[5 0.19] × [10 5.6]	= [12 1.06]	
13. Line 4 divided by line 8	[4 60] ÷ [8 0.984]	= [13 61]	
14. Line 13 plus line 12	[13 61] + [12 1.06]	= [14 62]	= R
15. Line 3 minus line 4	[3 270] − [4 60]	= [15 210]	
16. Line 15 divided by line 8	[15 210] ÷ [8 0.984]	= [16 213]	
17. Line 16 minus line 12	[16 213] − [12 1.06]	= [17 212]	= D

Note: The value on line 2 may be negative, in which case the values on lines 5,9, and 12. will be negative. Remember, then, in lines 10, 14, and 17, that adding a negative number is the same as subtracting x − (−y) = x+y. And subtracting a negative number is like adding: X-(-y) = x + y

Round off R and D to nearest integer, h to one decimal place

Figure 11.
Use of Workchart 6 to Evaluate Barrier in Examples 12b, 13 and 14

Noise Barrier Workchart 6



right until we meet the value of R or D, ever is smaller: in this example, R = 62 rom that point we drop vertically down- until we meet the value of R/D or D/R, ever is smaller: in this case, R/D = rom that point, move horizontally to ft to find the value for A = 9 dB. Enter- table for determining loss of ground tion effect due to the barrier with a of D/R of 3.5, the reduction in tion (B) is found to be 3 dB. cting 3 dB from 9 dB provides a net tion of 6 dB. With 6 dB of attenuation, nal DNL of 69 dB (Example 12a) is to 63 dB.

Example 13: An alternative approach, which is somewhat more direct, is illustrated here for the noise of automobiles on Road No. 3.

A preliminary step is to make an accurately scaled sketch of the general geometry introduced on page 8. It must include the positions of the source (this time at the road surface), the observer, and the top of the barrier; and will show the distances h, R, and D. Such a sketch is shown superimposed on the profile of the road and its neighborhood in Figure 12.

If we carefully scale the dimensions directly from this sketch, we find the following values for h, R, and D:

R=63 feet

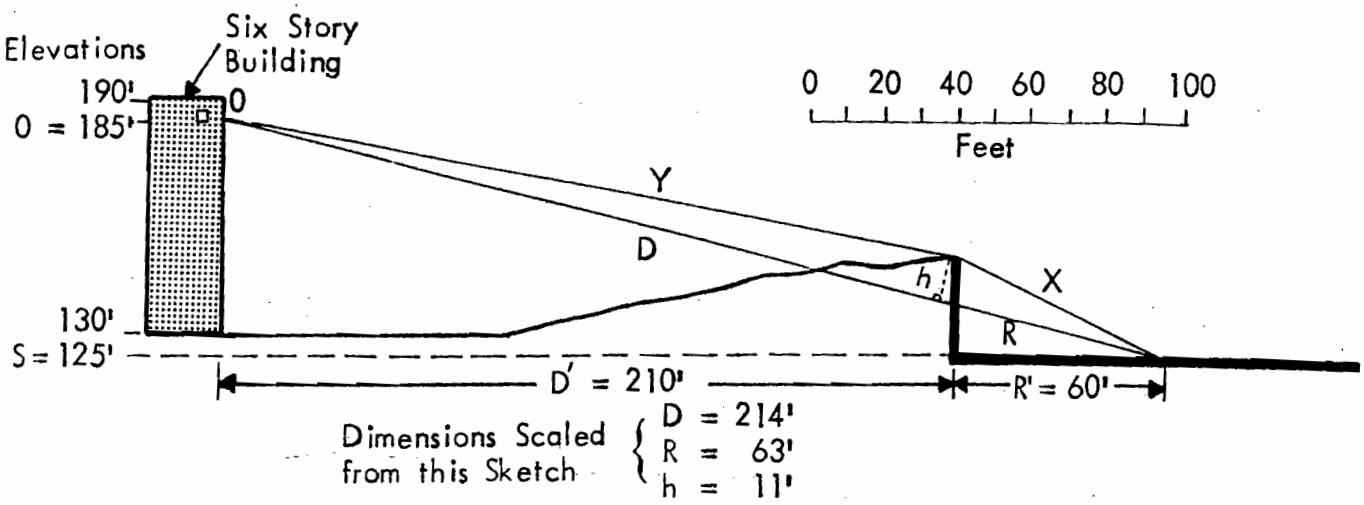
R/D=0.3

D=214 feet

h=11 feet

The barrier attenuation is found, by entering Workchart 6 with these values, to be A=12 dB. It is larger than that found for trucks because the noise source is lower and is, therefore, better shielded by the barrier. The loss from ground attenuation is again B=3 dB for a net attenuation of 12 - 3 = 9 dB. In Example 9b, we found that the DNL

Figure 12.
Sketch Showing Dimensions for Example 13



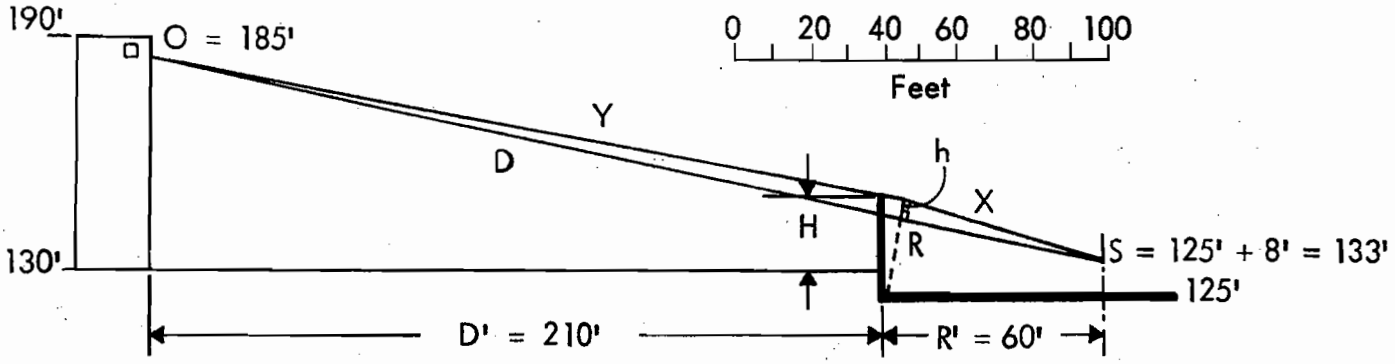
for the projected traffic volume of 100,000 vehicles per day was 69 dB if no consideration was given the shielding provided by the terrain. Subtracting the 9 dB attenuation from 69, we find the partial DNL for automobiles is 60 dB.

In order to find the combined truck and automobile noise for Road No. 3, we combine the 63 dB of truck noise with the 60 dB of automobile noise using Table 1. We find that 1.8 should be added to 63 dB, for a combined DNL of 64.8 dB, or 65 dB when rounded to the nearest whole number.

Example 14: Where no natural barrier exists, Workchart 6 can be used in reverse to estimate the height of a barrier needed to obtain a required attenuation. In example 9b we found that, without any attenuation from terrain or a barrier, the automobile traffic produced a DNL of 69 dB, and in Example 12a the heavy truck traffic produced a DNL of 69 dB. When combined, the total DNL is 72 dB. Suppose the terrain were not rising between NAL and Road No. 3, as shown in Figure 12, but instead was level between the NAL and the edge of the road, as shown in Figure 13. We want to find out how high a wall, infinite in length, would be required at the edge of the road to reduce the combined truck and automobile noise to less than 65 dB. We have found in the previous examples that a barrier of a given height will provide more attenuation for automobiles than it will for trucks. As a first step in our analysis, we will find the height of a wall that will reduce the truck noise to just below 65 dB, say 64 dB, and then find out whether the additional attenuation it provides for automobile noise will be sufficient to reduce the combined truck and automobile noise to less than 65 dB. We begin by finding the height of wall that will provide 5 dB attenuation for truck noise.

We estimate that the ratio of R/D is about the same as R'/D', the ratio of horizontal distance in Figure 13, which is equal to 0.29. Before entering Workchart 6, we find from the loss of ground attenuation table that for D/R = 3.4 we will lose 3 dB attenuation from an ideal barrier. In order to have a net attenua-

Figure 13.
Sketch Showing Dimensions for Example 14



tion of 5 dB, we must have an ideal barrier that provides 5 + 3 = 8 dB attenuation.

Entering Workchart 6 on the right side scale A at 8 decibels, we move across to the diagonal lines, finding 0.29 by interpolating between the lines marked at 0.2 and 0.5. Moving directly up to a point midway between the R lines of 50 and 70, we find our estimated R of approximately 60. Moving across to the left we find that the line of sight between the observer and the truck source height must be broken by a value of h equal to 4.5 feet.

We can determine the height of the wall H in several ways. By drawing h=4.5 feet to scale on Figure 13, we can scale the total wall height H to be approximately 20 feet. Those who feel comfortable with geometry can calculate H by using the similar triangle relationships in Figure 13 to determine that H is 19.1 feet.

Now we must find how much a wall 19 feet high will attenuate automobile noise, remembering that the source height for automobiles is at the road surface elevation of 125 feet. By scaling the drawing, or by geometry, we determine that the line of sight between the observer position and the automobile source is broken by a value of h that is approximately 13 feet. Entering Workchart 6 at 13 feet we find, for R=60 feet and R/D=0.29, that the potential barrier attenuation is 12dB. We must reduce this by 3 dB for loss of ground attenuation to find the actual shielding of automobile noise to be 9 dB. The original 69 dB of automobile noise is reduced to 69 - 9 = 60 dB.

Finally, we combine the heavy truck noise, attenuated by the wall to 69 - 5 = 64 dB, with the automobile noise reduced to 60 dB, to find a combined DNL of 65.5 dB, or 66 dB when rounded upward. Remember, however, that this is for an infinite wall. Further adjustments would have to be made once the actual length was known.

13

Railways

Necessary Information

To evaluate a site's exposure to railway noise, you will need to consider all rapid transit lines and railroads within 3000 feet of the site (except totally covered subways). The information required for this evaluation is listed below under headings that indicate the most likely source.

Before beginning the evaluation, you should record the following information on Worksheet D:

From the area map and/or the (County) Engineer:

- The distance from the appropriate NAL on the site to the center of the railway track carrying most of the traffic.

From the Supervisor of Customer Relations for the railway:

- The number of diesel trains and the number of electrified trains in both directions during an average 24-hour day.
- The fraction of trains that operate during nighttime (10 p.m. - 7 a.m.) If this is unknown, assume 0.15.
- The average number of diesel locomotives per train. If this is unknown, assume 2.
- The average number of railway cars per diesel train and per electrified train. If this is unknown, assume 50 for diesel trains and 8 for electrified trains.
- The average train speed. If this is unknown, assume 30 mph.
- Is the track made from welded or bolted rails?

From the Engineering Department of the railway:

- Is the site near a grade crossing that requires prolonged use of the train's horn or whistle? if so, where are the whistle posts located? (Whistle posts are signposts which tell the engineer to start blowing the horn or whistle. Every grade crossing has whistle posts and they are listed on the railroad's "track charts." If traffic on the track is one-way, there will be only one whistle post. The grade crossing itself is the other "whistle post."

Electrified rapid transit and commuter trains that do not use diesel engines should be treated the same as railway cars.

Note: Buildings closer than 100 feet to a railroad track are often subject to excessive vibration transmitted through the ground. Construction at such sites is discouraged.

Evaluation of Site Exposure to Railway Noise

Railway noise is produced by the combination of diesel engine noise and railway car noise. These Guidelines provide for the separate evaluation of diesel locomotives and railroad cars, and then the combination of the two, in order to obtain the DNL from trains. When rapid transit or electrified trains that do *not* use diesel engines are the only trains passing near a site go directly to the second part of the evaluation since these trains are treated in the same manner as railway cars.

Diesel Locomotives

Workchart 3 was derived with the following assumptions:

- A clear line of sight exists between the railway track and the Noise Assessment Location.
- There are two diesel locomotives per train.
- The average train speed is 30 mph.
- Nighttime operations are 0.15 of the 24-hour total.
- The site is not near a grade crossing requiring prolonged use of the train's horn or whistle.

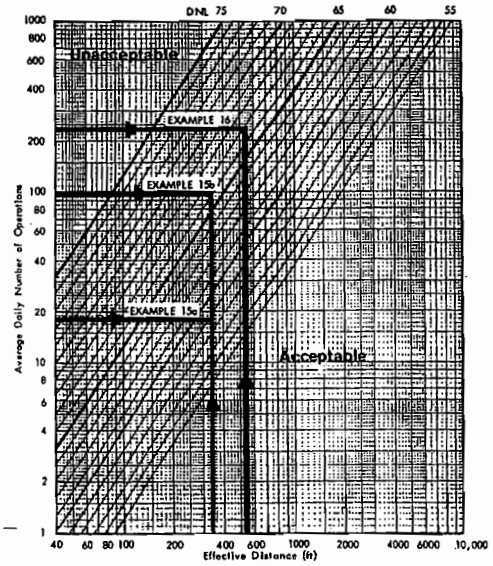
If the situation meets these conditions, proceed to Workchart 3 for an immediate evaluation of diesel locomotive noise.

But:

If any of the conditions is different, make the necessary adjustments listed below and *then* use Workchart 3 for the evaluation.

Figure 14.
Use of Workchart 3 to Evaluate Diesel Locomotive Noise

Railroads – Diesel Locomotives



Adjustments for Diesel Locomotives

Number of Locomotives:

If the average number of diesel locomotives per train is not 2, divide the average number by 2. Enter this value in column 9 of Worksheet D.

Example 15a: The distance from NAL number 1 to Railway Number 1 is 339 feet. Two percent of the 35 daily operations occur at night; there is clear line of sight between the tracks and the NAL, and no horns or whistles are used. No information is available on train size or speed, therefore we will assume 2 engines per train and a speed of 30 mph.

Since the percentage of nighttime operations is different from 15 percent, we must adjust the actual number of daily operations, multiplying by 0.50 according to Table 5.

0.50 x 35 = 17.5 = 18

Entering Workchart 3 with 18 daily operations and a distance of 339 feet, we find that the contribution of diesel engine noise is a DNL of 59 dB (see Figure 14).

In order to find the total contribution of the trains to the total DNL, we must also find the noise level produced by the train's cars. Entering Workchart 4 (see Figure 15) with 18 daily operations and a distance of 339 feet, we find the DNL is below 50 on the chart, or more than 10 decibels lower than the noise level produced by the engines. Based on the chart for decibel addition, the combination of the noise from the engines and the cars adds less than 0.5 decibels to the DNL value for the engines alone, 59 dB.

Example 15b: Suppose that a forecast of train operations for Railway 1 indicates that there will still be 35 trains per day, but now 50 percent of the operations will occur at night, the average train will have 4 engines and 75 cars, and the average speed will be 50 mph.

We first find the contribution to DNL made by diesel locomotives by using the following adjustment factors:

- number of engines adjustment: 2
- speed adjustment: 0.60
- day/night adjustment: 2.34

We multiply these adjustments together with the number of trains:

2 X 0.60 X 2.34 X 35 = 98

Entering Workchart 3 (see Figure 14) with 98 daily operations and a distance of 339

Average Train Speed:

If the average train speed is different from 30 mph, find the appropriate adjustment factor from Table 9 and list in column 10 of Worksheet D.

Table 9

Average Speed (mph)	Speed Adjustment Factor
10	3.00
20	1.50
30	1.00
40	0.75
50	0.60
60	0.50
70	0.43

Horns or Whistles:

If the NAL is perpendicular to any point on the track between the whistle posts for the grade crossing, enter the number 10 in column 11, Worksheet D.

Nighttime Adjustment:

Remember to adjust for nighttime operations, if different from 0.15 of the total, by selecting the appropriate adjustment factor from Table 5 on page 8. Enter in column 12, Worksheet D.

Multiply the adjustment factors together, times the number of diesel trains per day (you have listed this number previously on line 2a, page 1, of Worksheet D, and should enter this number again in column 13) to obtain the adjusted number of trains per day. Enter the adjusted number of diesel trains per day in column 14. Use this value, in conjunction with the distance from the NAL to the track (line 1, page 1, of Worksheet D), to find from Workchart 3 the DNL produced by diesel locomotives. List in column 15 of Worksheet D.

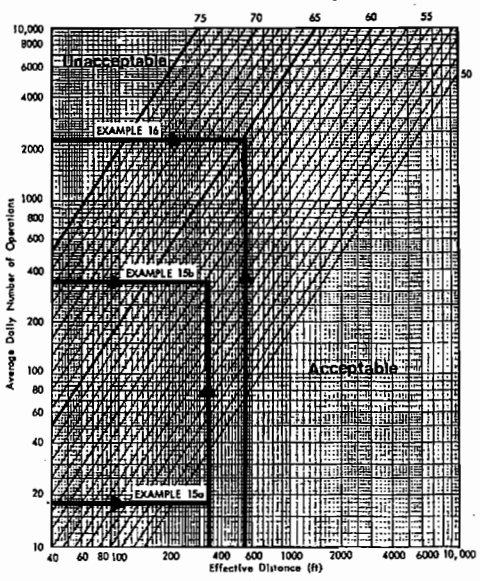
Railway Cars and Rapid Transit Systems

Workchart 4 was derived with the following assumptions:

- A clear line of sight exists between the railway and the NAL.
- There are 50 cars per train.
- The average train speed is 30 mph.
- Nighttime operations are 0.15 of the 24-hour total.
- Rails are welded together.

If the situation meets these conditions, proceed to Workchart 4 for an immediate evaluation of railway car noise. Again, if any of the conditions is different, make the necessary adjustments listed below and then use Workchart 4 for the evaluation.

Figure 15.
Use of Workchart 4 to Evaluate Railway Car Noise



Adjustments for Railway Cars and Rapid Transit Trains

Number of Cars:

Divide the average number of cars by 50 and enter this number in column 18 of Workchart D.

Average Speed:

Make this adjustment, if the average speed is not 30 mph, by selecting the appropriate value from Table 10, entering it in column 19 of Worksheet D.

Table 10

Average Speed (mph)	Speed Adjustment Factor
10	0.11
20	0.44
30	1.00
40	1.78
50	2.78
60	4.00
70	5.44
80	7.11
90	9.00
100	11.11

Bolted Rails:

Enter the number 4 in column 20 of Worksheet D.

Nighttime Adjustment:

Enter the appropriate adjustment factor from Table 5 in column 21 of Worksheet D.

feet, we find that the site has an engine noise contribution to DNL of 66 dB.

We next obtain the adjustment factors for the noise produced by the cars:

- number of cars adjustment: 1.50
- speed adjustment: 2.78
- day/night adjustment: 2.34

Multiplying the adjustment factors times the average daily number of trains:

1.5 X 2.78 X 2.34 X 35 = 342

Entering Workchart 4 (see Figure 15) with 342 operations and a distance of 339 feet, we find the contribution of the cars to the DNL is 60 dB. Using Table 1 for combining levels, we find that the 6 dB difference between engine noise at 66 and car noise at 60 gives a combined DNL of 67 dB for these trains.

Example 16: The distance from NAL number 2 to Railroad Number 2 is 550 feet; there are 100 operations per day, of which 30 percent occur at night. A clear line of sight exists between the site and the railroad, and no horns or whistles are used nearby. An average train on this track uses 4 engines, has 100 cars, the average speed is 40 miles per hour, and the track has bolted, not welded, rails.

We first find the adjustment factors for the diesel engines:

- number of engines adjustment: 2
- speed adjustment: 0.75
- day/night adjustment: 1.57

Multiplying the adjustments together, times the number of trains:

2 X 0.75 X 1.57 X 100 = 236

Entering Workchart 3 (see Figure 14) with 236 operations at a distance of 550 feet, we find the DNL contribution from engine noise to be 67 dB.

Next we find the adjustment factors for the railroad cars:

- number of cars adjustment: 2
- speed adjustment: 1.78
- bolted track adjustment: 4
- day/night adjustment: 1.57

Multiplying the adjustments together, times the number of trains:

2 X 1.78 X 4 X 1.57 X 100 = 2236

Entering Workchart 4 (see Figure 15) with

(Continued next page)

Figure 16.
Sketch Showing Dimensions for Example 16

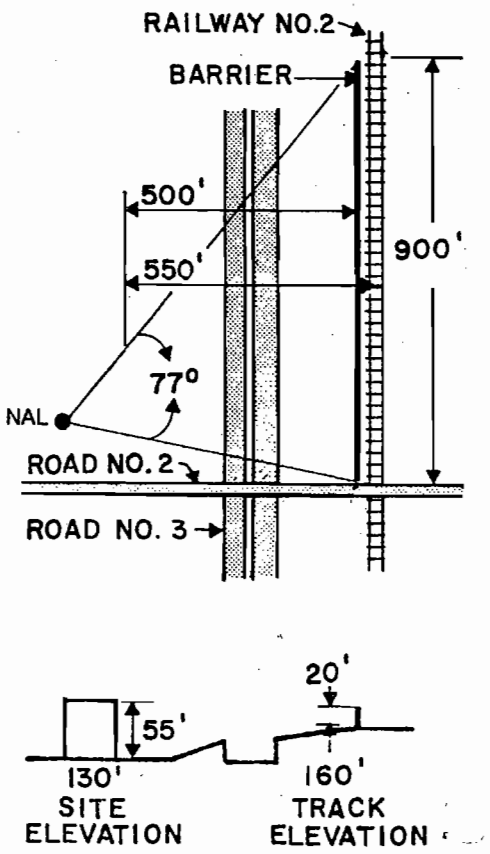


Figure 17.
Use of Workchart 6 in Example 16

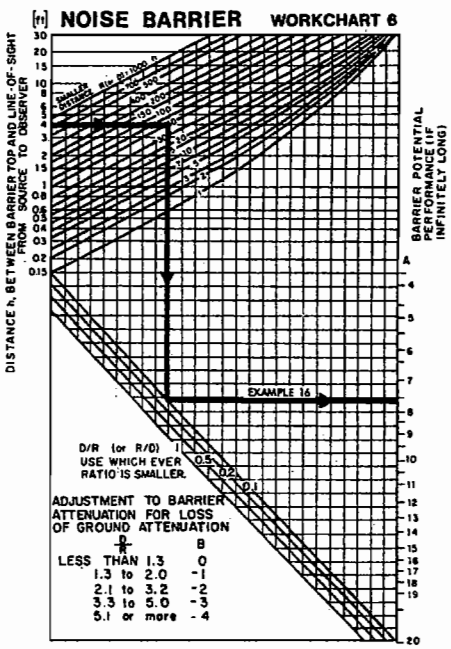
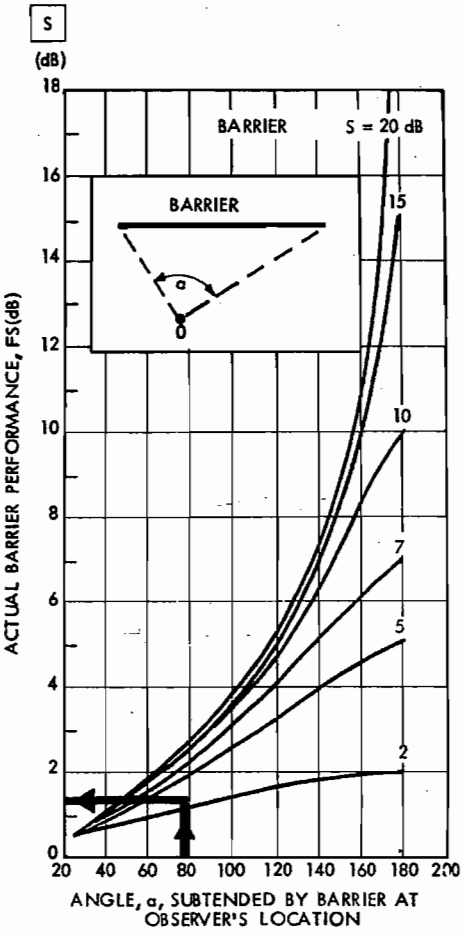


Figure 18.
Use of Workchart 7 in Example 16



2236 operations at a distance of 550 feet, we find the DNL contribution from the railroad cars to be 65 dB. Combining the engine sound levels with the car sound levels we find the total DNL from the trains to be 69 dB.

It would be possible to erect a 20-foot noise barrier, running parallel to the track at a distance of 50 feet; it could start at Road Number 2 and run 900 feet north toward the airport, as shown in Figure 16. Both the railroad track and the ground level at the barrier location are at an elevation of 160 feet. Thus, we have the following values with which to calculate the potential reduction in engine noise (using Workchart 5). (Because the distances involved are so unequal, this situation does not lend itself to direct scaling of the distances.)

H = 180 feet (20' above the ground)

S = 175 feet (15' above the track, see page 19)

0 = 285 feet (from Example 11 in the section on roadway noise)

R' = 50 feet

D' = 500 feet

We find from Worksheet 5 that the values of R and D are no different (within the accuracy of the calculation) from R' and D', a situation that will always occur when the differences in elevation are so much smaller than the distances from the site to the noise source. The value of h is 4 feet; R/D = 0.1

We can now use these numbers to enter Workchart 6 to find the *potential* barrier performance (that is, the barrier adjustment factor that would apply in the case of an infinitely long barrier). Entering Workchart 6 at h = 4 feet, with R/D = 0.1, we find the basic attenuation of the barrier to be 7.5 dB. However, with D/R = 10, we find from the table of loss-of-ground-effect attenuation that we must subtract 4 dB from the 7.5, or a net effect of 3.5 dB. However, the situation is even worse, since the barrier is finite in length.

To find the actual attenuation for this *finite* barrier, we must first find the angle subtended by the barrier to the NAL. Referring to Figure 16, we draw lines from the NAL each end of the barrier. With

References

1. D.E. Bishop, A.P. Hays, "Handbook for Developing Noise Exposure Contours for General Aviation Airports," FAA-AS-75-1, December 1975 (NTIS No. AD-A023429).

2. D.E. Bishop, et al., "Calculation of Day-Night Levels Resulting From Civil Aircraft Operations," BBN Report 3157 for Environmental Protection Agency, March 1976 (NTIS No. PB 266 165).

3. B.A. Kugler, D.E. Commins, W.J. Galloway, "Highway Noise – A Design Guide for Prediction and Control," NCHRP Report 174, Transportation Research Board, National Research Council, 1976.

4. T.J. Schultz, W.J. Galloway, "Noise Assessment Guidelines – Technical Background," Office of Policy Development and Research, U.S. Department of Housing and Urban Development," 1980.

5. M.A. Simpson, "Noise Barrier Design Handbook," FHWA-RD-76-58, Federal Highway Administration, February 1976 (NTIS No. PB 266 378).

a protractor we measure the angle between the two lines to be 77 degrees. Locate the curve on Workchart 7 corresponding to the potential barrier attenuation of 3.5 dB; it lies midway between the two lowest curves (see Figure 18). The point on this curve corresponding to a subtended angle of 77 degrees indicates that the actual barrier performance would be only 1.5 dB. With only 1.5 dB of attenuation, the barrier is clearly not cost-effective. In order to achieve a usable attenuation from the barrier, it would have to be extended beyond the other side of Road Number 2 to obtain a larger subtended angle. This extension, however, would still not be cost-effective unless the height of the barrier were increased substantially.

Summary of Adjustment Factors

Combination of Sound Levels

Table 1

Difference in Sound Level	Add to Larger Level
0	3.0
1	2.5
2	2.1
3	1.8
4	1.5
5	1.2
6	1.0
7	0.8
8	0.6
9	0.5
10	0.4
12	0.3
14	0.2
16	0.1
greater than 16	0.

Aircraft

Table 2 DNL Outside 65 dB Contour

D^1 = distance from 65 dB contour to flight path
D^2 = distance from site to flight path

D2 / D1	DNL dB
1.0	65
1.12	64
1.26	63
1.41	62
1.58	61
1.78	60
2.00	59
2.24	58
2.51	57
2.82	56
3.16	55

Automobile Traffic

Table 3 Stop-and-go

Distance from Site to Stop Sign feet	Automobile Stop-and-go Adjustment Factor
0	0.10
100	0.25
200	0.40
300	0.55
400	0.70
500	0.85
600	1.00

Table 4 Average Traffic Speed

Average Traffic Speed	Adjustment Factor
20 (mph)	0.13
25	0.21
30	0.30
35	0.40
40	0.53
45	0.67
50	0.83
55	1.00
60	1.19
65	1.40
70	1.62

Table 5 Nighttime (applies to all sources)

Nighttime Fraction of ADT	Nighttime Adjustment Factor
0	0.43
0.01	0.46
0.02	0.50
0.05	0.62
0.10	0.81
0.15	1.00
0.20	1.19
0.25	1.38
0.30	1.57
0.35	1.78
0.40	1.96
0.45	2.15
0.50	2.34

Medium Trucks

(less than 26,000 pounds, greater than 10,000 pounds)

Multiply adjusted automobile traffic by 10.

Heavy Trucks

Table 6 Road Gradient

Percent of Gradient	Adjustment Factor
2	1.4
3	1.7
4	2.0
5	2.2
6 or more	2.5

Table 7 Average Speed

Average Traffic Speed (mph)	Truck Speed Adjustment Factor
50 or less	0.81
55	1.00
60	1.17
65	1.38

Table 8 Stop-and-go

Heavy Truck Traffic Volume per Day	Heavy Truck Stop-and-Go Adjustment Factor
Less than 1200	1.8
1201 to 2400	2.0
2401 to 4800	2.3
4801 to 9600	2.8
9601 to 19,200	3.8
More than 19,200	4.5

Railroads - Diesel Engines

Number of Engines per Train
The number of engines divided by 2.

Table 9 Average Train Speed

Average Speed (mph)	Speed Adjustment Factor
10	3.00
20	1.50
30	1.00
40	0.75
50	0.60
60	0.50
70	0.43

Whistles or horns
Multiply number of trains by 10.

Railroads - Cars and Rapid Transit

Numbers of cars.
Number of cars per train divided by 50.

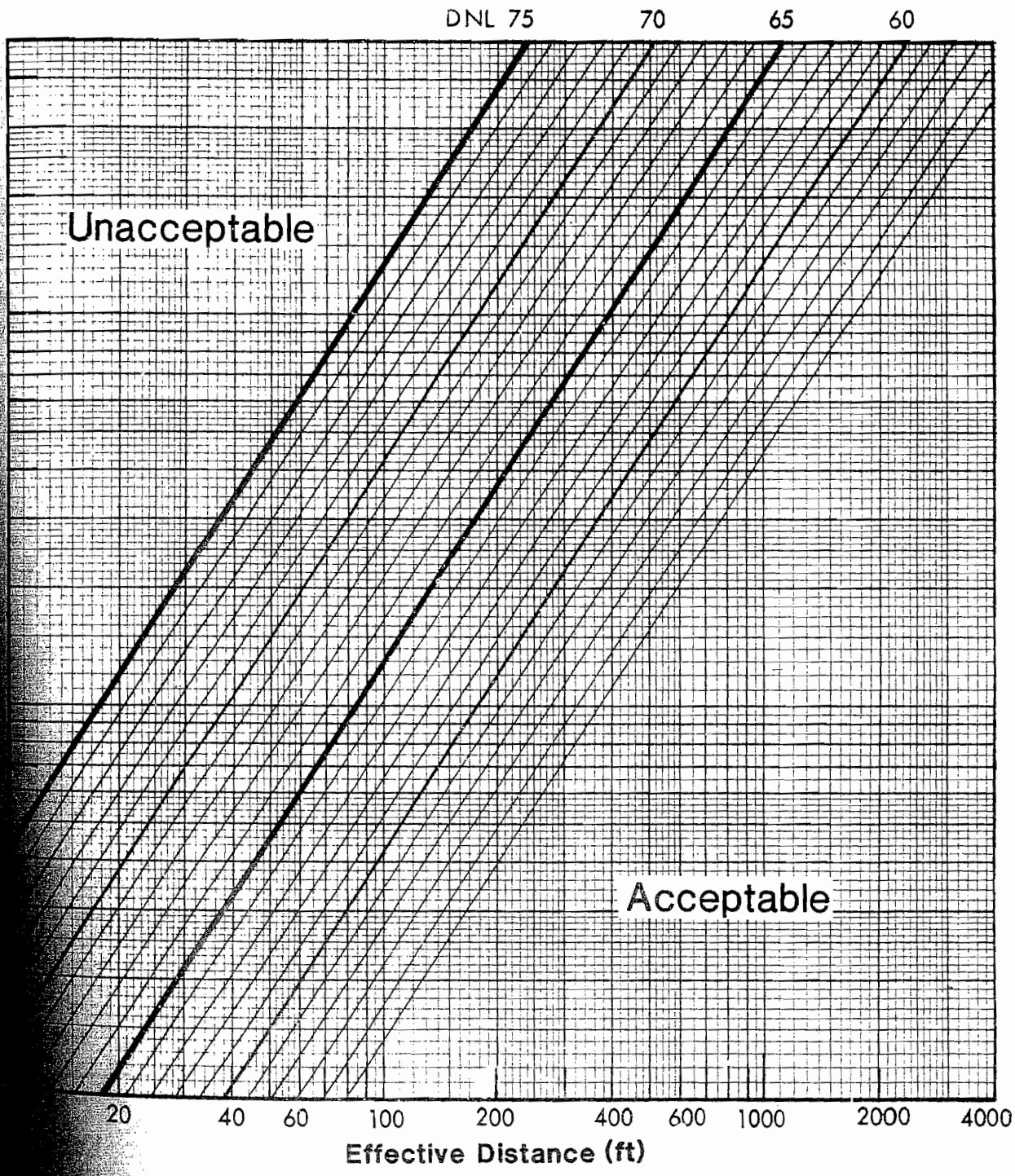
Table 10 Average Train Speed

Average Speed (mph)	Speed Adjustment Factor
10	0.11
20	0.44
30	1.00
40	1.78
50	2.78
60	4.00
70	5.44
80	7.11
90	9.00
100	11.11

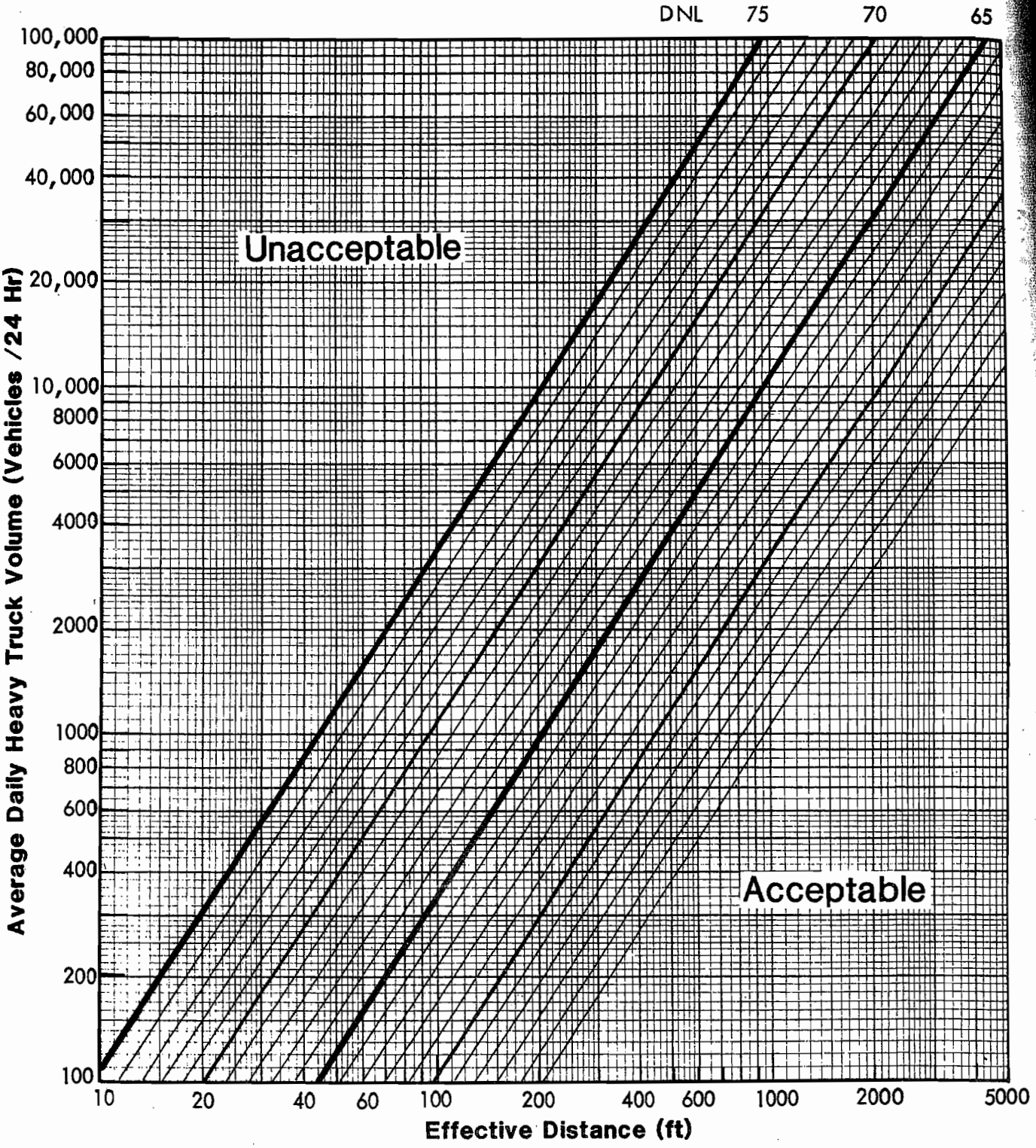
Bolted Rails
Multiply number of trains by 4.

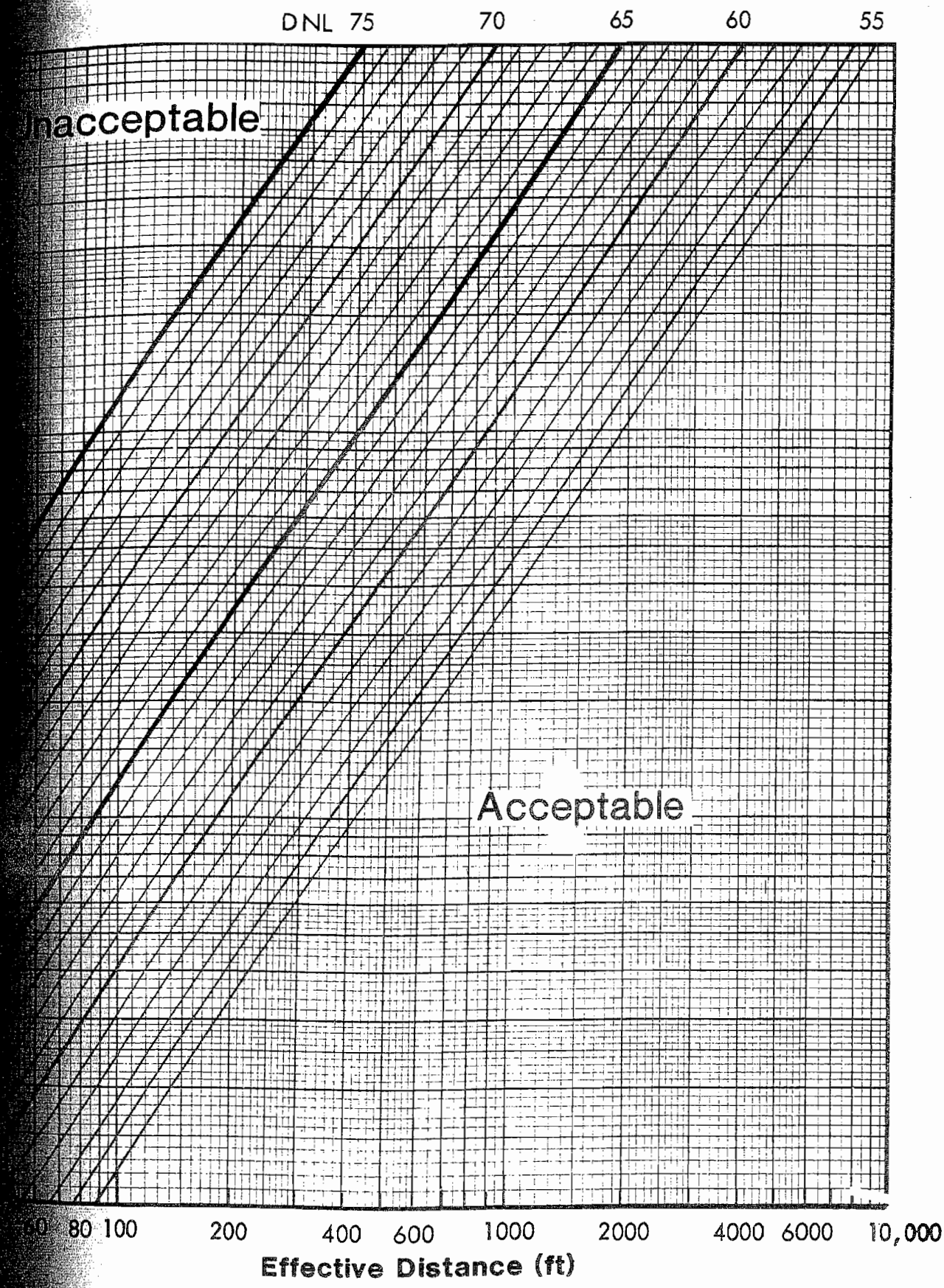
Whistles or Horns
Multiply number of trains by 100.

kchart 1
os (55 mph)



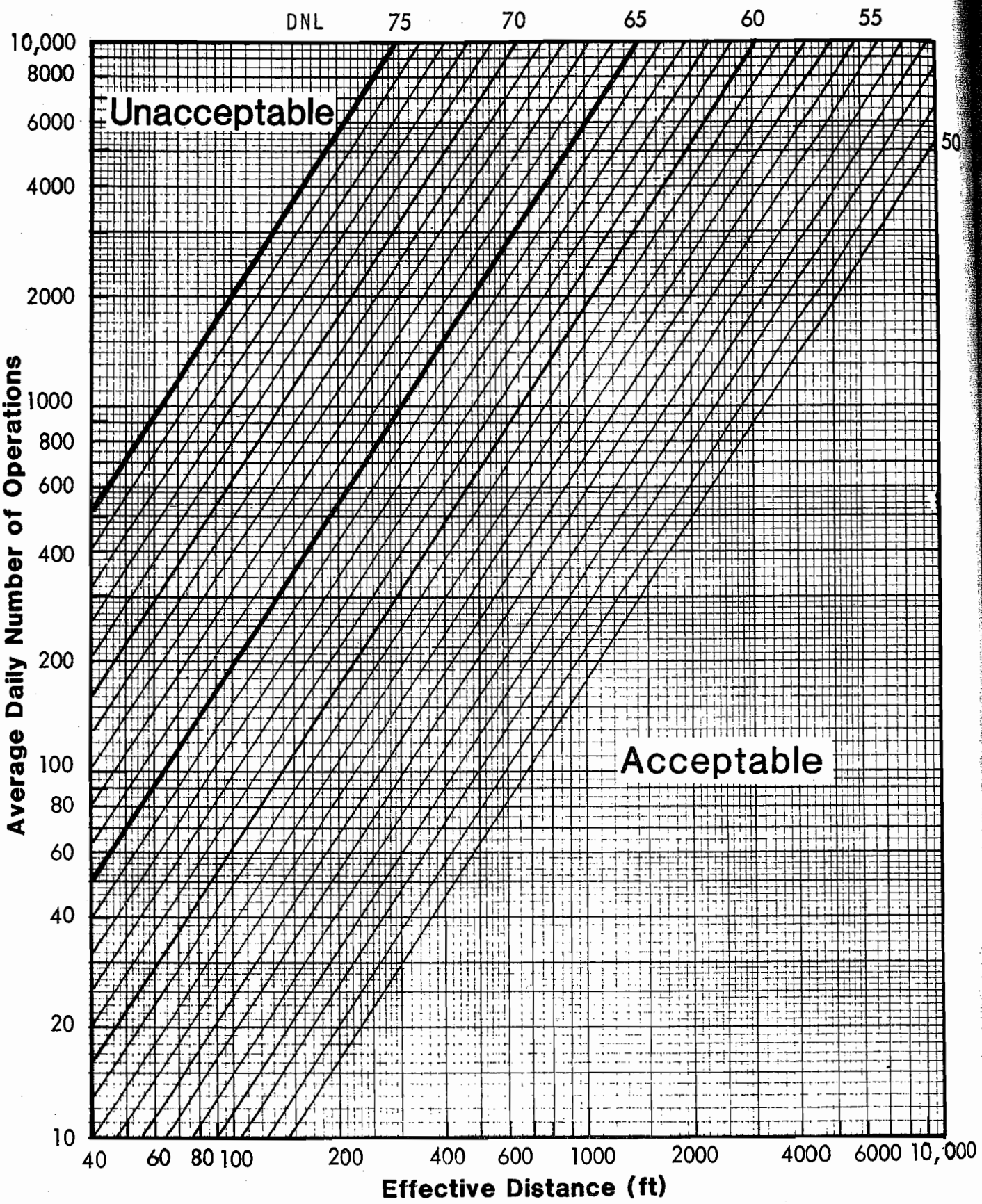
Workchart 2
Heavy Trucks (55 mph)




DNL 75
70
65
60
55
Unacceptable
Acceptable
60 80 100
200
400
600
1000
2000
4000
6000
10,000
Effective Distance (ft)

21

Workchart 4
Railroads - Cars and Rapid Transit



22

Workchart 5
Noise Barrier

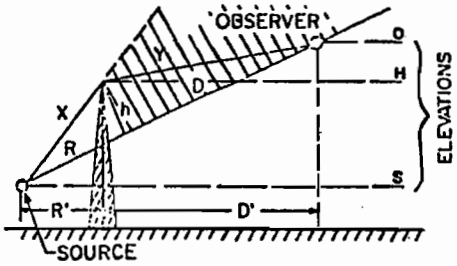
To find R, D and h from Site Elevations and Distances

Enter the values for:

H=_____ R'=_____

S=_____ D'=_____

O=_____



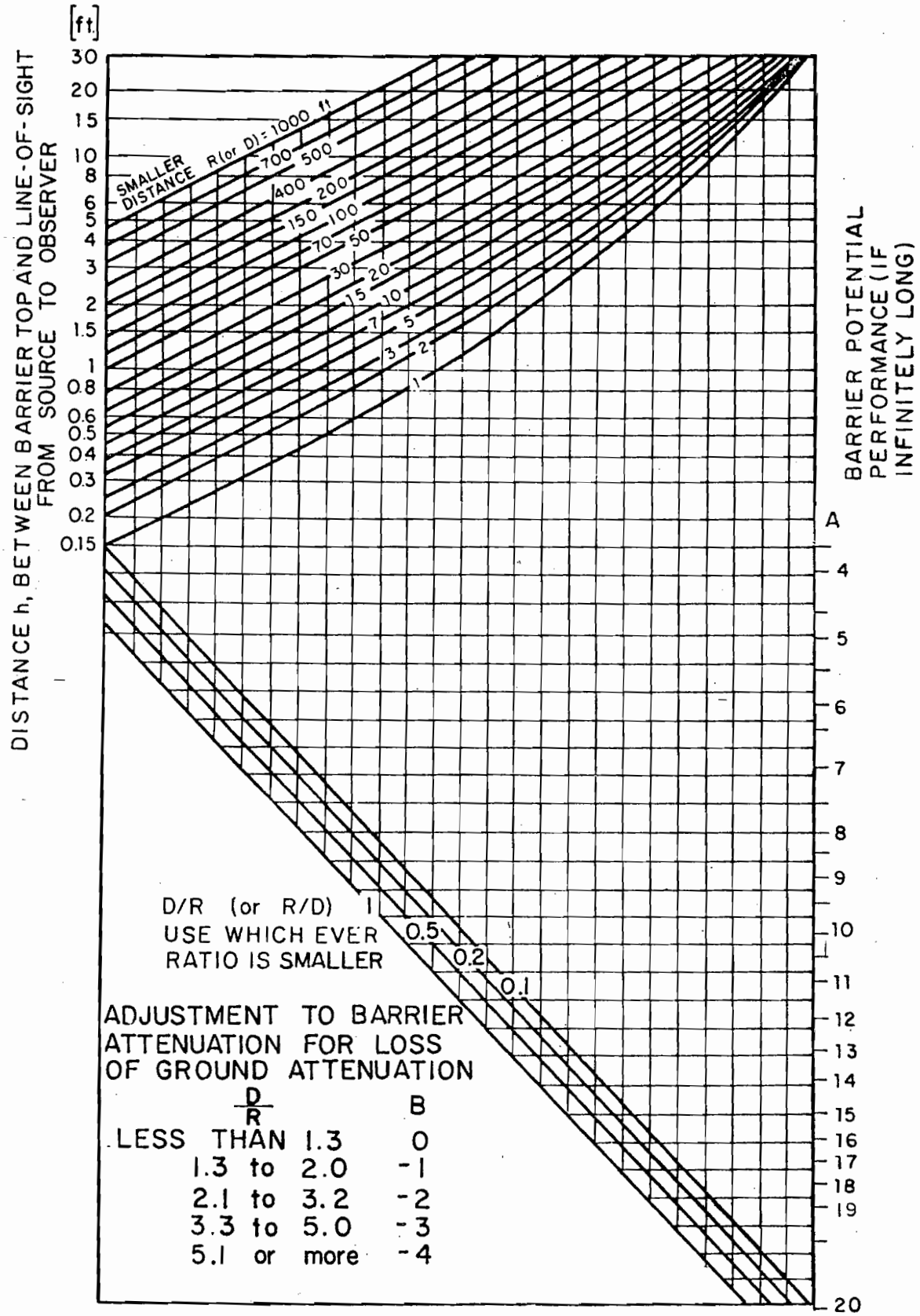
Fill out the following worksheet (all quantities are in feet):

1. Elevation of barrier top minus elevation of source	[H	]	−	[S	]	= [1	]	
2. Elevation of observer minus elevation of source	[O	]	−	[S	]	= [2	]	
3. Map distance between source and observer (R' + D')						[3	]	
4. Map distance between barrier and source (R')						[4	]	
5. Line 2 divided by line 3	[2	]	÷	[3	]	= [5	]	
6. Square the quantity on line 5 (i.e., multiply it by itself); always positive	[5	]	×	[5	]	= [6	]	
7. 40% of line 6	[0.4	]	×	[6	]	= [7	]	
8. One minus line 7	[1.0	]	−	[7	]	= [8	]	
9. Line 5 times line 4 (will be negative if line 2 is negative)	[5	]	×	[4	]	= [9	]	
10. Line 1 minus line 9	[1	]	−	[9	]	= [10	]	
11. Line 10 times line 8	[10	]	×	[8	]	= [11	]	= h
12. Line 5 times line 10	[5	]	×	[10	]	= [12	]	
13. Line 4 divided by line 8	[4	]	÷	[8	]	= [13	]	
14. Line 13 plus line 12	[13	]	+	[12	]	= [14	]	= R
15. Line 3 minus line 4	[3	]	−	[4	]	= [15	]	
16. Line 15 divided by line 8	[15	]	÷	[8	]	= [16	]	
17. Line 16 minus line 12	[16	]	−	[12	]	= [17	]	= D

If the value on line 2 may be negative, in which case so will the values on lines 5,9, and 12; h may also be negative. Remember, then, in lines 10, 14, and 17, that adding a negative number is the same as subtracting: x+(-y)=x-y. And subtracting a negative number is like adding: x-(-y)=x+y.

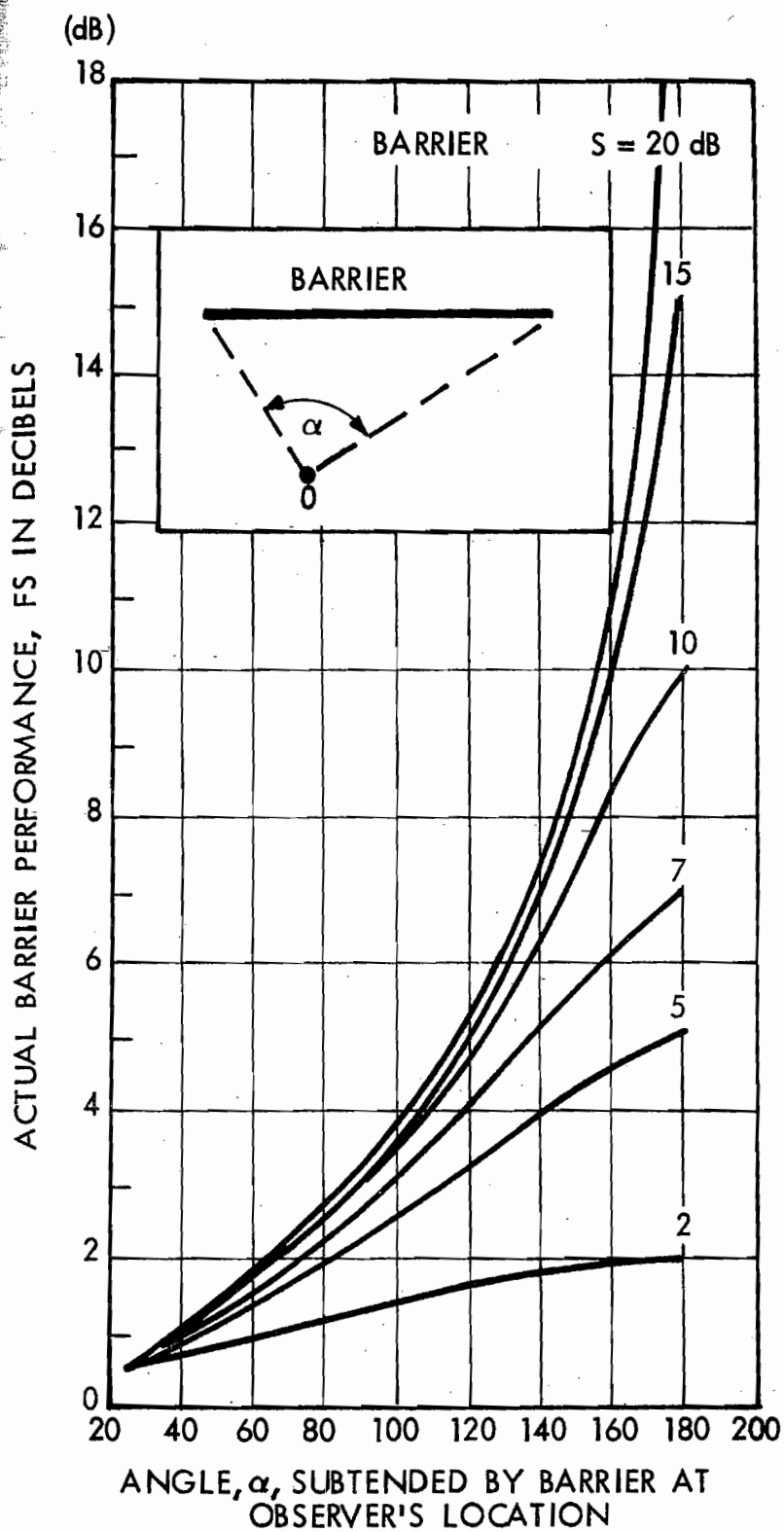
Round off R and D to nearest integer, h to one decimal place.

Workchart 6
Noise Barrier



Workchart 7

FS



Correction to be applied to barrier potential in order to find the actual performance of the barrier of the same construction but of finite length.

Worksheet A
Site Evaluation

Site Location

Program

Project Name

Locality

File Number

Sponsor's Name Phone

Street Address City, State

	Acceptability Category	DNL	Predicted for Operations in Year
1. Roadway Noise			
2. Aircraft Noise			
3. Railway Noise			

Value of DNL for all noise sources: (see page 3 for combination procedure)

Final Site Evaluation (circle one)

Acceptable

Normally Unacceptable

Unacceptable

Signature Date

Clip this worksheet to the top of a package containing Worksheets B-E and Workcharts 1-7 that are used in the site evaluations

List all airports within 15 miles of the site:

1. _____

2. _____

3. _____

Necessary Information:	**Airport 1**	**Airport 2**	**Airport 3**
1. Are DNL, NEF or CNR contours available? (yes/no)			
2. Any supersonic aircraft operations? (yes/no)			
3. Estimating approximate contours from Figure 3:			
a. number of nighttime jet operations			
b. number of daytime jet operations			
c. effective number of operations (10 times a + b)			
d. distance A for 65 dB			
70dB			
75 dB			
e. distance B for 65 dB			
70 dB			
75 dB			
4. Estimating DNL from Table 2:			
a. distance from 65 dB contour to flight path, D^1			
b. distance from NAL to flight path, D^2			
c. D^2 divided by D^1			
d. DNL			
5. Operations projected for what year?			
6. Total DNL from all airports			

Signed _____ Date _____

List all major roads within 1000 feet of the site:

1. _____

2. _____

3. _____

4. _____

Necessary information	**Road 1**	**Road 2**	**Road 3**	**Road 4**
1. Distance in feet from the NAL to the edge of the road				
a. nearest lane				
b. farthest lane				
c. average (effective distance)				
2. Distance to stop sign				
3. Road gradient in percent				
4. Average speed in mph				
a. Automobiles				
b. heavy trucks - uphill				
c. heavy trucks - downhill				
5. 24 hour average number of automobiles and medium trucks in both directions (ADT)				
a. automobiles				
b. medium trucks				
c. effective ADT (a + (10xb))				
6. 24 hour average number of heavy trucks				
a. uphill				
b. downhill				
c. total				
7. Fraction of nighttime traffic (10 p.m. to 7 a.m.)				
8. Traffic projected for what year?				

Adjustments for Automobile Traffic

	9 Stop and-go Table 3		10 Average Speed Table 4		11 Night-Time Table 5		12 Auto ADT (line 5c)		13 Adjusted Auto ADT		14 DNL (Workchart 1)		15 Barrier Attenuation		16 Partial DNL
Road No. 1	_____	X	_____	X	_____	X	_____	=	_____	_____	–	_____	=		_____
Road No. 2	_____	X	_____	X	_____	x	_____	=	_____	_____	–	_____	=		_____
Road No. 3	_____	X	_____	X	_____	X	_____	=	_____	_____	–	_____	=		_____
Road No. 4	_____	X	_____	X	_____	X	_____	=	_____	_____	–	_____	=		_____

Adjustments for Heavy Truck Traffic

	17 Gradient Table 6		18 Average Speed Table 7		19 Truck $\frac{ADT}{2}$		20		21		22 Stop and-go Table 8		23 Night-Time Table 5		24 Adjusted Truck ADT		25 DNL (Work-chart 2)		26 Barrier Attn.		27 Partial DNL
Uphill	_____	X	_____	X	_____	=	_____														
Road No. 1									Add	_____	X	_____	X	_____	=	_____	_____	–	_____	=	_____
Downhill			_____	X	_____	=	_____														
Uphill	_____	X	_____	X	_____	=	_____														
Road No. 2									Add	_____	X	_____	X	_____	=	_____	_____	–	_____	=	_____
Downhill			_____	X	_____	=	_____														
Uphill	_____	X	_____	X	_____	=	_____														
Road No. 3									Add	_____	X	_____	X	_____	=	_____	_____	–	_____	=	_____
Downhill			_____	X	_____	=	_____														
Uphill	_____	X	_____	X	_____	=	_____														
Road No. 4									Add	_____	X	_____	X	_____	=	_____	_____	–	_____	=	_____
Downhill			_____	X	_____	=	_____														

Combined Automobile & Heavy Truck DNL

Road No. 1 _____ Road No. 2 _____ Road No. 3 _____ Road No. 4 _____ Total DNL for All Roads _____

Signature _____ Date _____

List All Railways within 3000 feet of the site:

1. _____

2. _____

3. _____

Necessary Information:	**Railway No. 1**	**Railway No. 2**	**Railway No. 3**
1. Distance in feet from the NAL to the railway track:			
2. Number of trains in 24 hours:			
a. diesel			
b. electrified			
3. Fraction of operations occuring at night (10 p.m. – 7 a.m.):			
4. Number of diesel locomotives per train:			
5. Number of rail cars per train:			
a. diesel trains			
b. electrified trains			
6. Average train speed:			
7. Is track welded or bolted?			
8. Are whistles or horns required for grade crossings?			

Adjustments for Diesel Locomotives

	9 No. of Locomotives / 2	10 Average Speed Table 9	11 Horns (enter 10)	12 Night-time Table 5	13 No. of Trains (line 2a)	14 Adj. No. of Opns.	15 DNL Workchart 3	16 Barrier Attn.	17 Partial DNL
Railway No. 1	_____ X	_____ X	_____ X	_____ X	_____ =	_____	_____ –	_____ =	_____
Railway No. 2	_____ X	_____ X	_____ X	_____ X	_____ =	_____	_____ –	_____ =	_____
Railway No. 3	_____ X	_____ X	_____ X	_____ X	_____ =	_____	_____ –	_____ =	_____

Adjustments for Railway Cars or Rapid Transit Trains

	18 Number of cars / 50	19 Average Speed Table 10	20 Bolted Rails (enter 4)	21 Night-time Table 5	22 No. of Trains (Line 2a or 2b)	23 Adj. No. of Opns.	24 DNL Work-chart 4	25 Barrier Attn.	26 Partial DNL
Railway No. 1	_____ X	_____ X	_____ X	_____ X	_____ =	_____	_____ –	_____ =	_____
Railway No. 2	_____ X	_____ X	_____ X	_____ X	_____ =	_____	_____ –	_____ =	_____
Railway No. 3	_____ X	_____ X	_____ X	_____ X	_____ =	_____	_____ –	_____ =	_____

Combined Locomotive and Railway Car DNL

Railway No. 1 _____ Railway No. 2 _____ Railway No. 3 _____ Total DNL for all Railways _____

Signature_____ Date_____

Chapter 6

A Workbook for the Noise Assessment Guidelines

Introduction

The following problems were prepared to give you the opportunity to practice the calculations and procedures described in the *Noise Assessment Guidelines*. Because it is so rarely used, we have not included any problems dealing with the aircraft noise procedure.

We have not reproduced the charts or tables from the *Guidelines* so you will need to have it at hand to do the problems.

Noise Assessment Guidelines Workbook

Problems

Problems 1 Through 7: Combining Sound Levels in Decibels

Calculate the Combined Sound Level for the Following Sets of Individual Levels:

1. 67 LDN
   61 LDN
   _____ Combined Level

2. 63 LDN
   63 LDN
   _____ Combined Level

3. 51 LDN
   68 LDN
   _____ Combined Level

4. 62 LDN
   65 LDN
   _____ Combined Level

5. 67 LDN
   72 LDN
   _____ Combined Level

6. 59 LDN
   63 LDN
   71 LDN
   _____ Combined Level

7. 73 LDN
   72 LDN
   61 LDN
   67 LDN
   _____ Combined Level

Problems 8 and 9: Calculating Effective Distance

Calculate the Effective Distances for the Following Roads:

8. Distance in Feet from NAL to:

Near Edge of Nearest Lane	22 Feet
Far Edge of Farthest Lane	76 Feet
Effective Distance	_____

9. Distance in Feet from NAL to:

Near Edge of Nearest Lane	60 Feet
Far Edge of Farthest Lane	84 Feet
Effective Distance	_____

Problems 10 Through 15: Adjustment Factors

List The Adjustment Factors Necessary for Each of the Following Situations and the Numerical Value for Each Adjustment Factor.

10. A Roadway Where the Road Gradient Is 1%, the Average Speed for Both Autos and Trucks Is 30 MPH and the Fraction of Nighttime Traffic is 10%.

    Adjustment Factors Needed: _____

    _____

    _____

    Value of Adjustment Factors: _____

    _____

    _____

11. A Roadway Where There Is A Stop Sign 400 Feet from the NAL. The Gradient Is 1%, the Average Speed for Autos Is 45 MPH (There Are No Trucks) and the Fraction of Nighttime Traffic Is 15%.

    Adjustment Factors Needed: _____

    _____

    _____

    Value of Adjustment Factors: _____

    _____

    _____

12. A Roadway Where the Road Gradient Is 2%, the Average Speed for Autos Is 50 MPH and for Trucks (Both Uphill and Downhill) Is 50 MPH and the Fraction of Nighttime Traffic Is 10%.

Adjustment Factors Needed: _____

_____

_____

Value of Adjustment Factors: _____

_____

13. A Railroad Where the Fraction of Operations Occurring at Night Is 30%, the Average Train Speed Is 40 MPH, the Track Is Bolted and There Are No Whistle Or Horns Required for Grade Crossings.

Adjustment Factors Needed: _____

_____

_____

Value of Adjustment Factors: _____

_____

_____

14. A Railroad Where the Fraction of Operations Occurring at Night Is 5%, the Average Train Speed Is 10 MPH, the Tracks Are Welded and There Are No Whistles Or Horns Required for Grade Crossing.

Adjustment Factors Needed: _____

_____

_____

Value of Adjustment Factors: _____

_____

_____

15. A Railroad Where the Fraction of Operations Occurring at Night Is 20%, the Average Train Speed Is 30 MPH, the Track Is Bolted and No Whistles or Horns Are Required for Grade Crossings.

Adjustment Factors Needed: _____

_____

_____

Value of Adjustment Factors: _____

_____

_____

Problems 16 Through 21: Some Basic Problems

Calculate the Combined Noise Levels for Each of the Following Situations:

16. A Roadway Where the distance in Feet from the NAL to the Near Edge of the Nearest Lane Is 310 Feet, the Distance to the Far Edge of the Farthest Lane Is 358 Feet. There Is A Stop Sign 400 Feet from the NAL. The Gradient Is 1%. The Average Number of Automobiles Is 17,000, the 24 Hour Average Number of Medium Trucks Is 1,500, the 24 Hour Average Number of Heavy Trucks Is 400 Total. The Fraction of Nighttime Traffic Is 20%.

    The Combined Noise Level for This Roadway Is _____.

17. A Site Exposed to Noise from Two Roads. For Roadway Number 1 the Distance in Feet from the NAL to the Near Edge of the Nearest Lane Is 125 Feet, the Distance to the Far Edge of the Farthest Lane Is 233 Feet. There Is A Stop Sign 250 Feet from the NAL. The Gradient Is 3%. The Average Speed for Both Autos and Trucks Is 30 MPH.

    The 24 Hour Average Number of Autos Is 22,000, the 24 Hour Average Number of Medium Trucks Is 2,000. The 24 Hour Average Number of Heavy Trucks Is 950 Total. The Fraction of Nighttime Traffic Is 10%.

    For Roadway Number 2, the Distance to the Near Edge of the Nearest Lane Is 45 Feet, the Distance to the Far Edge of the Farthest Lane Is 93 Feet. There Is A Stop Sign 100 Feet from the NAL and the Gradient Is 1%. The Average Speed for Both Autos and Heavy Trucks Is 30 MPH. The 24 Hour Average Number of Automobiles Is 14,000, for Medium Trucks 700, and for Heavy Trucks 600 Total. The Fraction of Nighttime Traffic Is 20%.

    The Combined Noise Level for This Site Is _____

18. A Site Exposed to Noise from Two Railroads. For Railroad 1, the Distance in Feet from the NAL to the Railway Track Is 150 Feet. There Are 35 Diesel Trains Every 24 Hours, No Electrified Trains. The Fraction of Operations Occurring at Night Is 25%. There Are 3 Diesel Locomotives Per Train and 70 Cars Per Train. The Average Speed Is 30 MPH and the Track Is Bolted. No Whistles Or Horns Are Used.

    For Railroad 2, the Distance in Feet from the NAL to the Railway Track Is 310 Feet. There Are 20 Diesel and 2 Electrified Trains Each 24 Hours. The Fraction of Operations Occurring at Night Is 15%. There Are 2 Locomotives Per Diesel Train and 45 Cars for Each Diesel Train and 15 Cars Per Electrified Train. The Average Train Speed Is 40 MPH and the Track Is Bolted. No Horns Or Whistles Are Used.

    The Combined Noise Level for This Site Is _____.

19. A Site Exposed to Noise from Two Railroads. For Railroad 1, the Distance in Feet from the NAL to the Railway Track Is 75 Feet. There Are 34 Diesel Trains Every 24 Hours, No Electrified Trains. Twenty Percent of the Operations Occur at Night. There Are 5 Locomotives Per Train and 75 Cars Per Train. The Average Train Speed Is 35 MPH and the Track Is Welded. No Horns Or Whistles.

    For Railway 2, the Distance in Feet from the NAL to the Railway Track Is 120 Feet. There Are 12 Diesel Trains in 24 Hours, No Electrified Trains. Twenty-Five Percent of the Operations Occur at Night. There Are 4 Locomotives Per Train and 40 Cars Per Train. The Average Train Speed Is 20 MPH and the Track Is Bolted. No Horns Or Whistles Are Used.

    The Combined Noise Level for This Site Is _____

20. A Site Exposed to Noise from Three Roads. For Road 1, the Distance in Feet from the NAL to the Near Edge of the Nearest Lane Is 100 Feet, to the Far Edge of the Farthest Lane, 208 Feet. There Is No Stop Sign and the Gradient Is 1%. The Average Speed for Autos Is 55 MPH. (There Are No Trucks Allowed On This Road.) The 24 Hour Average Number of Autos Is 40,000. The Fraction of Nighttime Traffic Is 15%.

    For Road 2, the Distance from the NAL to the Near Edge of the Nearest Lane Is 45 Feet, to the Far Edge of the Farthest Lane 75 Feet. There Is A Stop Sign 175 Feet from the NAL and the Road Gradient Is 4%. The average Speed for Both Autos and Trucks Is 40 MPH. The 24 Hour Average Number of Autos Is 15,000, for Medium Trucks 900 and for Heavy Trucks 320 Total. The Fraction of Nighttime Traffic Is 20%.

    For Road 3, the Distance from the NAL to the Near Edge of the Nearest Lane Is 52 Feet, to the Far Edge of the Farthest Lane 92 Feet. There Is A Stop Sign 400 Feet from the NAL and the Gradient Is 1%. The Average Speed for Both Autos and Trucks Is 25 MPH. The 24 Hour Average Number of Autos Is 5,000, for Medium Trucks 1,050 and for Heavy Trucks 175 Total. The Fraction of Nighttime Traffic Is 20%.

    The Combined Noise Level for This Site Is _____.

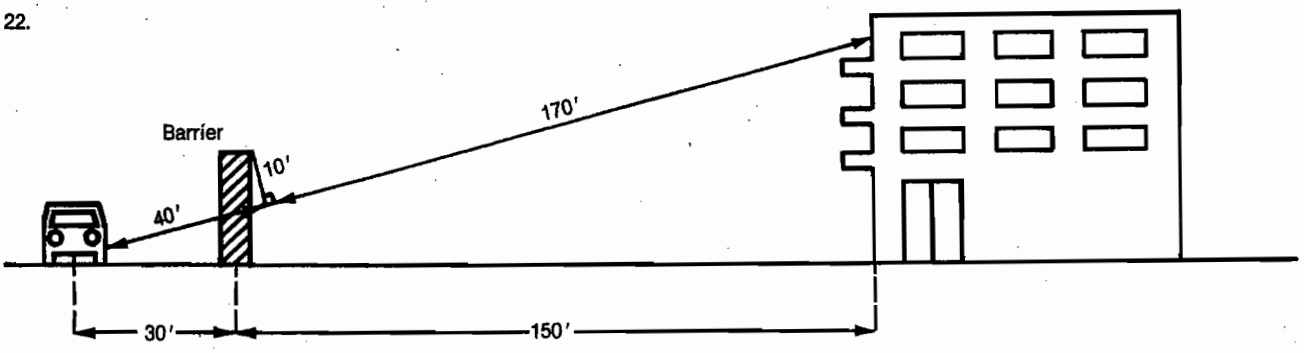
21. A Site Exposed to Noise from A Railroad. The Distance from the NAL to the Railroad Is 110 Feet. There Are 30 Diesel Trains Every 24 Hours, No Electrified Trains. Twenty Percent of the Operations Occur at Night. There Are 3 Locomotives Per Train and 50 Cars Per Train. The Average Train Speed Is 30 MPH, the Track Is Bolted and There Is A Grade Crossing Where Horns and Whistles Are Used 100 Feet from the NAL.

The Combined Noise Level at This Site Is _____.

Problems 22 Through 24: Barriers - Identifying the Values for H, R, R', D and D'

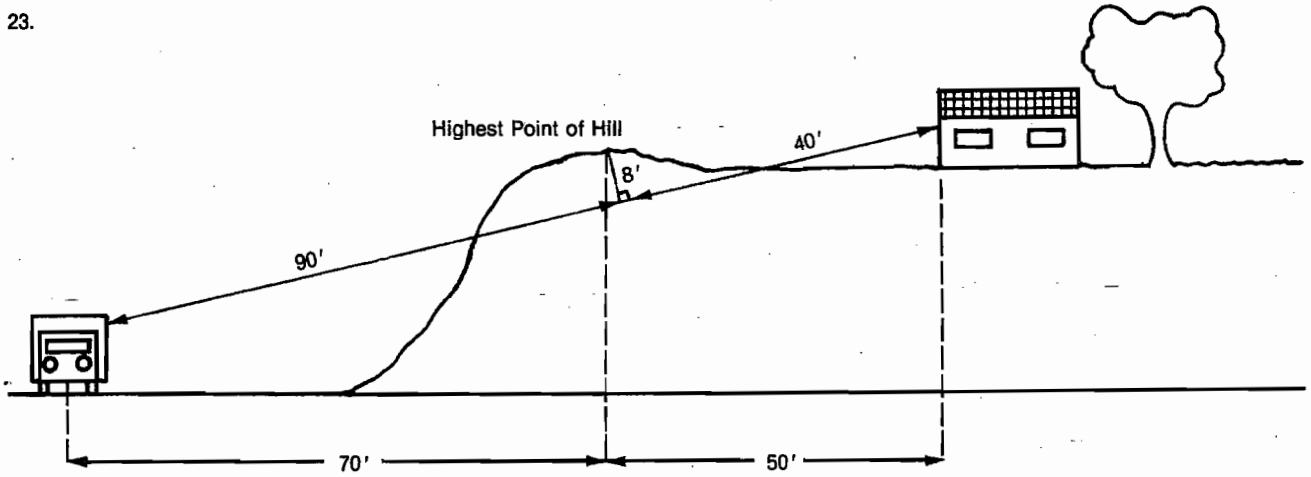
Identify the Values for H, R, R', D and D' for Each of the Following Barriers:

22.



H = _____, R = _____, R' = _____ D = _____ and D' = _____

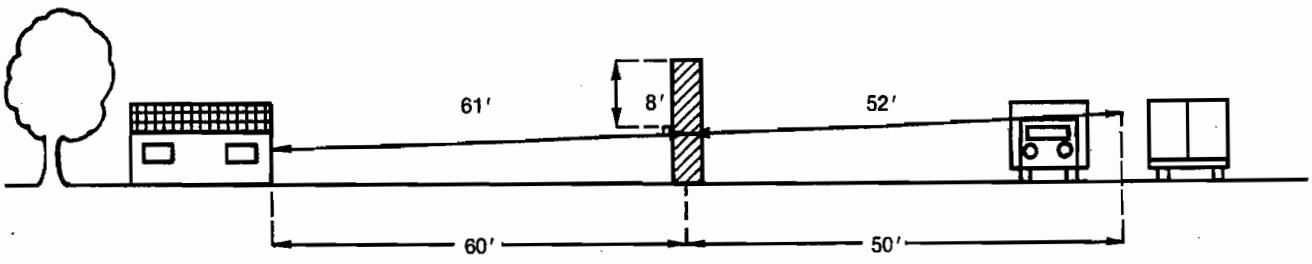
23.



H = _____, R = _____, R' = _____, D = _____ and D' = _____

Barrier	40'	10'	170'	90'	70'
Highest Point of Hill	30'	150'		8'	50'
				40'	

24.



H = _____, R = _____, R' _____, D = _____ and D' _____

Problems 25 Through 27: Barrier Calculations Using Workcharts 6 and 7.

Using Workcharts 6 and 7 Only, Calculate the Noise Attenuation Provided by the Barriers Illustrated in Problems 22 Through 24. Additional Data on the Angles Subtended by the Ends of the Barriers and the NAL for Each Location Is Provided.

25. Calculate the Noise Attenuation Provided by the Barrier Described In Problem 22. The Angle Subtended by the Ends of the Barrier and the NAL Is 150 Degrees.

    The Noise Attenuation Provided Is _____ Decibels.

26. Calculate the Noise Attenuation Provided by the Barrier Described in Problem 23. The Angle Subtended by the Ends of the Barrier and the NAL Is 90 Degrees.

    The Noise Attenuation Provided Is _____ Decibels.

27. Calculate the Noise Attenuation Provided by the Barrier Described in Problem 24. The Angle Subtended by the Ends of the Barrier and the NAL Is 130 Degrees.

    The Noise Attenuation Provided Is _____ Decibels.

Problems 28 Through 30: Barrier Calculations Using Workcharts 5, 6 and 7

Calculate the Attenuation Provided By the Barriers in the Following Situations. Use Workcharts 5, 6 and 7.

28. A Two Story Building Is Exposed to Noise Levels of 68 LDN from Automobiles. The Barrier Is 15 Feet High and Is Located 40 Feet from the Source and 20 Feet from the Building. The Source, Barrier, and Building Are All On Level Ground. The Angle Subtended by the Ends of the Barrier and the Noise Assessment Location Is 110 Degrees.

    The Noise Attenuation Provided by This Barrier Is _____ Decibels.

    Is This Sufficient? _____

29. A Three Story Building Is Exposed to A Noise Level of 72 LDN from Diesel Locomotives and 60 LDN from Railroad Cars. The Barrier Is 12 Feet High and Is Located 40 Feet from the Source and 85 Feet from the Building. The Barrier and the Building Are on the Same Level, But the Track Is Depressed 25 Feet. The Angle Subtended by the Ends Of the Barrier and the NAL Is 120 Degrees.

    The Noise Attenuation Provided by This Barrier Is _____ Decibels.

    Is This Sufficient? _____

30. A Three Story Building Is Exposed to Noise Levels of 67 LDN from Automobiles and 71 LDN from Trucks. The Barrier Is 16 Feet High and Is Located 36 Feet from the Source and 56 Feet from the Building. The Source, the Barrier and the Building Are All At the Same Level. The Angle Subtended by the Barrier Ends and the NAL Is 130 Degrees.

    The Noise Attenuation Provided by This Barrier Is _____ Decibels.

    Is This Sufficient? _____

Noise Assessment Guidelines Workbook
Answers

Problem

1. 68 LDN (67-61 = 6, Add 1dB (From Table) to 67 = 68 LDN)
2. 66 LDN (63-63 = 0, Add 3dB (From Table) to 63 = 66 LDN)
3. 69 LDN (69-51 = 0, Add 0dB to 69 = 69 LDN)
4. 67 LDN (65-62 = 3, Add 1.8dB to 65, Round Off to Nearest Whole Number, 66.8 = 67 LDN)
5. 73 LDN (72-65 = 5, Add 1.2 = 73.2 = 73 LDN)
6. 72 LDN (63-59 = 4, Add 1.5 = 64.5, 71-64.5 = 6.5
Interpolate From Table: 6 = 1.0, 7 = .8
6.5 = .9) 71 + .9 = 71.9 = 72 LDN)

7. 76 LDN (67-61 = 6, Add 1.0 = 68, 72-68 = 4, Add 1.5 = 73.5, 73.5-73 = .5, Interpolate From Table, Add 2.75 = 76.25 = 76 LDN)

8. 49 Feet (76 + 22 = 98 – 2 = 49)
9. 72 Feet (84 + 60 = 144 – 2 = 72)

10. Adjustment Factors Needed: Speed and Night-Time Percentage

    Value of Factors: Speed = Autos .30
    Trucks .81
    Nighttime
    Percentage .81

    Note—You Must Have Different Speed Adjustments for Autos and Trucks.

11. Adjustment Factors Needed: Speed and Stop and Go Traffic
    Value of Factors: Speed .67
    Stop and Go .70

12. Adjustment Factors Needed: Gradient, Speed and Nighttime Percentage

    Value of Factors: Gradient 1.4
    Speed = Autos .30
    Trucks .81
    Nighttime
    Percentage .81

13. Adjustment Factors Needed: Nighttime Percentage, Speed, Bolted Track

    Value of Factors: Nighttime
    Percentage 1.57
    Speed = Engines .75
    Cars 1.78
    Bolted Track 4

    Note—You Must Have Different Speed Adjustments for Engines and Cars.

14. Adjustment Factors Needed: Nighttime Percentage and Speed

    Value of Factors: Nighttime
    Percentage .62
    Speed = Engines 3.0
    Cars .11

15. Adjustment Factors Needed: Nighttime Percentage and Bolted Track

    Value of Factors: Nighttime
    Percentage 1.19
    Bolted Track 4

16. Combined Noise Level = 62 LDN (If Your Answer Is Plus or Minus 1dB Its OK – Between Rounding Off and the Large Scale on the Nomographs, That's Close Enough)

Worksheet C
Roadway Noise

Page 1

Noise Assessment Guidelines

List all major roads within 1000 ft of the site:

1. _____
2. _____
3. _____
4. _____

Necessary Information	Road 1	Road 2	Road 3	Road 4
1. Distance in feet from the NAL to the edge of the road				
a. nearest lane	310			
b. farthest lane	358			
c. average (effective distance)	334			
2. Distance to stop sign	400			
3. Road gradient in percent	1%			
4. Average speed in mph				
a. Automobiles	40			
b. heavy trucks - uphill	40			
c. heavy trucks - downhill	40			
5. 24 hour average number of automobiles and medium trucks in both directions (ADT)				
a. automobiles	17000			
b. medium trucks	1500			
c. effective ADT (a + (10xb))	32000			
6. 24 hour average number of heavy trucks				
a. uphill	200			
b. downhill	200			
c. total	400			
7. Fraction of nighttime traffic (10:00 p.m. to 7: a.m.)	20%			
8. Traffic projected for what year?	—			

—

Worksheet C
Roadway Noise

Page 2

Noise Assessment Guidelines

Adjustments for Automobile Traffic

	9 Stop and-go Table 3		10 Average Speed Table 4		11 Night-Time Table 5		12 Auto ADT (line 5c)		13 Adjusted Auto ADT		14 DNL (Workchart 1)		15 Barrier Attenuation		16 Partial DNL
Road No. 1	.70	x	.53	x	1.19	x	32000	=	.14128		57	-	0	=	57
Road No. 2		x		x		x		=				-		=	
Road No. 3		x		x		x		=				-		=	
Road No. 4		x		x		x		=				-		=	

Adjustments for Heavy Truck Traffic

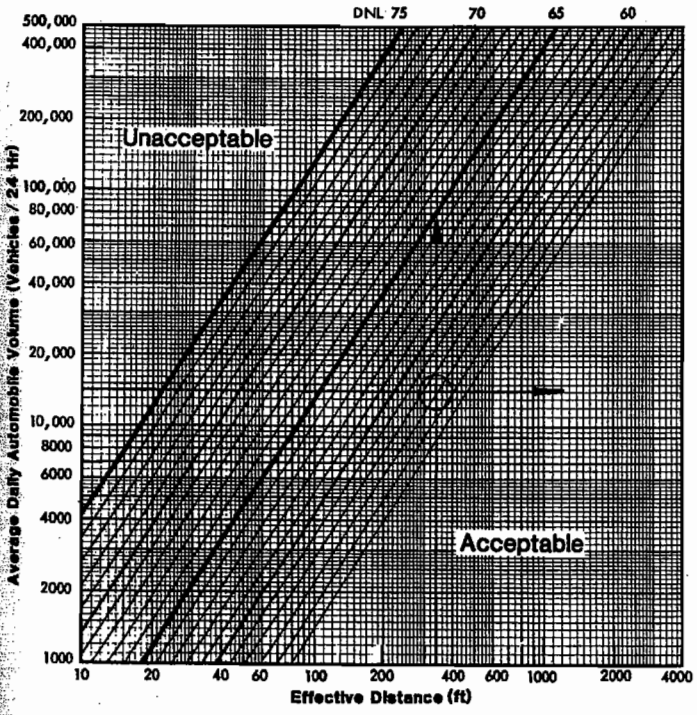
	17 Gradient Table 6		18 Average Speed Table 7		19 Truck ADT / 2		20		21		22 Stop and-go Table 6		23 Night-Time Table 5		24 Adjusted Truck ADT		25 DNL (Work chart 2)		26 Barrier Attn.		27 Partial DNL
Uphill	—	x	.81	x	200	=	162														
Road No. 1									Add	324	x	1.8	x	1.19	=	694	60	-	0	=	60
Downhill	.81	x	200	=	162																
Uphill		x		x		=															
Road No. 2									Add		x		x		=			-		=	
Downhill		x		=																	
Uphill		x		x		=															
Road No. 3									Add		x		x		=			-		=	
Downhill		x		=																	
Uphill		x		x		=															
Road No. 4									Add		x		x		=			-		=	
Downhill		x		=																	

Combined Automobile & Heavy Truck DNL

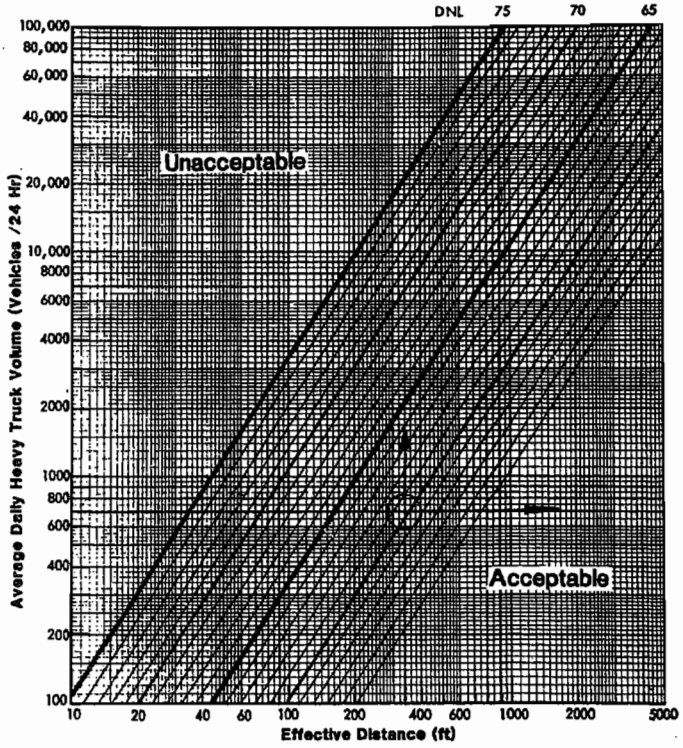
Road No. 1 62 Road No. 2 _____ Road No. 3 _____ Road No. 4 _____ Total DNL for All Roads 62

Signature _____ Date _____

Workchart 1
Autos (55 mph)



Workchart 2
Heavy Trucks (55 mph)



17. Combined Noise Level = 74 LDN (+ OR – 1 dB)

Worksheet C
Roadway Noise

Page 1

Noise Assessment Guidelines

List all major roads within 1000 ft of the site:

1. _____
2. _____
3. _____
4. _____

Necessary Information	Road 1	Road 2	Road 3	Road 4
1. Distance in feet from the NAL to the edge of the road				
a. nearest lane	125	45		
b. farthest lane	233	93		
c. average (effective distance)	179	69		
2. Distance to stop sign	250	100		
3. Road gradient in percent	3%	1%		
4. Average speed in mph				
a. Automobiles	30	30		
b. heavy trucks - uphill	30	30		
c. heavy trucks - downhill	30	30		
5. 24 hour average number of automobiles and medium trucks in both directions (ADT)				
a. automobiles	22000	14000		
b. medium trucks	2000	700		
c. effective ADT (a + (10xb))	42000	21000		
6. 24 hour average number of heavy trucks				
a. uphill	475	300		
b. downhill	475	300		
c. total	950	600		
7. Fraction of nighttime traffic (10:00 p.m. to 7: a.m.)	10%	20%		
8. Traffic projected for what year?	–	–		

Worksheet C
Roadway Noise

Page 2

Noise Assessment Guidelines

Adjustments for Automobile Traffic

	9 Stop and-go Table 3	10 Average Speed Table 4	11 Night-Time Table 5	12 Auto ADT (line 5c)	13 Adjusted Auto ADT	14 DNL (Workchart 1)	15 Barrier Attenuation	16 Partial DNL
Road No. 1	.48	x .30	x .81	x 42000	= 4899	57	– 0	= 57
Road No. 2	.25	x .30	x 1.19	x 21000	= 1874	59	– 0	= 59
Road No. 3		x	x	x	=		–	=
Road No. 4		x	x	x	=		–	=

Adjustments for Heavy Truck Traffic

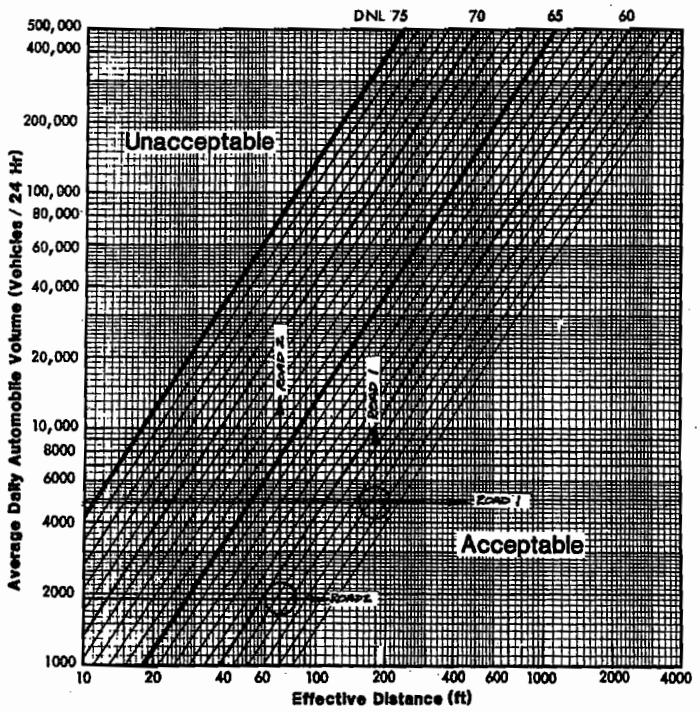
	17 Gradient Table 6	18 Average Speed Table 7	19 Truck ADT /2	20	21	22 Stop and-go Table 8	23 Night-Time Table 5	24 Adjusted Truck ADT	25 DNL (Work chart 2)	26 Barrier Attn.	27 Partial DNL
Uphill	1.7	x .81	x 475	= 654							
Road No. 1					Add 1089	x 1.8	x .81	= 1515	68	– 0	= 68
Downhill		.81	x 475	= 385							
Uphill	–	x .81	x 300	= 243							
Road No. 2					Add 486	x 1.8	x 1.19	= 1041	72	– 0	= 72
Downhill		.81	x 300	= 243							
Uphill		x	x	=							
Road No. 3					Add	x	x	=		–	=
Downhill		x	=								
Uphill		x	x	=							
Road No. 4					Add	x	x	=		–	=
Downhill		x	=								

Combined Automobile & Heavy Truck DNL

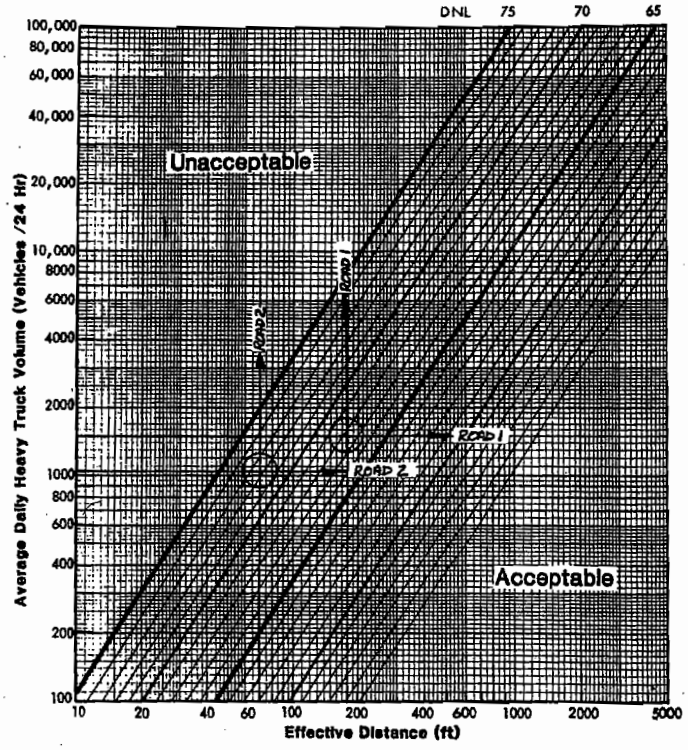
Road No. 1 68 Road No. 2 72 Road No. 3 _____ Road No. 4 _____ Total DNL for All Roads 74

Signature _____ Date _____

Workchart 1
Autos (55 mph)



Workchart 2
Heavy Trucks (55 mph)



18. Combined Noise Level = 71 LDN

Note—In Order to Complete Column 18 for Railway #2 You Must Find the Average Number of Cars Per Train. Multiply the Number of Diesel Trains Times the Number of Cars Per Train (20 × 45 = 900). Multiply the Number of Electrified Trains Times the Number of Cars Per Train (2 × 15 = 30). Add the Two Totals Together and Divide By the Total Number of Trains (900 + 30 = 930 – 22 = 42).

Worksheet D **Page 2** **Noise Assessment Guidelines**
Railway Noise

Adjustments for Diesel Locomotives

	9 No. of Locomotives / 2	10 Average Speed Table 9	11 Horns (enter 10)	12 Night-time Table 5	13 No. of Trains (line 2a)	14 Adj. No. of Opns.	15 DNL Workchart 3	16 Barrier Attn.	17 Partial DNL
Railway No. 1	1.5	1.0	–	1.38	35	72	70	0	72
Railway No. 2	1	.75	–	1.0	20	15	58	0	58
Railway No. 3									

Adjustments for Railway Cars or Rapid Transit Trains

	18 Number of cars / 50	19 Average Speed Table 10	20 Bolted Rails (enter 4)	21 Night-time Table 5	22 No. of Trains (Line 2a or 2b)	23 Adj. No. of Opns.	24 DNL Work-chart 4	25 Barrier Attn.	26 Partial DNL
Railway No. 1	1.4	1.0	4	1.38	35	270	64	0	64
Railway No. 2	.84	1.76	4	1.38	22	182	57	0	57
Railway No. 3									

Combined Locomotive and Railway Car DNL

Railway No. 1 71 Railway No. 2 61 Railway No. 3 71 Total DNL for all Railways

Signature _____ Date _____

19. Combined Noise Level = 76 LDN

Worksheet D **Page 2** **Noise Assessment Guidelines**
Railway Noise

Adjustments for Diesel Locomotives

	9 No. of Locomotives / 2	10 Average Speed Table 9	11 Horns (enter 10)	12 Night-time Table 5	13 No. of Trains (line 2a)	14 Adj. No. of Opns.	15 DNL Workchart 3	16 Barrier Attn.	17 Partial DNL
Railway No. 1	2.5	.88	–	1.19	34	89	75	0	75
Railway No. 2	2	1.50	–	1.38	12	50	70	0	70
Railway No. 3									

Adjustments for Railway Cars or Rapid Transit Trains

	18 Number of cars / 50	19 Average Speed Table 10	20 Bolted Rails (enter 4)	21 Night-time Table 5	22 No. of Trains (Line 2a or 2b)	23 Adj. No. of Opns.	24 DNL Work-chart 4	25 Barrier Attn.	26 Partial DNL
Railway No. 1	1.5	1.39	–	1.19	34	84	63	0	63
Railway No. 2	.80	.44	4	1.38	12	23	55	0	55
Railway No. 3									

Combined Locomotive and Railway Car DNL

Railway No. 1 75 Railway No. 2 70 Railway No. 3 _____ Total DNL for all Railways 76

Signature _____ Date _____

20. Combined Noise Level = 75 LDN

Worksheet C
Roadway Noise

Page 1

Noise Assessment Guidelines

List all major roads within 1000 ft of the site:

1. _____
2. _____
3. _____
4. _____

Necessary Information	Road 1	Road 2	Road 3	Road 4
1. Distance in feet from the NAL to the edge of the road				
a. nearest lane	100	45	52	
b. farthest lane	208	75	92	
c. average (effective distance)	154	60	72	
2. Distance to stop sign	-	175	400	
3. Road gradient in percent	1%	4%	1%	
4. Average speed in mph				
a. Automobiles	55	40	25	
b. heavy trucks - uphill	55	40	25	
c. heavy trucks - downhill	55	40	25	
5. 24 hour average number of automobiles and medium trucks in both directions (ADT)				
a. automobiles	40000	15000	5000	
b. medium trucks	-	900	1050	
c. effective ADT (a + (10xb))	40000	24000	15500	
6. 24 hour average number of heavy trucks				
a. uphill	-	160	87	
b. downhill	-	160	88	
c. total	-	320	175	
7. Fraction of nighttime traffic (10:00 p.m. to 7: a.m.)	15%	20%	20%	
8. Traffic projected for what year?	-	-	-	

Worksheet C
Roadway Noise

Page 2

Noise Assessment Guidelines

Adjustments for Automobile Traffic

	9 Stop and-go Table 3		10 Average Speed Table 4		11 Night-Time Table 5		12 Auto ADT (line 5c)		13 Adjusted Auto ADT		14 DNL (Workchart 1)		15 Barrier Attenuation		16 Partial DNL
Road No. 1	0	x	1.0	x	1.0	x	40000	-	40000		67	-	0	=	67
Road No. 2	.36	x	.53	x	1.19	x	24000	=	5450		65	-	0	=	65
Road No. 3	.70	x	.21	x	1.19	x	15500	=	2711		60	-	0	=	60
Road No. 4		x		x		x		=				-		=	

Adjustments for Heavy Truck Traffic

	17 Gradient Table 6		18 Average Speed Table 7		19 Truck ADT / 2		20		21		22 Stop and-go Table 8		23 Night-Time Table 5		24 Adjusted Truck ADT		25 DNL (Work chart 2)		26 Barrier Attn.		27 Partial DNL
Uphill	-	x	-	x	-	=	-														
Road No. 1									Add	-	x	-	x	-	=	-	-	=	-		
Downhill	-	x	-	=	-																
Uphill	2.0	x	.81	x	160	=	259														
Road No. 2									Add	389	x	1.8	x	1.19	=	833	72	-	0	=	72
Downhill			.81	x	160	=	130														
Uphill	1.0	x	.81	x	87	=	70														
Road No. 3									Add	141	x	1.8	x	1.19	=	303	67	-	0	=	67
Downhill			.81	x	88	=	71														
Uphill		x		x		=															
Road No. 4									Add		x		x		=			-		=	
Downhill		x		=																	

Combined Automobile & Heavy Truck DNL

Road No. 1 67 Road No. 2 73 Road No. 3 68 Road No. 4 _____ Total DNL for All Roads 75

Signature _____ Date _____

21. Combined Noise Level = 81 LDN

To Solve This Problem You Must Add Some More Lines to the Workchart for Engines Because the Workchart as Set up Does Not Go High Enough. There Are A Variety of Ways to Do This But One of the Easiest Is to Take A Piece of Blank Paper (A 3 x 5 Card Does Very Well) Place the Edge of the Paper Along Either the Top Or Bottom Edge of the Workchart and Mark Where the LDN Lines Fall Along the Edge of the Blank Paper. Then Once You Have Drawn Your Distance and Operations Lines on the Work Chart, You Take Your Paper with the Line Markings and Lay It along the Line for Adjusted Operations with the Mark Farthest to the Right Lined up with the 75 LDN Line. Now Just Count over until You Reach the Intersection of the Operations and Distance Lines.

Worksheet D **Page 2** **Noise Assessment Guidelines**
Railway Noise

Adjustments for Diesel Locomotives

	9 No. of Locomotives / 2	10 Average Speed Table 9	11 Horns (enter 10)	12 Night-time Table 5	13 No. of Trains (line 2a)	14 Adj. No. of Opns.	15 DNL Workchart 3	16 Barrier Attn.	17 Partial DNL
Railway No. 1	1.5	1.0	10	1.19	30	535	81	0	81
Railway No. 2									
Railway No. 3									

Adjustments for Railway Cars or Rapid Transit Trains

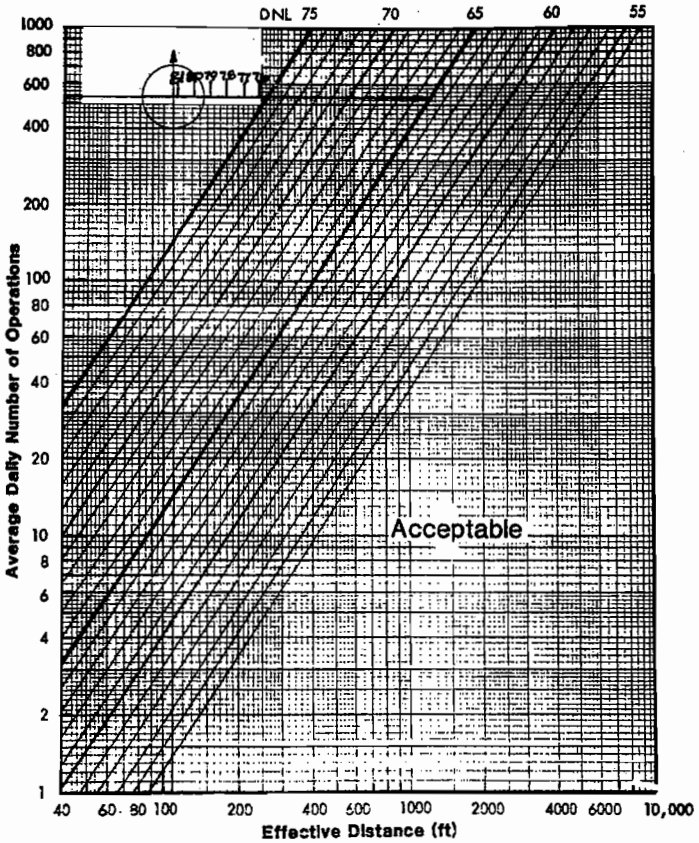
	18 Number of cars / 50	19 Average Speed Table 10	20 Bolted Rails (enter 4)	21 Night-time Table 5	22 No. of Trains (Line 2a or 2b)	23 Adj. No. of Opns.	24 DNL Work-chart 4	25 Barrier Attn.	26 Partial DNL
Railway No. 1	1.0	1.0	4	1.19	30	143	63	0	63
Railway No. 2									
Railway No. 3									

Combined Locomotive and Railway Car DNL

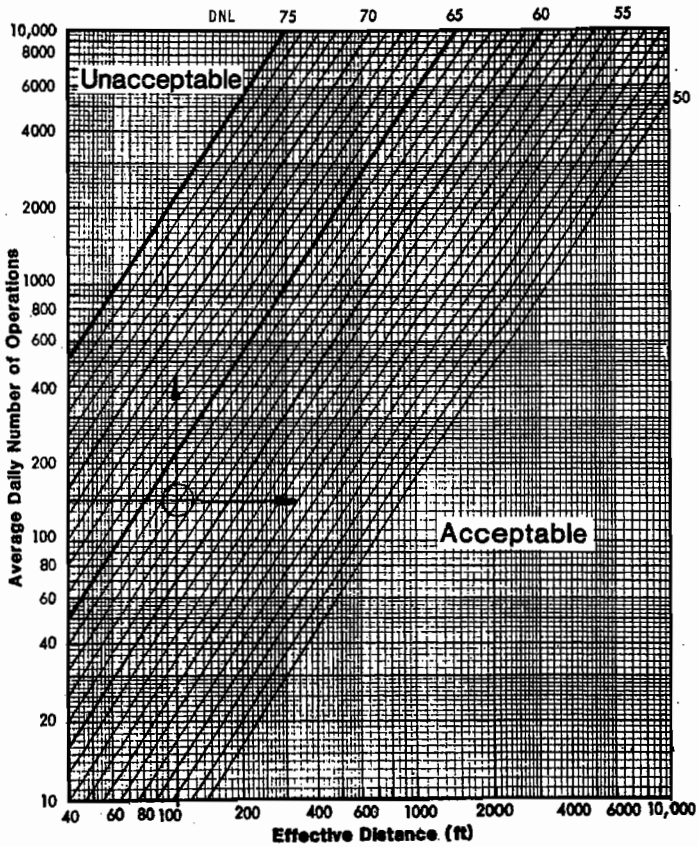
Railway No. 1 81 Railway No. 2 _____ Railway No. 3 _____ Total DNL for all Railways 81

Signature _____ Date _____

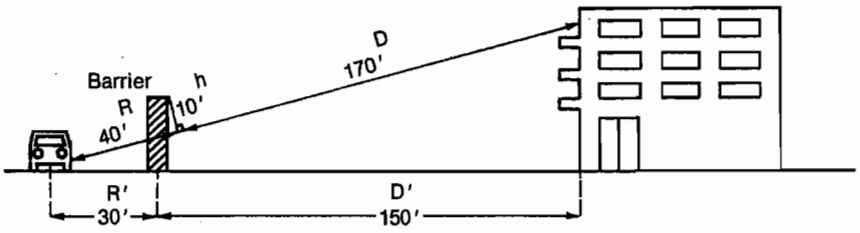
Workchart 3
Railroads - Diesel Locomotives



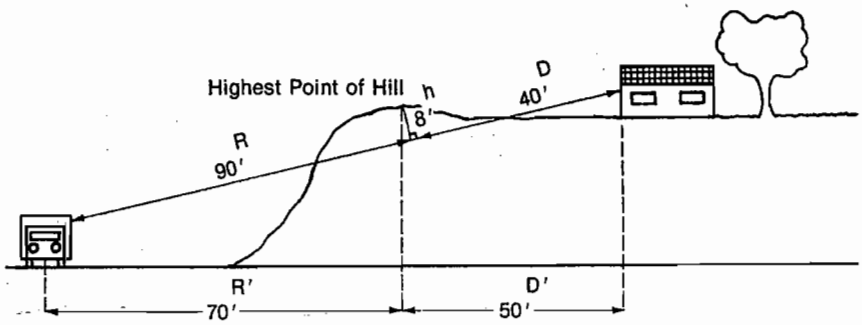
Workchart 4
Railroads - Cars and Rapid Transit



22. H = 10 Feet, R = 40 Feet, R′ = 30 Feet, D = 170 Feet, D′ = 150 Feet

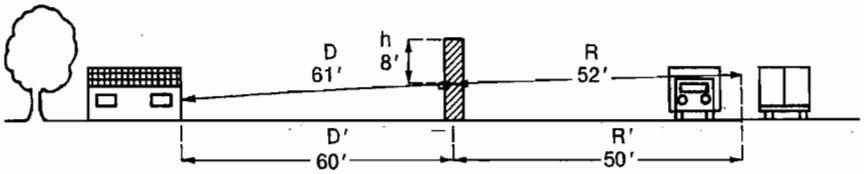


23. H = 8 Feet, R = 90 Feet, R′ = 70 Feet, D = 40 Feet, D′ = 50 Feet

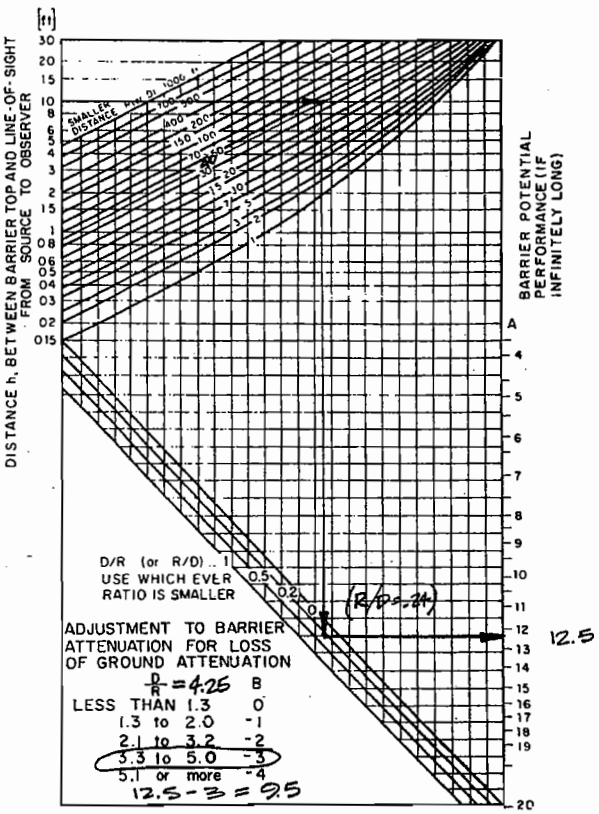


Note—The Line of Sight Line Starts Above the Road Level Because of the Trucks.

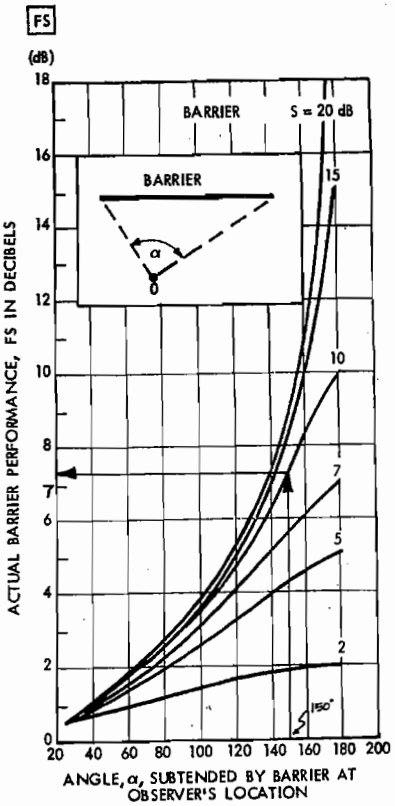
24. H = 8 Feet, R = 52 Feet, R′ = 50 Feet, D = 61 Feet, D′ = 60 Feet



Workchart 6
Noise Barrier



Workchart 7

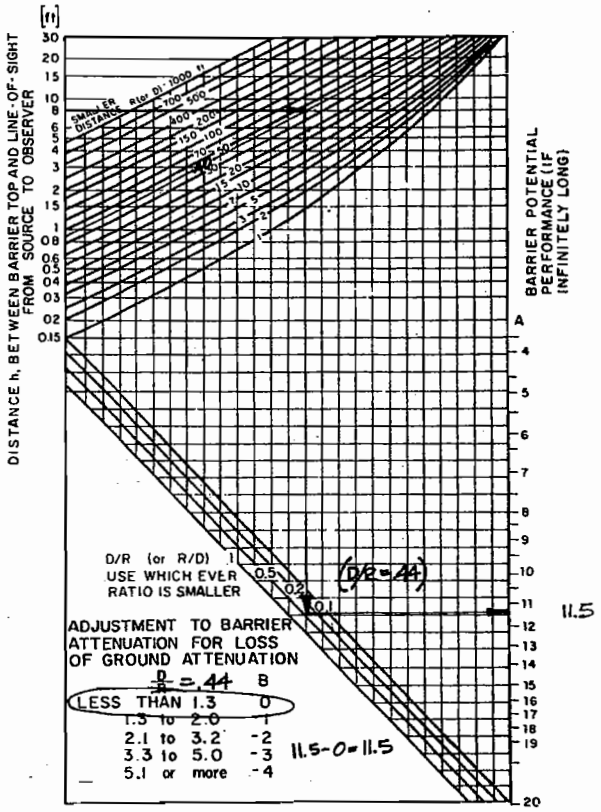


Correction to be applied to barrier potential in order to find the actual performance of the barrier of the same construction but of finite length.

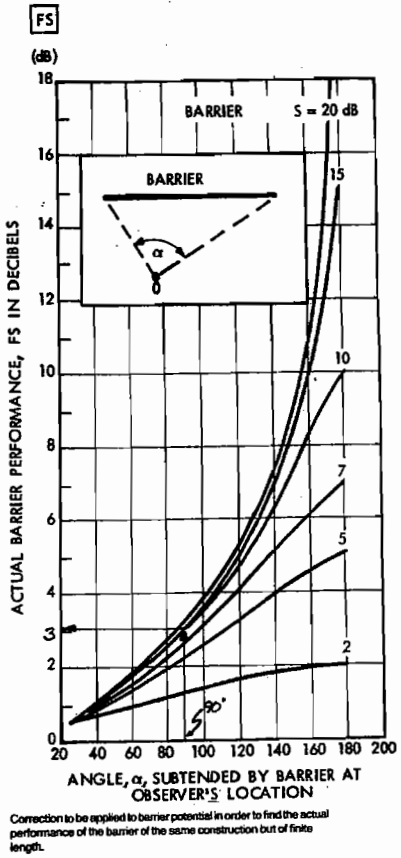
26. The Noise Attenuation Provided Is 3 Decibels

Note—When the Curves ARe So Close Together Don't Worry About Extrapolating. In This Case You Couldn't Anyway, the 15 dB and 10 dB Curves Have Merged.

Workchart 6
Noise Barrier



Workchart 7

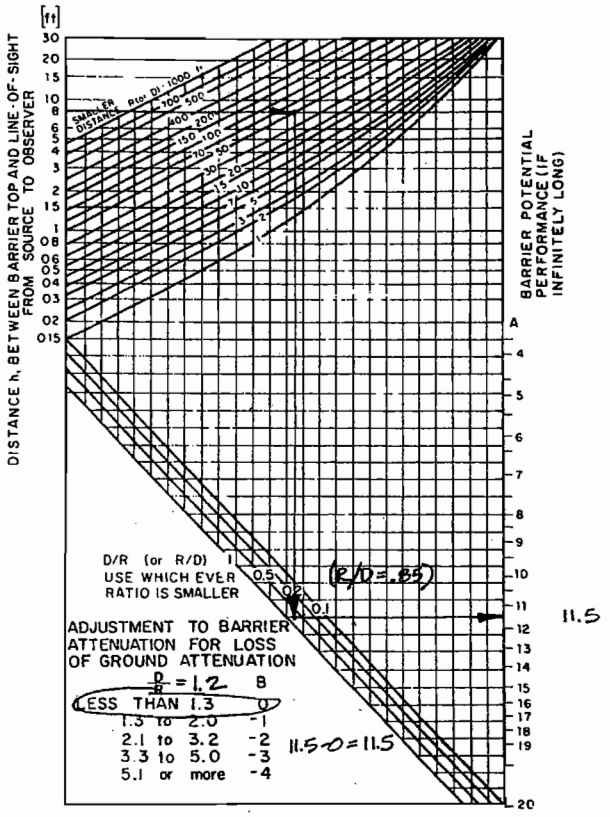


Correction to be applied to barrier potential in order to find the actual performance of the barrier of the same construction but of finite length.

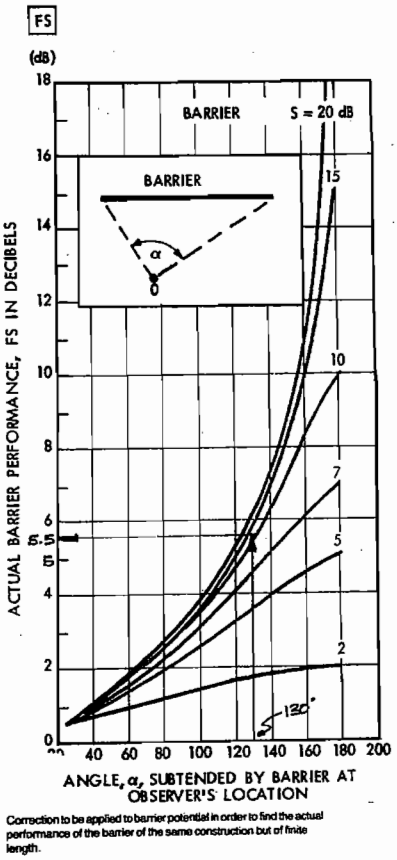
27. The Noise Attenuation Provided Is 6 Decibels (5.5 Rounded Up)

Note—Again You Have Problems With Extrapolating—Don't Worry About Being Too Precise.

Workchart 6
Noise Barrier



Workchart 7



Correction to be applied to barrier potential in order to find the actual performance of the barrier of the same construction but of finite length.

28. The Noise Attenuation Provided by This Barrier Is 4 dB. This Is Sufficient

Note—Don't Forget That the Height of the observor Is 5′ Less Than the Total Height of the Building and the Height of the Building Is 10 Feet Times the Number of Stories. And Did You Remember to Make the Adjustment for Ground Attenuation Loss.

Workchart 5
Noise Barrier

To find R, D and h from Site Elevations and Distances

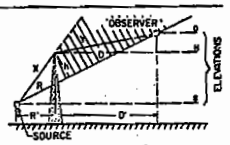
Fill out the following worksheet (all quantities are in feet):

Enter the values for:

H= 15 R'= 40

S= 0 D'= 20

O= 15

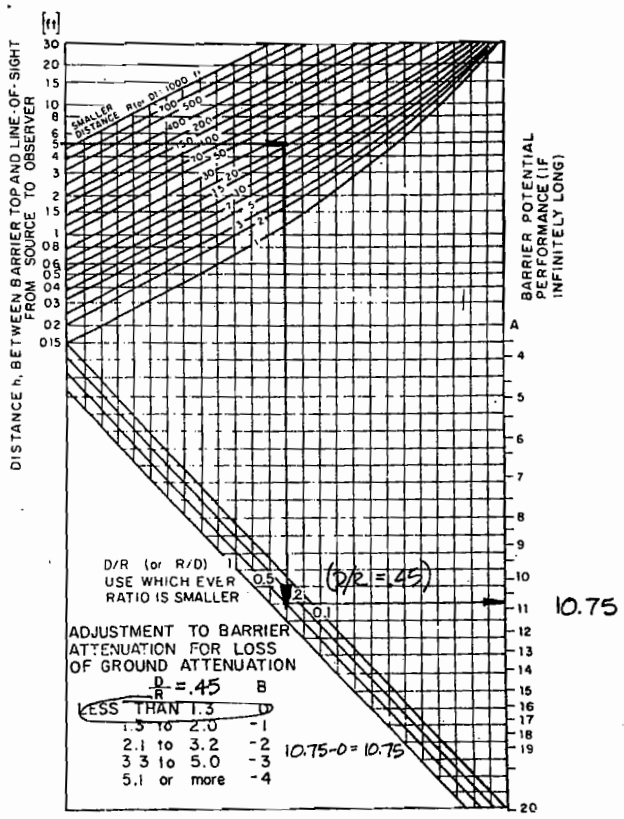


1. Elevation of barrier top minus elevation of source	[H 15]	− [S 0]	= [1 15]	
2. Elevation of observer minus elevation of source	[O 15]	− [S 0]	= [2 15]	
3. Map distance between source and observer (R' + D')			[3 60]	
4. Map distance between barrier and source (R')			[4 40]	
5. Line 2 divided by line 3	[2 15]	÷ [3 60]	= [5 .25]	
6. Square the quantity on line 5 (i.e., multiply it by itself); always positive	[5 .25]	× [5 .25]	= [6 .0625]	
7. 40% of line 6	[0.4]	× [6 .0625]	= [7 .025]	
8. One minus line 7	[1.0]	− [7 .025]	= [8 .975]	
9. Line 5 times line 4 (will be negative if line 2 is negative)	[5 .25]	× [4 40]	= [9 10]	
10. Line 1 minus line 9	[1 15]	− [9 10]	= [10 5]	
11. Line 10 times line 8	[10 5]	× [8 .975]	= [11 4.9]	= h
12. Line 5 times line 10	[5 .25]	× [10 5]	= [12 1.25]	
13. Line 4 divided by line 8	[4 40]	÷ [8 .975]	= [13 41]	
14. Line 13 plus line 12	[13 41]	+ [12 1.25]	= [14 42]	= R
15. Line 3 minus line 4	[3 60]	− [4 40]	= [15 20]	
16. Line 15 divided by line 8	[15 20]	÷ [8 .975]	= [16 20.5]	
17. Line 16 minus line 12	[16 20.5]	− [12 1.25]	= [17 19]	= D

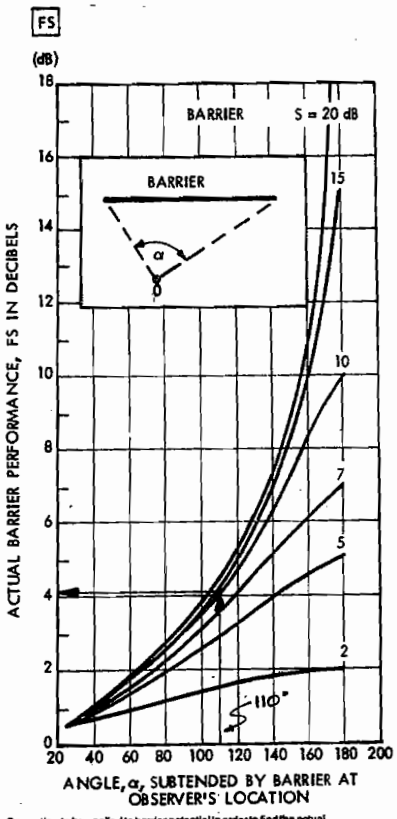
[Note: the value on line 2 may be negative, in which case so will the values on lines 5,9, and 12; line 1 may also be negative. Remember, then, in lines 10, 14, and 17, that adding a negative number is the same as subtracting: x + (-y) = x-y. And subtracting a negative number is like adding: X-(-y) = x+y.]

Round off R and D to nearest integer, h to one decimal place.

Workchart 6
Noise Barrier



Workchart 7



Correction to be applied to barrier potential in order to find the actual performance of the barrier of the same construction but of finite length.

29. The Noise Attenuation Provided by This Barrier Is Approximately 5 dB for Both the Engines and the Railroad Cars.

    This Is Not Sufficient.

    Note—You Were Supposed to Calculate Attenuation for Diesel Engines and Cars Separately Because the Source Heights Are Different. The Value of S for the Engines Should Have Been −10 and the Value of S for the Railroad Cars Should Have Been −25.

Workchart 5
Noise Barrier

To find R, D and h from Site Elevations and Distances

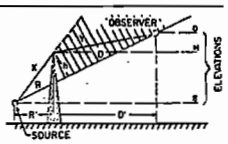
Fill out the following worksheet (all quantities are in feet):

Enter the values for:

H= 12 R'= 40

S= −10 D'= 85

O= 25

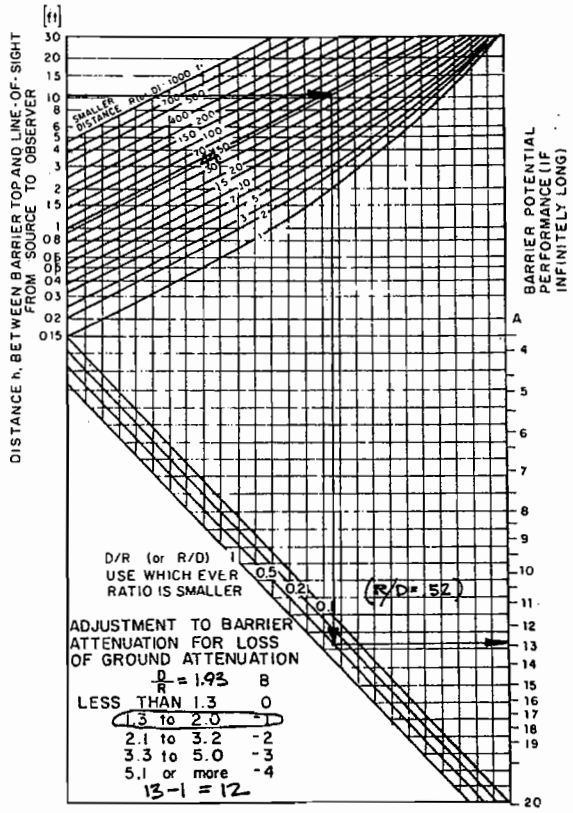


1. Elevation of barrier top minus elevation of source	[H 12] −	[S −10] =	[1 22]	
2. Elevation of observer minus elevation of source	[O 25] −	[S −10] =	[2 35]	
3. Map distance between source and observer (R' + D')			[3 125]	
4. Map distance between barrier and source (R')			[4 40]	
5. Line 2 divided by line 3	[2 35] ÷	[3 125] =	[5 .28]	
6. Square the quantity on line 5 (i.e., multiply it by itself); always positive	[5 .28] ×	[5 .28] =	[6 .08]	
7. 40% of line 6	[0.4] ×	[6 .08] =	[7 .03]	
8. One minus line 7	[1.0] −	[7 .03] =	[8 .97]	
9. Line 5 times line 4 (will be negative if line 2 is negative)	[5 .28] ×	[4 40] =	[9 11.2]	
10. Line 1 minus line 9	[1 22] −	[9 11.2] =	[10 10.8]	
11. Line 10 times line 8	[10 10.8] ×	[8 .97] =	[11 10.5]	= h
12. Line 5 times line 10	[5 .28] ×	[10 10.8] =	[12 3]	
13. Line 4 divided by line 8	[4 40] ÷	[8 .97] =	[13 41]	
14. Line 13 plus line 12	[13 41] +	[12 3] =	[14 44]	= R
15. Line 3 minus line 4	[3 125] −	[4 40] =	[15 85]	
16. Line 15 divided by line 8	[15 85] ÷	[8 .97] =	[16 88]	
17. Line 16 minus line 12	[16 88] −	[12 3] =	[17 85]	= D

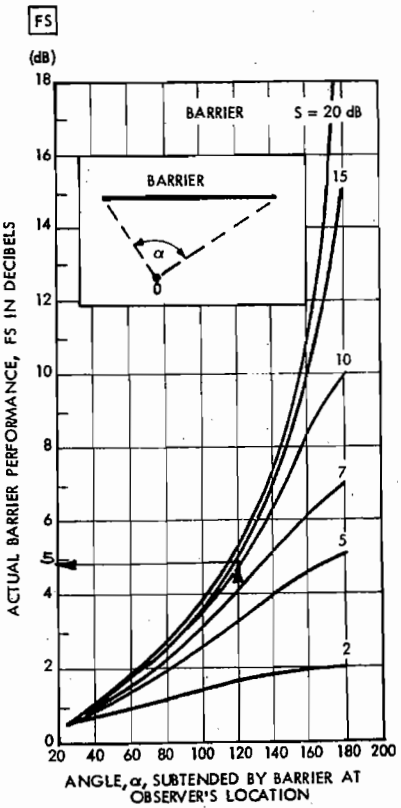
[Note: the value on line 2 may be negative, in which case so will the values on lines 5,9, and 12; line 1 may also be negative. Remember, then, in lines 10, 14, and 17, that adding a negative number is the same as subtracting: x+(-y)=x-y. And subtracting a negative number is like adding: X-(-y)=x+y.]

Round off R and D to nearest integer, h to one decimal place.

Workchart 6
Noise Barrier



Workchart 7



Correction to be applied to barrier potential in order to find the actual performance of the barrier of the same construction but of finite length.

Workchart 5
Noise Barrier

To find R, D and h from Site Elevations and Distances

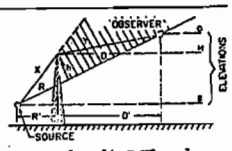
Fill out the following worksheet (all quantities are in feet):

Enter the values for:

H= 12 R'= 40

S= -25 D'= 85

O= 25

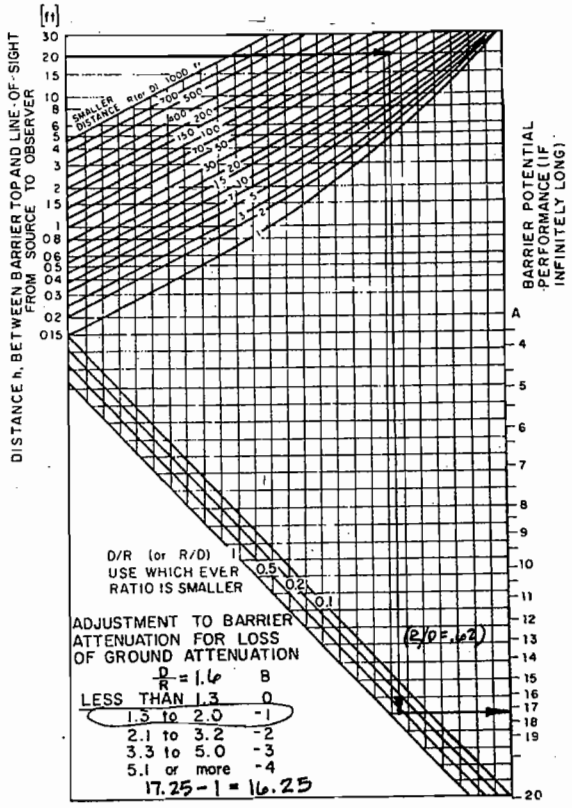


1. Elevation of barrier top minus elevation of source	[H 12]	− [S −25]	= [1 37]	
2. Elevation of observer minus elevation of source	[O 25]	− [S −25]	= [2 50]	
3. Map distance between source and observer (R' + D')			[3 125]	
4. Map distance between barrier and source (R')			[4 40]	
5. Line 2 divided by line 3	[2 50]	÷ [3 125]	= [5 .4]	
6. Square the quantity on line 5 (i.e., multiply it by itself): always positive	[5 .4]	× [5 .4]	= [6 .16]	
7. 40% of line 6	[0.4]	× [6 .16]	= [7 .06]	
8. One minus line 7	[1.0]	− [7 .06]	= [8 .94]	
9. Line 5 times line 4 (will be negative if line 2 is negative)	[5 .4]	× [4 40]	= [9 16]	
10. Line 1 minus line 9	[1 37]	− [9 16]	= [10 21]	
11. Line 10 times line 8	[10 21]	× [8 .94]	= [11 19.7]	= h
12. Line 5 times line 10	[5 .4]	× [10 21]	= [12 8.4]	
13. Line 4 divided by line 8	[4 40]	÷ [8 .94]	= [13 42.6]	
14. Line 13 plus line 12	[13 42.6]	+ [12 8.4]	= [14 51]	= R
15. Line 3 minus line 4	[3 125]	− [4 40]	= [15 85]	
16. Line 15 divided by line 6	[15 85]	÷ [8 .94]	= [16 90.4]	
17. Line 16 minus line 12	[16 90.4]	− [12 8.4]	= [17 82]	= D

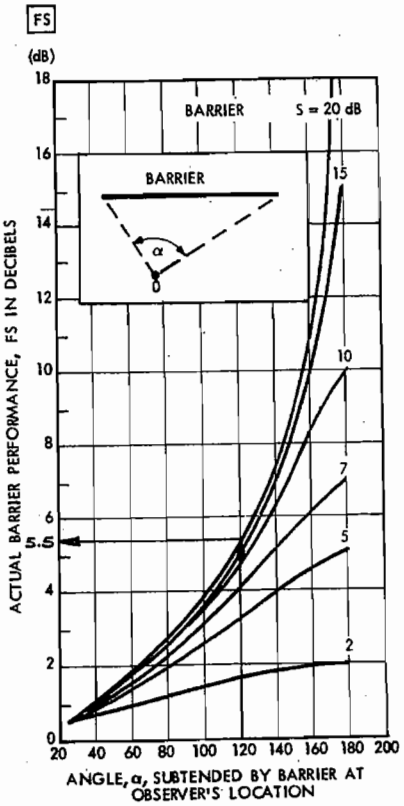
[Note: the value on line 2 may be negative, in which case so will the values on lines 5,9, and 12; line 1 may also be negative. Remember, then, in lines 10, 14, and 17, that adding a negative number is the same as subtracting: x + (-y) = x-y. And subtracting a negative number is like adding: X-(-y)=x+y.]

Round off R and D to nearest integer, h to one decimal place.

Workchart 6
Noise Barrier



Workchart 7



Correction to be applied to barrier potential in order to find the actual performance of the barrier of the same construction but of finite length.

30. The Noise Attenuation Provided by This Barrier Is 3 dB for Trucks and 5 dB for Autos. The Combined Level Resulting Is 69 LDN.

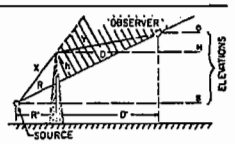
This Is Not Sufficient

Note—You Must Calculate the Barrier Effect Separately for Autos and Trucks Because the Source Height is Different. Then Recombine levels.

Workchart 5
Noise Barrier
To find R, D and h from Site Elevations and Distances

Enter the values for:
H= 16 R'= 36
S= 0 D'= 56
O= 25

Fill out the following worksheet (all quantities are in feet):

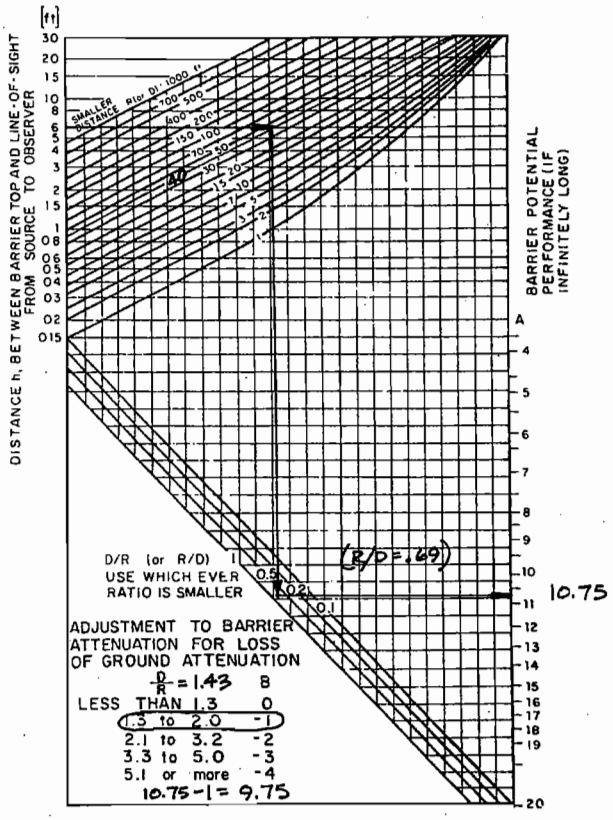


1. Elevation of barrier top minus elevation of source	[H 16	] − [S 0	] =	[1 16	]	
2. Elevation of observer minus elevation of source	[O 25	] − [S 0	] =	[2 25	]	
3. Map distance between source and observer (R' + D')				[3 92	]	
4. Map distance between barrier and source (R')				[4 36	]	
5. Line 2 divided by line 3	[2 25	] ÷ [3 92	] =	[5 .27	]	
6. Square the quantity on line 5 (i.e., multiply it by itself); always positive	[5 .27	] × [5 .27	] =	[6 .07	]	
7. 40% of line 6	[0.4	] × [6 .07	] =	[7 .03	]	
8. One minus line 7	[1.0	] − [7 .03	] =	[8 .97	]	
9. Line 5 times line 4 (will be negative if line 2 is negative)	[5 .27	] × [4 36	] =	[9 9.7	]	
10. Line 1 minus line 9	[1 16	] − [9 9.7	] =	[10 6.3	]	
11. Line 10 times line 8	[10 6.3	] × [8 .97	] =	[11 6.1	]	= h
12. Line 5 times line 10	[5 .27	] × [10 6.1	] =	[12 1.7	]	
13. Line 4 divided by line 8	[4 36	] ÷ [8 .97	] =	[13 37	]	
14. Line 13 plus line 12	[13 37	] + [12 1.7	] =	[14 39	]	= R
15. Line 3 minus line 4	[3 92	] − [4 36	] =	[15 56	]	
16. Line 15 divided by line 8	[15 56	] ÷ [8 .97	] =	[16 58	]	
17. Line 16 minus line 12	[16 58	] − [12 1.7	] =	[17 56	]	= D

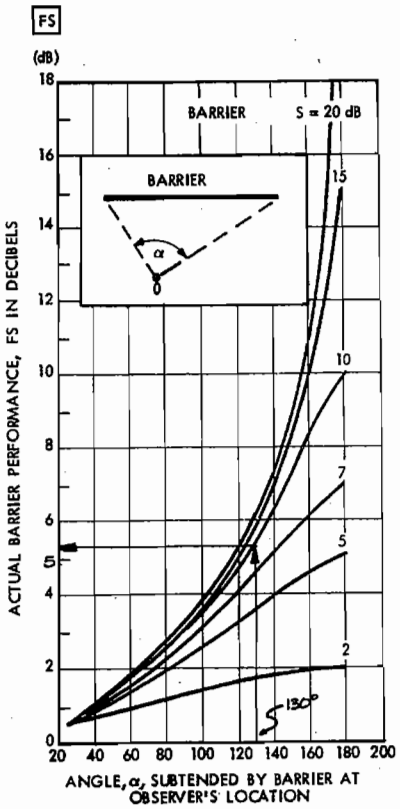
(Note: the value on line 2 may be negative, in which case so will the values on lines 5,9, and 12; line 1 may also be negative. Remember, then, in lines 10, 14, and 17, that adding a negative number is the same as subtracting: X-(-y)=x+y. And subtracting a negative number is like adding: X-(-y)=x+y.)

Round off R and D to nearest integer, h to one decimal place.

Workchart 6
Noise Barrier



Workchart 7



Correction to be applied to barrier potential in order to find the actual performance of the barrier of the same construction but of finite length.

Workchart 5
Noise Barrier

To find R, D and h from Site Elevations and Distances

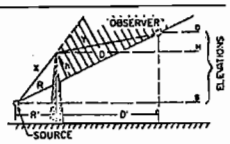
Fill out the following worksheet (all quantities are in feet):

Enter the values for:

H= 16 R= 36

S= 8 D'= 56

O= 25

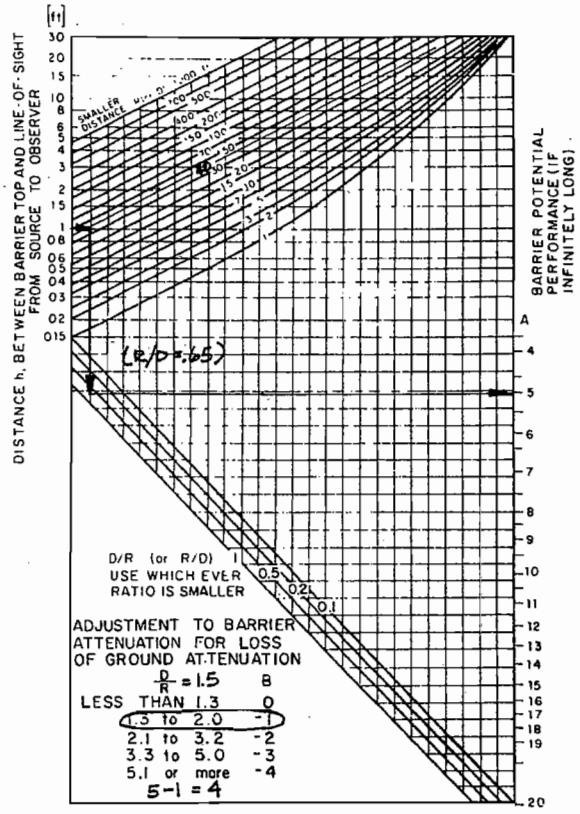


1. Elevation of barrier top minus elevation of source	[H 16]	− [S 8]	= [1 8]	
2. Elevation of observer minus elevation of source	[O 25]	− [S 8]	= [2 17]	
3. Map distance between source and observer (R' + D')			[3 92]	
4. Map distance between barrier and source (R')			[4 36]	
5. Line 2 divided by line 3	[2 17]	÷ [3 92]	= [5 .2]	
6. Square the quantity on line 5 (i.e., multiply it by itself); always positive	[5 .2]	× [5 .2]	= [6 .04]	
7. 40% of line 6	[0.4]	× [6 .04]	= [7 .02]	
8. One minus line 7	[1.0]	− [7 .02]	= [8 .98]	
9. Line 5 times line 4 (will be negative if line 2 is negative)	[5 .2]	× [4 36]	= [9 7]	
10. Line 1 minus line 9	[1 8]	− [9 7]	= [10 1]	
11. Line 10 times line 8	[10 1]	× [8 .98]	= [11 .98]	= h
12. Line 5 times line 10	[5 .2]	× [10 1]	= [12 .2]	
13. Line 4 divided by line 8	[4 36]	÷ [8 .98]	= [13 37]	
14. Line 13 plus line 12	[13 37]	+ [12 .2]	= [14 37]	= R
15. Line 3 minus line 4	[3 92]	− [4 36]	= [15 56]	
16. Line 15 divided by line 8	[15 56]	÷ [8 .98]	= [16 57]	
17. Line 16 minus line 12	[16 57]	− [12 .2]	= [17 57]	= D

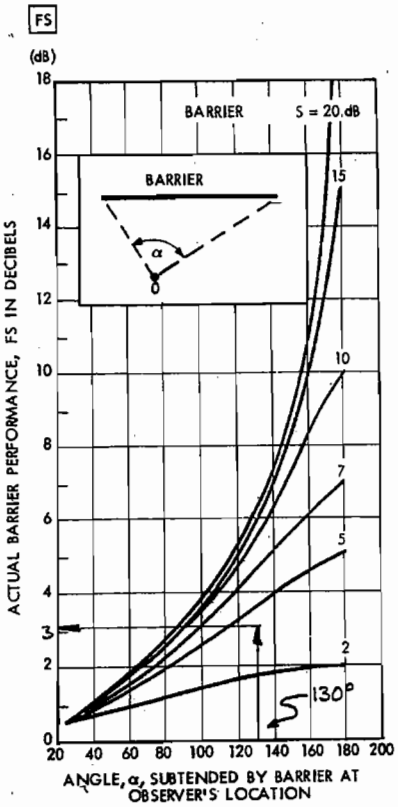
[Note: the value on line 2 may be negative, in which case so will the values on lines 5,9, and 12; line 1 may also be negative. Remember, then, in lines 10, 14, and 17, that adding a negative number is the same as subtracting: x + (-y) = x-y. And subtracting a negative number is like adding: X-(-y) = x+y.]

Round off R and D to nearest integer, h to one decimal place.

Workchart 6
Noise Barrier



Workchart 7



Correction to be applied to barrier potential in order to find the actual performance of the barrier of the same construction but of finite length.

Chapter 7

The Use of Noise Measurements

Noise Calculations Are Best For HUD Use

There are two ways to determine noise levels for a site under review: the noise can be calculated or it can be measured. While one's first reaction might well be that it would obviously be better to go out and actually measure the noise levels at the site, calculated noise levels are really much better for implementing HUD's noise policy.

Calculated noise levels are developed using mathematical models that contain a variety of assumptions about the process of noise propagation as well as data on sound levels generated by typical sources (i.e. aircraft engines, automobile tires etc.). The model can be a complex computer model or it can be a simple desktop model such as the procedures in the *Noise Assessment Guidelines*. The models can also employ a variety of noise descriptors. (See chapter 1 for a discussion of noise descriptors.) Most noise studies done for the Federal Highway Administration, for example, use either the L_{10} or the L_{eq} noise descriptor. Many aircraft noise studies use the NEF or CNEL descriptor. All of these descriptors are compatible with the L_{dn} noise descriptor system that is preferred by HUD and the HUD noise regulation contains instructions for converting all of them into L_{dn}. (sections 51.106(a)(1) and (2))

Whether produced by a sophisticated computer model or by the desktop *Noise Assessment Guidelines*, calculated noise levels are more useful for HUD needs than measured levels for two significant reasons: The first is that with noise measurements you have no good way to take into account future changes in the future noise environment. The houses we help build today are going to be around for a long time and it is very important that we determine, to the extent we can, the noise environment that will exist throughout the life of the buildings. While there are clearly limitations on how far into the future we can reasonably project traffic levels for roads, railroads and airports, we can at least look 5 to 10 years ahead. The HUD noise regulation (24 CFR 51B) requires that "to the extent possible, noise exposure shall be projected to be representative of conditions that are expected to exist at a time at least 10 years beyond the date of the project or action under review." It is very easy to make these projections if you use the *Noise Assessment Guidelines* or a computer model to determine noise levels.

The second reason why we prefer that you calculate noise levels is that through the calculation process you can use monthly or yearly data to determine traffic levels. Thus you come up with a more typical picture of conditions. With noise measurements there is always the possibility that the day or even days chosen for measurements will not be typical and that the measurements may over or understate the problem. While the conscientious measurer will try to account for any unusual conditions, it isn't always possible. So long as cost considerations limit the number of days that measurements can be taken there will always be the problem of unrepresentative data. With calculations this isn't a problem. The computer model that generates contours for airports, for example, uses an entire years data to develop the average day. Certainly the results are more likely to be representative than the results that would be derived from just a few days measurements.

When Noise Measurements Are Useful

While it is the preferred procedure to calculate noise levels, there are a few situations where the noise models might not be accurate and it might be better to rely on measurements. One instance would be when there is insufficient or inadequate traffic data. Another case might be where you have a unique physical situation that is not accounted for in whatever mathematical model is available.

Obtaining good traffic data can be difficult. You may only be able to get gross data that simply lists total vehicles without making any distinctions between trucks and automobiles. Or you may not be able to get any reliable data on the percentage of traffic between 10 pm and 7 am. While the *Noise Assessment Guidelines* do contain some assumptions that you can use when you don't have all the data you need, there may be instances when you just don't think those assumptions would accurately portray the problem.

By the same token, there are certain physical situations that mathematical models such as the *Noise Assessment Guidelines* couldn't anticipate and therefore do not reflect in their formulas. For example, the *Guidelines* say that you don't have to calculate the noise levels for underground transit lines. Well what if the line is underground but there are large air vents that reach from the belowground tunnels to the surface? A great deal of noise can reach the surface through these vents but the *Noise Assessment Guidelines* don't have any way to take it into account. You couldn't treat it as if the subway line were aboveground because it isn't really and at least some of the noise is blocked. This would be a case where a noise measurement would probably be the best way to determine the noise levels. By the same token, the guidelines do not really take into account the sometimes significant amounts of reflected noise that can occur at urban sites surrounded by tall buildings, i.e. the canyon effect.

When Not to Use Measurements

One thing noise measurements should not be used for is to confirm or refute calculated noise levels, especially computer generated aircraft contours. Our experience with both the *Noise Assessment Guidelines* and with computer noise models is that both are quite accurate if done properly. If you are convinced that the calculations were done correctly, and if you believe that the data used were good, you should strongly discourage anyone who wants to take measurements because they think that measurements are inherently more accurate than calculations. Comparing measured noise levels to calculated levels is like comparing apples and oranges. The

calculated noise levels should include projected traffic levels, the measured ones will not. The calculated levels will be based on daily traffic counts derived by averaging months of data, the measured levels will, at best, reflect just a few days. (This is particularly true for aircraft noise contours. The day-to-day operations of an airport can vary significantly depending upon weather conditions and any one or two days worth of measurements are very likely to show different levels from those generated by a computer model employing a year of data to derive an average day.)

If you have determined that noise measurements are appropriate, you must make sure that they are done properly, otherwise the data will be useless. There are four elements to proper measurements: 1) where the measurements are taken; 2) when they are taken; 3) the type of equipment used; and 4) the actual measurement procedure.

Where measurements should be taken: The locations for noise measurements should be selected using the same criteria you would use to select a Noise Assessment Location for a *Noise Assessment Guidelines* calculation. The *Noise Assessment Guidelines* recommend that "assessments of the noise exposure should be made at representative locations around the site where significant noise is expected." Further, the *Guidelines* state that when selecting these locations you should consider those buildings containing noise sensitive uses which are closest to the predominant noise sources. Where quiet outdoor space is desired at a site, you should also select points in the outdoor area in question. Specifically, the "relevant measurement location for buildings is a point 2 meters (6.5 feet) from the facade." If there are no buildings yet the measurement point should be 2 meters from the closest point setback requirements would allow a building facade.

When measurements should be taken: Because measurements are only going to be taken for a few days at best, special care should be taken to make sure that the days selected are representative of average traffic levels. For highways, avoid both Monday and Friday, particularly before or after a holiday. In fact holiday periods, such as the Christmas/New Years season, should be avoided entirely. Highway traffic, or rather more importantly, truck traffic is likely to be down during these periods and noise levels may be significantly lower than normal. On the other hand, holiday periods are often peak travel periods for airlines and measurements taken around airports then would show unusually high noise levels.

Whoever is taking the measurements should also check to make sure that there aren't any special circumstances that might affect traffic levels. For example road construction or repair work might divert additonal traffic onto the road being measured, or divert traffic away. In both cases the noise levels measured would not be representative.

And finally, noise measurements should not be taken during extreme weather conditions both because of the possible effects on traffic levels but also because the weather conditions can exaggerate the actual noise levels.

Ideally, noise measurements should be taken over several days spread over at least a few months. But given that time and money will normally preclude this, at least make sure the one or two days you can get are as close to typical as possible.

What equipment to use: There are many sound level meters on the market which are suitable for taking noise measurements for transportation sources. They need only to meet the requirements of American National Standard Specification for Type 1 Sound Level Meters: S1.4-1971. Type 1 sound level meters are "precision" meters and provide the most accurate measurements. They are also, of course, the most expensive. Fast time-averaging and A frequency weighting are to be used. The sound level meter with the A-weighting is progressively less sensitive to sound with frequencies below 1,000 hertz, somewhat as is the ear. With fast time averaging the sound level meter responds particularly to recent sounds almost as quickly as does the ear in judging the loudness of a sound. Fast time averaging has a time constant of about 1/8 second.

While a sound level measuring system that averages decibel readouts on a short term basis such as for every minute or every hour is acceptable, it would be far better if a system that actually provides a 24 hour integrated L_{dn} readout were used. Such a system eliminates the need for calculating the L_{dn} value, an area where many inexperienced consultants go astray. These systems are more expensive however, and the consultant who doesn't do much noise work is unlikely to have one.

Measurement procedures: Detailed procedures for making sound level measurements are spelled out in the American National Standards Institute's Standard Methods ANSI S1.2-1962(R1976) *American National Standard Method for the Physical Measurement of Sound* and ANSI S1.13-1971(R1976) *American National Standard Methods for the Measurement of Sound Pressure Levels.*

Some of the basic procedures that should be followed are:

1. Measurements should normally be made over a continuous 24 hour period. If this is not possible, measurements may be made over a period of days but still must cover the entire 24 hour period. The selection of the days becomes even more critical so that they are as similar as possible. Sampling is not acceptable.
2. The sound level meter must be calibrated before each use.
3. The sound level meter should be provided with a wind screen.
4. Care should be taken to insure that there are no temporary obstructions, such as parked trucks, between the meter and the source.

The Noise Study

The noise study prepared to describe the measurement results should contain at least the following:

1. A map showing where the measurements were taken
2. A vicinity map showing the site and the major noise sources
3. A chart indicating the date, the time, and weather conditions when measurements were taken at each measurement location
4. The type of microphone used
5. Any variations from ANSI procedures
6. The results of the measurements in L_{dn} for each measurement location
7. Any unusual conditions that existed during the measurement period—i.e. construction activity, major traffic tieup, etc.
8. If an integrating sound level meter was not used, the calculations used to derive the L_{dn} value.

U.S. Department of Housing and Urban Development
Washington, D.C. 20410

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HUD - 401

March 1985
HUD-953-CPD

Noise and Its Effects

By Dr. Alice H. Suter, Conference Consultant, Administrative Conference of the United States, November 1991

This report was prepared for the consideration of the Administrative Conference of the United States. The views expressed are those of the author and do not necessarily reflect those of the members of the Conference or its committees except where formal recommendations of the Conference are cited.

Table of Contents

I. Introduction

This report presents an overview of noise and its effects on people. Special emphasis is placed on developments over the past decade, both in terms of noise conditions and noise effects research. By doing so, this report should illustrate some of the reasons for concern about noise problems, which persist after the closing of EPA's Office of Noise Abatement and Control (ONAC).

Noise has a significant impact on the quality of life, and in that sense, it is a health problem in accordance with the World Health Organization's (WHO) definition of health. WHO's definition of health includes total physical and mental well-being, as well as the absence of disease. Along these lines, a 1971 WHO working group stated: "Noise must be recognized as a major threat to human well-being." (Suess, 1973)

The effects of noise are seldom catastrophic, and are often only transitory, but adverse effects can be cumulative with prolonged or repeated exposure. Although it often causes discomfort and sometimes pain, noise does not cause ears to bleed and noise-induced hearing loss usually takes years to

develop. Noise-induced hearing loss can indeed impair the quality of life, through a reduction in the ability to hear important sounds and to communicate with family and friends. Some of the other effects of noise, such as sleep disruption, the masking of speech and television, and the inability to enjoy one's property or leisure time also impair the quality of life. In addition, noise can interfere with the teaching and learning process, disrupt the performance of certain tasks, and increase the incidence of antisocial behavior. There is also some evidence that it can adversely affect general health and well-being in the same manner as chronic stress. These effects will be discussed in more detail in the paragraphs below.

II. ONAC'S Activities in Noise Effects Research and Criteria

In response to the mandates of Section 5 of the Noise Control Act of 1972, ONAC published Public Health and welfare Criteria for Noise (EPA, 1973a) and Information on Levels of Environmental Noise Requisite to Protect Public Health and welfare with an Adequate Margin of Safety (EPA, 1974a), popularly known as the "Levels Document" for obvious reasons). Also in 1973,ONAC sponsored an international conference in Yugoslavia on the effects of noise, from which voluminous proceedings there published (EPA, 1973b). All of these documents there widely distributed and, although somewhat dated, are still read and referenced today. Because a considerable amount of research in this area has been conducted over the past 2 decades, these documents would benefit from revision.

In these documents ONAC established dose-response relationships for noise and its effects, and identified safe levels of noise to prevent hearing loss and activity interference. The agency also established the day-night average noise level as a universal descriptor to be used in assessing the impact of community noise.

Section 14 of the Act directs ONAC to conduct or finance research on noise effects, including investigations of the psychological and physiological effects of noise on humans and the effects of noise on animals. Approximately 35 technical reports resulted from these efforts, as well as contractor reports and numerous articles in scientific journals.

Some of the more noteworthy examples of EPA's research program there:

- Projects involving the cardiovascular effects of noise at the University of Miami, Johns Hopkins University and the Massachusetts Institute of Technology (Peterson, et al., 1978, 1981, 1983; Hattis and Richardson,1980; Turkkan et al, 1983).
- A longitudinal study of noise exposure and hearing threshold levels in children conducted by the Fels Institute (Roche et al., 1977).
- An interagency agreement with the U.S. Air Force to study the effects of noise on hearing (e.g., Guignard, 1973; Johnson, 1973; Schori and McGatha, 1978; Suter, 1978).
- A study identifying the sound levels of speech communication in various environments (Pearsons, et al., 1977).
- Two studies at Northeastern University comparing methods for predicting the loudness and acceptability of noise (Scharf et al., 1977; Scharf and Hellman, 1979).

Although much useful information was derived from these programs, some of them there irreparably damaged by the abrupt termination of funding from ONAC that occurred in 1981 and 1982. For one example, the Johns Hopkins study of cardiovascular effects of noise on primates was terminated after testing on only one subject had been completed. For another, the longitudinal data from the Fels Institute is now of little value after a hiatus of more than a decade.

III. Physical Properties and Measurement of Sound

A. Physical Properties

Noise is often defined as unwanted sound. To gain a satisfactory understanding of the effects of noise, it would be useful to look briefly at the physical properties of sound.

Sound is the result of pressure changes in a medium (usually air), caused by vibration or turbulence. The amplitude of these pressure changes is stated in terms of sound level, and the rapidity with which these changes occur is the sound's frequency. Sound level is measured in decibels (abbreviated dB), and sound frequency is stated in terms of cycles per second, or nowadays, Hertz (abbreviated Hz). Sound level in decibels is a logarithmic rather than a linear measure of the change in pressure with respect to a reference pressure level. A small increase in decibels can represent a large increase in sound energy. Technically, an increase of 3 dB represents a doubling of sound energy, and an increase of 10 dB represents a tenfold increase. The ear, however, perceives a 10-dB increase as doubling of loudness.

Another important aspect is the duration of the sound, and the way it is distributed in time. Continuous sounds have little or no variation in time, varying sounds have differing maximum levels over a period of time, intermittent sounds are interspersed with quiet periods, and impulsive sounds are characterized by relatively high sound levels and very short durations.

The effects of noise are determined mainly by the duration and level of the noise, but they are also influenced by the frequency. Long-lasting, high-level sounds are the most damaging to hearing and generally the most annoying. High-frequency sounds tend to be more hazardous to hearing and more annoying than low-frequency sounds. The way sounds are distributed in time is also important, in that intermittent sounds appear to be somewhat less damaging to hearing than continuous sounds because of the ear's ability to regenerate during the intervening quiet periods. However, intermittent and impulsive sounds tend to be more annoying because of their unpredictability.

B. Instrumentation

The instrument for measuring noise is the basic sound level meter or a number of its derivatives, including noise dose meters (usually called dosimeters), integrating sound level meters, graphic level recorders, and community noise analyzers. Improvements in all of these instruments have taken place during the last decade. This is especially true of the computerized dosimeters and integrating meters, which can measure, compute, store, and display comprehensive data on the noise field (Earshen, 1986). These instruments are now able to measure over very wide dynamic ranges and to measure impulsive sounds with a high degree of accuracy.

C. Measurement and Descriptors

Most sound level meters and dosimeters use built-in frequency filters or "weighting networks " in the measurement process. By far the most frequently used filter is the A weighting network, which discriminates against low-frequency and very high-frequency sounds. A weighting approximates the equal-loudness response of the ear at moderate sound levels, and correlates well with both hearing damage and annoyance from noise. A weighting will be assumed throughout this report unless otherwise specified.

Composite measures of noise, such as the equivalent continuous sound level (Leq) and the day-night average sound level (DNL) incorporate A weighting, (The mathematical notation for DNL is Ldn.) these levels constitute sound energy averages over given periods of time, the DNL incorporates a 10-dB nighttime penalty from 10:00 pm to 7:00 am, meaning that events occurring during

that time are counted as 10 dB higher than they really are. A variant of the DNL that is used in California (and Europe) is the community noise equivalent level (CNEL), which incorporates a 5-dB penalty for evening noise events, as well as the 10-dB nighttime penalty (California Code of Regulations, 1990).

For more than a decade, both the DNL and the simple Leq have been used extensively for assessing the impact of aircraft/airport noise. Recently, however, communities have expressed dissatisfaction with these metrics when used to regulate noise (Wesler, 1990). Metrics that employ averaging fail to describe the disturbance arising from single events, especially low-flying aircraft, unexpected or newly occurring flights, or flights occurring in areas where solitude is at a premium. The sound exposure level (SEL), an event's sound level normalized to one second, is gaining popularity as a supplement to the DNL and the Leq for characterizing single events.

IV. Noise in America

A. Population Trends

The U.S. population has increased an average of 25 million with each census since 1950. According to the World Almanac (1991), the population in 1980 was 226 million and approximately 250 million in 1990. This reflects an increase of nearly 11 percent over the decade, or slightly more than 1 percent per year. Presently, 77 percent of the U.S. population lives in the nation's 283 designated metropolitan areas, and the rate of growth in these areas is twice that of nonmetropolitan areas (Bryant, 1991).

Not surprisingly, EPA research indicates that noise levels in communities is directly related to the population density (EPA, 1974b).[1] Because the noise in urban areas generally exceeds that of suburban and rural areas, it is not unreasonable to assume that noise in the U.S. is increasing at least in proportion to the increase in urbanization and more rapidly than the growth of the general population. In addition, noise sources appear to be multiplying at a faster pace than the population.

B. Noise Sources

Figure 1, from EPA's simplified version of the Levels Document, Protective Noise Levels, shows the range of sound levels for some common noise sources (EPA, 1978). Most leading noise sources will fall into the following categories: road traffic, aircraft, railroads, construction, industry, noise in buildings, and consumer products.

1. Road traffic noise

In its Levels Document (1974), EPA estimated that road traffic noise was the leading source of community noise. EPA's contractors found that to be true in 1981 (EPA, 1981), and there is little reason to believe otherwise today.

Truck transportation, as a convenient and economical means of moving raw materials and consumer goods from place to place, is growing at a faster pace than the general population. For example, a total[2] of 33.6 million trucks there registered in the U.S. in 1980. That number grew to 45.5 million in 1989, an increase of about 35 percent (American Trucking Assoc., 1991).

---

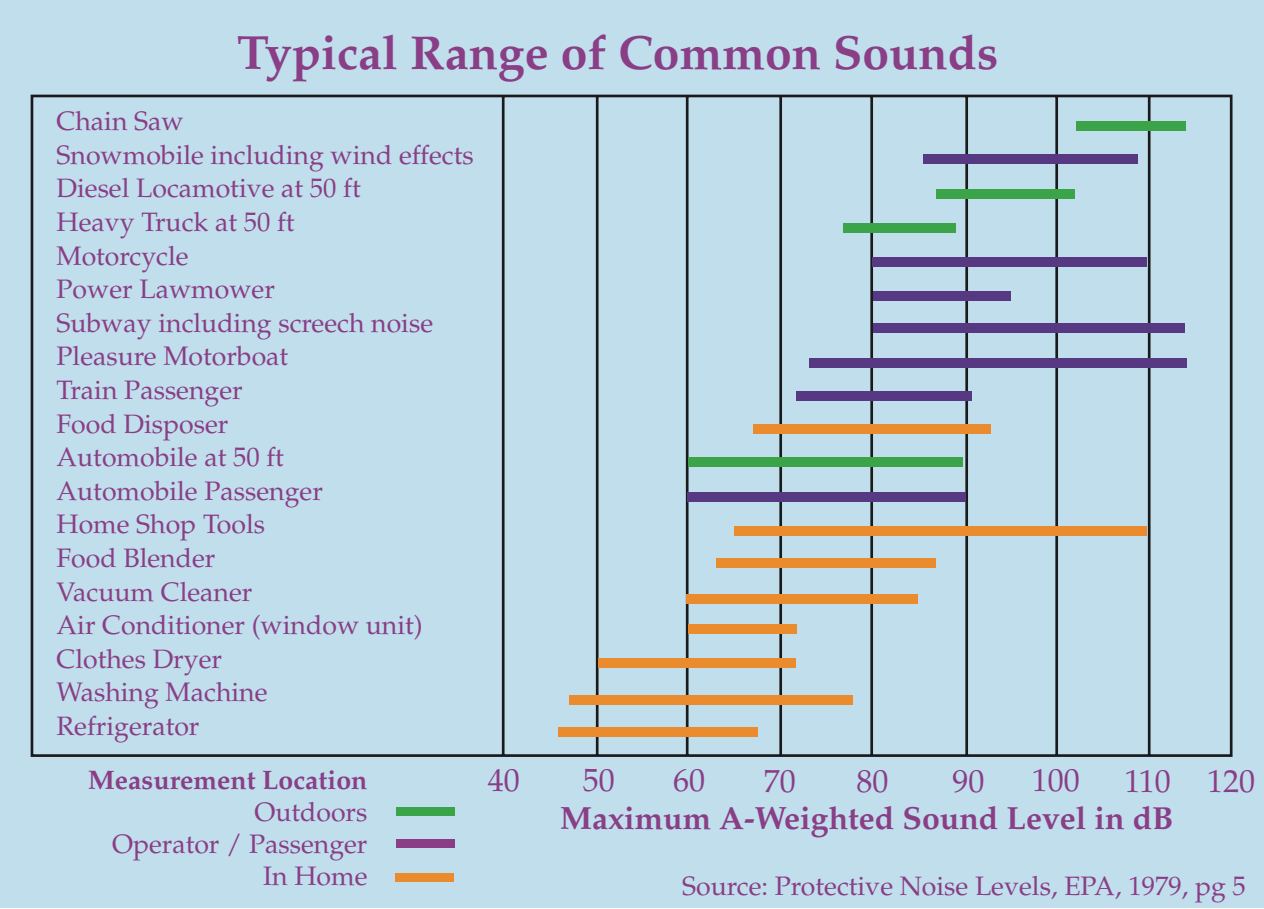
[1] The day-night average sound level appears to be proportional to the log of population density in people per square mile (EPA.1974b).

[2] The total number of trucks registered includes personal-use as well as commercial trucks of all weight classes.

Noise from the motors and exhaust systems of large trucks provides the major portion of highway noise impact, and provides a potential noise hazard to the driver as well.[3] In addition, noise from the interaction of tires with the roadway is generated by trucks, buses, and private autos.

In the city, the main sources of traffic noise are the motors and exhaust systems of autos, smaller trucks, buses, and motorcycles. This type of noise can be augmented by narrow streets and tall buildings, which produce a "canyon" in which traffic noise reverberates.

Typical Range of Common Sounds



2. Aircraft noise

Air traffic also appears to be increasing more rapidly than the U.S. population. In 1980, U.S. scheduled airlines flew approximately 255.2 billion passenger miles and 5.7 billion cargo (ton) miles. By 1990, these figures there 457.9 billion and 10.6 billion, respectively (Air Transport Assoc., 1991a). This represents an increase of 79 percent in passenger mileage, and 86 percent in air height mileage. Air cargo traffic has grown particularly rapidly in the last five years, and will probably continue that trend over the next decade.

By 1989, the quieter "Stage III" airplanes comprised nearly 40 percent of the domestic fleet (Air Transport Assoc, 1991b). By the year 2004, all of the noisier Stage II aircraft must be phased out

---

[3] According to Reinhart (1991) the most common complaint about truck noise is related to problems caused by tampering with the mufflers of trucks using compression brakes. About 5 percent of the heavy trucks surveyed by Reinhart and his colleagues had no functioning muffler, despite the existence of antitampering laws.

(Airport Noise and Capacity Act, 1990). This requirement should promote a quieter environment around airports, but the growth of air transportation and the pressing need for airport expansion threatens to offset the benefits of the quieter aircraft.

Nowadays, the problem of low-flying military aircraft has added a new dimension to community annoyance, as the nation seeks to improve its "nap-of-the-earth" warfare capabilities. In addition, the issue of aircraft operations over national parks, wilderness areas, and other areas previously unaffected by aircraft noise has claimed national attention over recent years (Fidell, 1990; Cantoni, 1991; Weiner, 1990; Mouat, 1990).

3. Noise from railroads

The noise from locomotive engines, horns and whistles, and switching and shunting operations in rail yards can impact neighboring communities and railroad workers. For example, rail car retarders can produce a high-frequency, high-level screech that can reach peak levels of 120 dB at a distance of 100 feet (EPA, 1974), which translates to levels as high as 138 or 140 dB at the railroad worker's ear.

Unlike truck and air transportation, however, rail transportation does not appear to be increasing. According to the Association of American Railroads, the railroad industry loaded 22.1 million freight cars in 1988, down slightly from 22.6 million in 1980 (AAR, 1991).

4. Construction noise

The noise from construction of highways, city streets, and buildings is a major contributor to the urban scene. Construction noise sources include pneumatic hammers, air compressors, bull dozers, loaders, dump trucks (and their back-up signals), and pavement breakers. The construction industry has done very well over recent years with a value-added GNP of $97.9 billion in 1977, increasing to $247.7 billion in 1989 (Dept. of Commerce, 1991), an increase of about 153 percent. The number of workers employed in construction grew from 4.3 million in 1980 to about 5.2 million in 1990, an increase of nearly 21 percent (BLS, 1991a).

5. Noise in industry

Although industrial noise is one of the less prevalent community noise problems, neighbors of noisy manufacturing plants can be disturbed by sources such as fans, motors, and compressors mounted on the outside of buildings. Interior noise can also be transmitted to the community through open windows and doors, and even through building walls. These interior noise sources have significant impacts on industrial workers, among whom noise-induced hearing loss is unfortunately common.

The size of the U.S. manufacturing industry has not grown significantly over the last decade. Although the industrial. GNP increased from $673.9 billion in 1980 to $969.6 billion in 1990 (in terms of constant dollars) (BLS, 1991b), the workforce has declined from slightly more than 20 million to about 19 million during that period (BLS, 1991c). Consequently, industrially-generated community noise is probably no greater than it was in 1980.

From the worker's perspective the industrial noise problem is still very serious. The Occupational Safety and Health Administration has cut back on the enforcement of occupational noise standards and has allowed the substitution of hearing protection devices in lieu of engineering controls in many cases (OSHA, 1986). However, it is difficult to know whether noise levels in industry are increasing or decreasing because no comprehensive survey has been performed since the 1976 survey performed by Bolt Beranek and Newman Inc. (BBN, 1976).

6. Noise in buildings

Apartment dwellers are often annoyed by noise in their homes, especially when the building is not well designed and constructed. In this case, internal building noise from plumbing, boilers, generators, air conditioners, and fans, can be audible and annoying. Improperly insulated walls and ceilings can reveal the sound of amplified music, voices, footfalls, and noisy activities from neighboring units. External noise from emergency vehicles, traffic, refuse collection, and other city noises can be a problem for urban residents, especially when windows are open or insufficiently glazed.

Wetherill (1987) reports that although the lack of soundproofing is the most frequent environmental complaint of apartment dwellers, the knowledge to solve these problems is not being applied. In fact, the quality of construction is steadily declining, and the noise problems are getting worse (Wetherill, 1991).

7. Noise from consumer products

Certain household equipment, such as vacuum cleaners and some kitchen appliances, have been and continue to be noisemakers, although their contribution to the daily noise dose is usually not very large. Added to this list would be yard maintenance equipment, such as lawn mowers and snow blowers, which can, at least, cause disharmony with one's neighbors, and pother shop tools, which can be hazardous to hearing if used for sufficient periods of time.

One example of a fairly new product is the gasoline-pothered leaf blower, with average A-weighted sound levels at the operator's position of 103.6 dB, and maximum levels of 110-l12 dB (Clark, 1991). In an extensive review of nonoccupational noise exposures, Davis et al. (1985) report that the manufacturers of household devices have been reluctant to release sound level information. Consequently, it could be difficult to assess the magnitude of the problem and the extent to which noise levels are increasing or decreasing.

Residents of suburban and rural areas are sometimes disturbed by recreational noise sources, such as off-road vehicles, high-pothered motor boats, and snowmobiles. Some of these sources, such as snowmobiles, are not as noisy as they there more than a decade ago, due to attention to the problem by the manufacturers and their trade associations. Others are no less noisy, and possibly more so because noise seems to be generic to the sport. Example would be motorcycle and car racing, and events like "tractor pulls."

In fact, the allure of noisy recreational activities seems to be considerably greater now than it was a decade or so ago. The technology of sound reproduction has advancer to the point where loudspeakers can faithfully reproduce music and other sounds at levels well above 120 dB. Sporting events use giant digital "applause meters" to measure and display enthusiasm for the more popular team. The extreme in car stereo technology is now the "boom car", with sound levels exceeding 140 dB.[4] Activities like aerobic exercising and ice skating, as well as disco dancing, are accompanied by amplified music played at high sound levels. After summarizing the results of 16 studies of discotheques and rock concerts Clark (1991) reported the geometric mean of the measured sound levels as 103.4 dB. The trend in noise levels for these kinds of activities is definitely upward.

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[4] The International Auto Sound Challenge Association sponsors contests and gives the most points to contestants whom speakers produce the highest sound pressure levels, up to 140 dB. However, levels above that merit no more than 140 points.

One of the most serious sources of recreational noise is sport shooting, where peak sound pressure levels at the ear can range from about 144 dB up to more than 170 dB[5] (Odess, 1972). In his analysis of this literature, Clark (1991) cites estimates of the number of people responding positively to questions about hunting or target shooting. These estimates range from 14 percent of the general population in Scandinavia and the U.K. (Axelsson et al., 1981; Davis et al., 1985) to nearly 50 percent in the Canadian workforce (Chung et al., 1981), which Clark found to be consistent with estimates from U.S. industry. In a population of rural schoolchildren, 45 out of 47 boys and 2 out of 21 girls reported having used guns (Kramer and Wood, 1982).

A subcategory of consumer product noise that deserves mention is noisy toys. A few toys, such as firecrackers, snappers, and cap pistols have been part of the adventurous child's experience for generations. The general assumption is that these toys do not pose a hazard when used occasionally and located at a sufficient distance from the ear[6]. Nowadays, there is a large variety of noisy toys, thanks to the availability of improved technology. Many of them mimic adult noisemakers, such as amplified toy guitars, child-shed vacuum cleaners, and miniature pother saws. Some of these toys generate quite high levels of sound. For example, a baby's squeeze toy (Fay, 1991) and the battery operated siren of a toy police car have both been measured at 110 dB[7].

In a recent report on noisy toys, Leroux and Laroche (1991) cite studies showing A-weighted noise levels for a toy motor at 107 dB and a child's rattle at 99-100 dB (LNE, 1973). Current Canadian legislation limits the sound output of toys to "one hundred decibels measured at the distance that the product ordinarily would be from the ear of the child using it..." (Act, 1969), but Leroux and Laroche propose that this limit be lowered to an A-weighted level of 75 dB.

C. Numbers of People Exposed to Noise

The fact that people are variously exposed to noise is not surprising. Considering that decibels are measured on a logarithmic scale, however, the magnitude of these variations can be enormous. For example, the average noise level outside an urban apartment can be 1,000 times more intense than in a rural residential neighborhood. Fortunately, this difference will be perceived more like an eightfold rather than a thousand-fold increase. Figure 2, from EPA's document Protective Noise Levels, shows examples of outdoor day-night average sound levels measured at various locations (EPA, 1978).

In 1974, EPA estimated that nearly 100 million Americans lived in areas where the daily average noise levels exceeded its identified safe DNL of 55 dB (EPA, 1974a). Figure 3, from EPA's Levels

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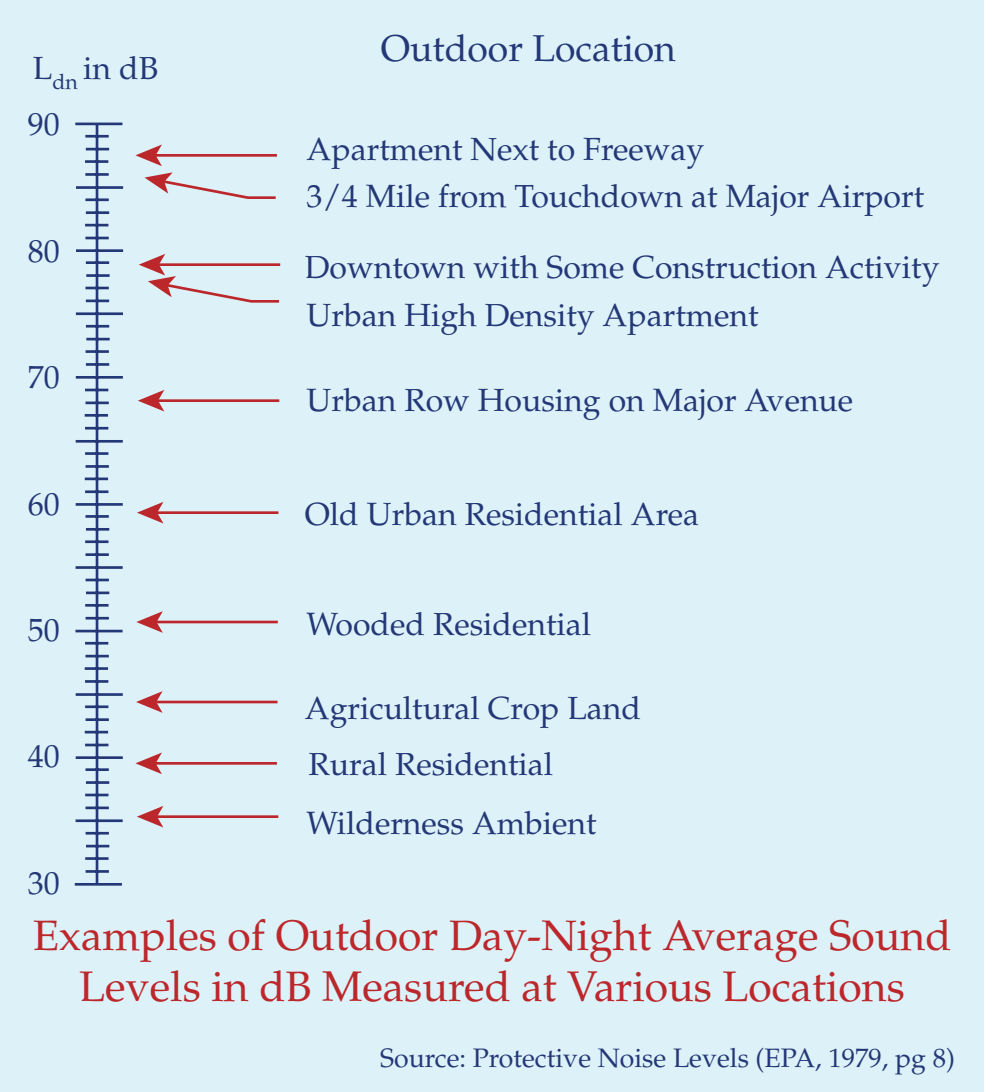
[5] A-weighted level. of these weapons would measure somewhat lower, with levels for .22 caliber rifles at about 132-139 dB and shotguns at 150-165 dB. (See Clark, 1991)

[6] Certain European studies, however, have reported as many as 1 percent to 3.7 percent of teenage children suffer hearing losses caused by impulsive noise from toys (Gjaevenes, 1967; Moe, 1966). Noise from cap guns, for example, can exceed peak sound pressure levels of 140 dB (Gjaevenes, 1966; Hodge and McCommons, 1966; Marshall and Brandt, 1973; all as cited by Leroux and Laroche,
1991).

[7] New York audiologist Thomas Fay has measured the noise levels of a variety of children's toys. In doing so he places the sound level meter's microphone quite close to the noise source (from 2 inches to 1/2 inch away), based on his observations of the children at play. (Personal communication, April 1991).

Document, shows the residential noise environment of the U.S. population as a function of the exterior DNL, with separate curves for the freeway and aircraft increments.

Examples of Outdoor Day-Night Average Sound Levels in dB Measured at Various Locations



A few years later EPA contracted with the consulting firm Bolt Beranek and Newman (BBN) to develop more detailed estimates. The resulting report, Noise in America, includes a breakdown according to noise exposure source (EPA, 1981). Table I gives the estimated number of Americans exposed to traffic; aircraft, construction, rail, and industrial noise for various DNLs from 55 dB to 80 dB. The authors note that there will be some overlap among populations exposed to different sources, so the numbers across categories are not additive. The far right column represents the total estimated number of people exposed to the combined sources. Although the authors do not give an estimate for the number of people exposed above Ldn 55 dB, another authority puts it at 138 million at that time (Eldred, 1990).

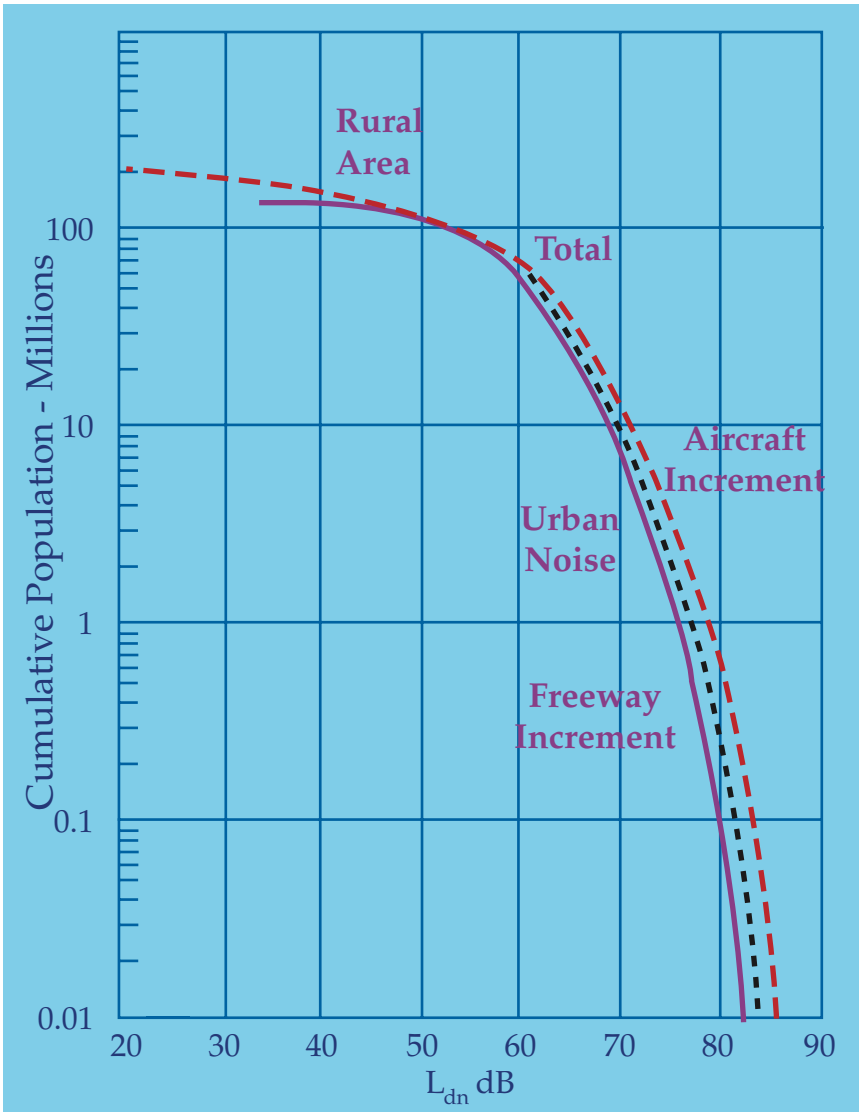
These estimates do not represent the results of a national survey. Instead, the authors used data and models available to EPA and BBN at the time. Because of this, some categories of noise exposure are likely to be more accurate than others. They did, however, represent the best available esti-

mates at the time, and because no efforts have been made to update them, they are the best estimates available today.

D. Summary: Noise in America

It is safe to assume that noise in communities is increasing. Noise levels are directly related to population density, and the urban population is increasing at twice the pace of the nonurban population. In addition, the last decade has seen rapid growth in air transportation, trucking, and the construction industries, indicating that noise levels from these sources has most likely increased. The fact that some of these sources have been and continue to be quieted (especially new generations of trucks and aircraft) should mitigate this increase, but the extent of this mitigation will remain unknown until some sort of national survey is performed. Noise from construction continues to be a problem, and it appears that noise inside buildings as well as noise from recreational activities and consumer products is on the rise. Estimates of the number of people exposed to noise at various levels are now somewhat outdated.

Residential Noise Environment of the National Population As a Function of Exterior Day-Night Average Sound Level



Residential Noise Environment of National Population as Function of Exterior Day-Night Average Sound Level

Source: Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA, 1974a, pg 16)

Table 1: Summary of U.S. Population Exposed to Various Day-Night Average Sound Levels (or higher) From Noise Sources in the Community. (1) From Noise in America (EPA, 1981, pp. 10 and 15)

Estimated Number (in Millions) of People in Each Noise Category

DNL (dB)	Traffic	Aircraft	Construction	Rail	Industrial	Total
>80	0.1	0.1	—	—	—	0.2
>75	1.1	0.3	0.1	—	—	1.5
>70	5.7	1.3	0.6	0.8	—	8.1
>65	19.3	4.7	2.1	2.5	0.3	27.8
>60	46.6	11.5	7.7	3.5	1.9	63.6
>55	96.8	24.5	27.5	6.0	6.9	92.4*

(1) DNL values are yearly averages, outdoors
(2) Note that there is some overlap among populations exposed to different noise sources. For example, some of the 96.8 million people exposed to Ldn 55 dB and above from traffic noise are also exposed to aircraft noise.
(3) Construction estimates include both residential and nonresidential exposure.

*Distribution of total exposed to all sources starts at Ldn 58 dB since the analysis involves combining distributions exposed to 55 dB and above.

V. Effects of Noise

A. Noise-Induced Hearing Loss

Hearing loss is one of the most obvious and easily quantified effects of excessive exposure to noise. Its progression, however, is insidious, in that it usually develops slowly over a long period of time, and the impairment can reach the handicapping stage before an individual is aware of what has happened. While the losses are temporary at first, they become permanent after continued exposure, and there is no medical treatment to counteract the effect. When combined with presbycusis, hearing loss naturally occurring with the aging process, the result is a premature impairment that grows inexorably with age.

According to the U.S. Public Health Service (PHS, 1991), some 10 million of the estimated 21 million Americans with hearing impairments owe their losses to noise exposure (as cited in Carney, 1991). The study goes on to say that it is unclear whether the incidence of hearing impairment has risen in recent years because the necessary studies have not been conducted.

1. Extent of noise-induced hearing loss from environmental sources

Although the major cause of noise-induced hearing loss is occupational, substantial damage can be caused by nonoccupational sources. In addition to the frequently-blamed sources of loud music and shooting, noise-induced hearing loss has been noted in the children of farm families, presumably from the frequent use of tractors (e.g., Broste et al., 1979); general aviation pilots because of the high noise levels emitted by piston aircraft (Anon., 1982); and users of earlier generations of cordless telephones because of the placement of the ring mechanism in the earpiece (Orchik et al., 1985 and 1987).

The prevailing notion among parents is that the hearing threshold levels of children are worse than they used to be because of exposure to loud music. Actually, a recent national survey of 38,000 school children found better hearing threshold levels than 30 years ago, but blames the discrepancies on the sampling methods used in the earlier study and the conversion from an older to a nether zero reference level (Lundeen, 1991). There is, however, evidence that the hearing of some young people is being affected by noisy leisure time activities (Axelsson et al., 1987).

Loud music in particular appears to be the cause of hearing impairment and tinnitus in rock musicians. Such luminaries as Pete Townshend and Ted Nugent[8] have acquired substantial hearing losses and are now campaigning for hearing conservation (Murphy, 1989). Some studies point to a hearing hazard for attendees as well (see in Clark, 1991; Clark and Bohne, 1986; Danenberg et al.,1987).

As mentioned above, probably the greatest nonoccupational hazard to hearing comes from sport shooting. Clark (1991) cites studies of industrial workers by Chung et al. (1981), Johnson and Riffle (1982), and Prosser et al. (1988), showing significantly greater hearing losses among sport-shooters than among their nonshooting counterparts. These losses are almost always characterized by worse hearing in the left ear than the right.

The contribution from nonoccupational sources is called "sociocusis" (a contraction of "socio-acusis"). Evidence from primitive societies suggests that the absence of sociocusis explains the large differences in hearing threshold level between these populations and those of the "civilized" nations (Rosen, 1962). Sociocusis, occupational hearing loss, and presbycusis contribute in various

2. The handicap of noise-induced hearing loss

Vowel sounds tend to be low in frequency and high in sound energy, while the consonants are much higher in frequency and have considerably less amplitude. It also happens that consonants provide the primary intelligibility to speech. Because noise damages the ear's ability to perceive high-frequency sounds much earlier and more severely than the low-frequency sounds, individuals with noise-induced hearing loss are at a particular disadvantage in understanding speech.

Individuals with early noise-induced hearing loss often think that other people no longer speak dearly. They soon begin to notice that they have difficulty understanding speech when there is noise in the background, and in groups of people, and that it is hard to identify which person is talking. As the hearing loss progresses, these individuals avoid social occasions and situations where they must listen at a distance, like church and theater. The eventual result can be loneliness and isolation.

3. The study of noise-induced hearing loss

Noise damages the delicate sensory cells of the inner ear, the cochlea. This process can be studied in the laboratory by inducing temporary shifts in hearing threshold level in humans. Over recent years the preferred method of investigation is to produce temporary and permanent threshold shifts in animals, and to study the resulting physiological and anatomical changes in the cochlea, as well as shifts in hearing threshold level. The laboratory allows for strict control of noise level and

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[8] According to Nugent, who has worn an earplug in his right ear since 1967: "My left ear is there just to balance my face, because it doesn't work at all." (Murphy 1989) proportion to an individual's total hearing impairment. While the contribution of each source may be less than significant, the combination of all three can be enough to produce a handicapping condition. As longevity in the U.S. population increases, the toll of noise-induced hearing loss will become increasingly evident (Carney, 1991).

duration, but the durations are usually relatively short because of the time and expense involved. Also there is some controversy over the extent to which the results can be generalized to humans.

Much of the recent laboratory effort in noise research has focused on the structural and functional basis of noise-induced hearing loss, which has been greatly aided by the electron microscope. Investigators have identified the sensory cell's stereocilia and the rootlets which anchor them as the auditory system's most vulnerable components with respect to noise exposure (Libermnan, 1990).

Field studies of noise-exposed workers avoid the problems of species generalization, and the exposure durations can be over many decades. They are usually cross-sectional studies, however, meaning that the current hearing threshold levels are related to noise exposures that have been experienced over many years. Although the current noise measurements may be valid, their validity over prior years usually has to be assumed without benefit of precise data.

4. Risk of hearing impairment from continuous noise

The methods and results of the major field studies of continuous noise exposure conducted in the late 1960s and early 1970s remain unchallenged. Examples are the studies of Burns and Robinson (1970), Baughn (1973), Passchier-Vermeer (1968), and the U.S. National Institute for Occupational Safety and Health (NIOSH, 1973). Data from these studies have been used by various organizations to estimate the risk of hearing impairment over a working lifetime of exposure to noise. These types of studies have also been used by the EPA to estimate the hazard of nonoccupational noise (Guignard, 1973; Johnson, 1973; EPA, 1973a). The data cited above of Burns and Robinson, Baughn, and Passchier-Vermeer went into EPA's identification of a yearly average exposure level of 70 dB as the safe level, which could be experienced over a lifetime (EPA, 1974a)[9].

A new international standard (ISO, 1989), which is based mainly on the data of Passchier-Vermeer and Burns and Robinson, contains formulas for assessing the risk of noise-induced hearing impairment and handicap: using either a highly screened (for non-occupational hearing loss) or an unscreened population as a control group. The data and analyses found in these major studies have not been seriously challenged, and remain in use today.

5. Varying and intermittent noise

There has been some debate over the best rule for combining noise level and duration to assess the damaging effects of noise, especially varying and intermittent noise. This relationship is often called the doubling rate, or nowadays, the exchange rate. The EPA, as well as most other federal agencies (and most European countries, the United Kingdom, some Canadian provinces) use the equal-energy rule, which incorporates a 3-dB exchange rate. OSHA uses the 5-dB exchange rate, and the U.S. Air Force, uses 4 dB. None of these rules makes any provisions for the temporal order of sounds, although the 5-dB exchange rate supposedly represents a simplification of criteria that take a certain number of intermittencies into account.[10]

Investigations of the relationship between noise level and duration have been conducted over recent years using laboratory animals. The results have confirmed the validity of the equal energy (3-dB) rule for single exposures to continuous noise (Bohne and Pearse, 1982; Ward and Turner, 1982),

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[9] The 70-dB 24-hour average sound level can be interpreted as a 75-dB 8-hour average sound level plus an average sound level during the other 16 hours of less than 60 dB (see EPA's Levels Document, p.29, footnote d).

[10] The 5-dB rule does not necessarily provide for intermittencies because it allows uninterrupted exposures to continuous noise at high levels. See Suter 1983.

or when the exposures are broken up into 8-hour, or even 1-hour "workdays", 5 days per week, so long as the sound energy is equivalent (Ward, 1983). There is, however, some benefit to intermittent quiet periods (Ward and Turner, 1982), during which the ear can recover from small, temporary hearing losses. For this reason EPA has adjusted its identified safe level upward by 5 dB[11] since most environmental noise exposures are intermittent in nature. EPA's use of the equal-energy rule and the 5-dB adjustment have not been seriously challenged.

6. Impulse noise

The effects of impulse noise have been studied extensively over recent years, but there is less agreement on this topic than there is for continuous and intermittent noise. Although there was consensus favoring the 3-dB rule at a 1981 international meeting in England (von Gierke et al., 1981), actual dose-response relationships are still elusive. The effects of impulse noise do not always follow the 3-dB rule, in that temporal pattern, waveform, and rise time can affect the growth of hearing loss, despite constancy of sound energy (Henderson and Hamernik, 1986).

Frequency also has some bearing on the damage caused by impulse noise, in that low-frequency impulses produce significantly less damage than sounds in the mid-to-high-frequency range (Price, 1983). The ear appears to be most susceptible to impulses with peaks around 4,000 Hz (Price, 1989). Also, there may be a critical level, above which the ear is considerably more at risk because of a change in the response mechanism. On the basis of his research, Price (1981) has suggested a critical level of 145 dB, with a standard deviation of 8 dB.

7. Susceptibility

Evidence from field studies indicates that men incur more hearing loss than women from comparable noise exposures (Burns and Robinson, 1970; Berger et al., 1978; Royster et al., 1980), and that Caucasians appear to be more susceptible than Blacks to noise-induced hearing loss (Royster et al., 1980). Other factors, such as age, preexposure hearing threshold level, general health, and use of alcohol, have not yet proved to be reliable predictors of susceptibility (Ward, 1986), although

8. Interactions with other agents

Noise can interact with drugs and industrial agents to produce additive or even synergistic effects on hearing. As expected, the higher the levels of noise and the greater the dose of the other agent, the greater will be the resulting hearing loss. The ototoxic properties of certain drugs, most notably the aminoglycoside antibiotics (the "mycin" drugs), are heightened by exposure to noise. Numerous studies of kanamycin plus noise exposure have revealed additive and some synergistic results (Humes, 1984). High doses of salicylates (aspirin) accompanied by noise exposure can produce temporary hearing losses (McFadden and Plattsmier, 1983), but permanent losses do not seem to occur. Cisplatin, used in cancer chemotherapy, is known to be toxic to the auditory system, and has been shown to interact significantly with none exposure (Boettcher et al., 1989).

A variety of industrial agents, which can be potent neurotoxins, have been shown to be capable of producing hearing loss (Fechter, 1989). These agents include heavy melds, such as lead and mercury, organic solvents, such as toluene, xylene, and carbon disulfide, and an asphyxiant, carbon monoxide.

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[11] The identified safe level of 70 dB reflects the incorporation of the 5-dB adjustment there is some indication that the use of tobacco may increase susceptibility to noise-induced hearing loss (Barone, et al., 1987; Stark, et al., 1988)

9. Hearing protectors

As its first (and only) labeling regulation, EPA promulgated a regulation for labeling the attenuation of hearing protection devices (EPA, 1979). The standard required manufacturers to subject their hearing protectors to specific laboratory tests, and to publish a "Noise Reduction Rating" (NRA) on the product's package. The NRA was subsequently adopted by OSHA in its hearing conservation amendment, which required employers to use it in assessing the adequacy of hearing protectors for given noise environments (OSHA, 1981 and 1983). Recent research shows that the NRA greatly overestimates the noise reduction to be achieved by these devices in actual field use.[12] These kinds of findings have led to the formation of a new ANSI working group to investigate alternatives to the current NRA (Berger et al. 1990), and the recommendation that EPA revise its existing labeling regulation (Berger, 1991; Stewart, 1991).

10. Summary: Noise-induced hearing loss

Noise-induced hearing loss is probably the most well-defined of the effects of noise. Predictions of hearing loss from various levels of continuous and varying noise have been extensively researched and are no longer controversial. Some discussion still remains on the extent to which intermittencies ameliorate the adverse effects on hearing and the exact nature of dose-response relationships from impulse noise. It appears that some members of the population are somewhat more susceptible to noise-induced hearing loss than others, and there is a growing body of evidence that certain drugs and chemicals can enhance the auditory hazard from noise.

Although the incidence of noise-induced hearing loss from industrial populations is more extensively documented, there is growing evidence of hearing loss from leisure time activities, especially from sport shooting, but also from loud music, noisy toys, and other manifestations of our "civilized" society. Because of the increase in exposure to recreational noise, the hazard from these sources needs to be more thoroughly evaluated. Finally, the recent evidence that hearing protective devices do not perform in actual use the way laboratory tests would imply, lends support to the need for reevaluating current methods of assessing hearing protector attenuation.

B. Interference With Communication

Noise can mask important sounds and disrupt communication between individuals in a variety of settings. This process can cause anything from a slight irritation to a serious safety hazard involving an accident or even a fatality because of the failure to hear the warning sounds of imminent danger. Such warning sounds can include the approach of a rapidly moving motor vehicle, or the sound of malfunctioning machinery. For example, Aviation Safety (Anon., 1982), states that hundreds of accident reports have many "say again" exchanges between pilots and controllers, although neither side reports anything wrong with the radios.

Noise can disrupt face-to-face and telephone conversation, and the enjoyment of radio and television in the home. It can also disrupt effective communication between teachers and pupils in schools, and can cause fatigue and vocal strain in those who need to communicate in spite of the noise. Interference with communication has proved to be one of the most important components of noise-related annoyance (EPA, 1974a).

In its Levels Document, EPA determined that a yearly average day-night sound level of 45 dB would permit adequate speech communication in the home, and a DNL of 55 dB would permit

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[12] In a summary of 10 studies, Berger (1983) shows that most hearing protectors in the field provide only one-third to one-half the attenuation that they do in the laboratory.

normal communication outdoors at a distance of about 3 meters.[13] These levels also apply to hospitals and educational facilities. Higher average noise levels would be satisfactory for certain nonresidential spaces, such as commercial and industrial facilities, and inside transportation, depending on the degree to which speech communication is critical. Research over the last 20 years has expanded and refined EPA's criteria development in this area, but has not generated any major changes.

1. Prediction of speech interference

Methods of predicting the amount of speech that can be communicated in various noise backgrounds have been available for decades. Probably the most popular and respected method is the articulation index (AI) (French and Steinberg, 1947), which requires the measurement or estimation of the spectrum level of both speech and noise in 20 contiguous bands. Over the past 2 decades investigators have suggested adjustments to the AI for l13-octave bands, reverberation time, various vocal efforts, etc., and more recently for various degrees of hearing impairment (Humes, et al., 1986 and 1987).

The speech interference level (SIL) (Beranek, 1954) provides a quick method for estimating the distance at which communication can occur for different levels of vocal effort. The current method involves measuring octave-band sound pressure levels at 500, 1,000, 2,000, and 4,000 Hz and referring to a chart to determine the die potential communication distance. The basic chart has been expanded to include such parameters as a broader range of voice levels and provisions for room reverberation (Webster, 1983). Additions to both the AI and the SIL have been proposed by Lazarus (1990), who offers modifications and extensions to account for strain on the part of both talker and listener, and the wearing of hearing protectors.

Another popular method to predict speech communication in a variety of conditions, the speech transmission index (STI), has been developed by a Netherlands research group (Houtgast, 1980; Houtgast and Steeneken, 1983). The STI takes into account room volume and reverberation time, in addition to speech and none levels, and distance between talker and listener. A more recent outgrowth, the rapid speech transmission index (RASTI), represents a simplified version of the STI intended for field use, and is available in an instrument conforming to an international standard (IEC, 1987).

Finally the sound level meter's A-weighting network can be successfully used to predict speech interference levels. It is easy to use, available on virtually all sound level meters, and effective when the noise spectra are not complex.

2. Criteria for speech and warning signals

In addition to the classic work of Beranek and his colleagues (Beranek et al., 1971), Beranek has recently refined the traditional curves to account for the annoyance due to low-frequency "rumble" (Beranek, 1989). New criteria for determining acceptable background levels of noise in rooms are also offered by Lazarus (1986a, 1986b, 1987, and 1990). Lazarus includes in his criteria a variety of parameters such as: type of room, type of communication, communication distance, vocal effort, quality of speech intelligibility, AI, communication strain, listener's hearing sensitivity, and the use of hearing protectors.

Guidelines for audible warning signals have been developed by Patterson (1982). These guidelines, which there originally created for civil aircraft, there later adapted to helicopters and even station-

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[13] These levels represent EPA's identification of safe levels of environmental noise to protect the public health and welfare against all adverse effects of noise with the exception of hearing loss.

ary workplaces like hospitals (Patterson, 1985; Rood et al., 1985). Another set of guidelines for acoustic warning signals has been developed by Lazarus and Hoge (1986), and are based on the compatibility of signal type with various desired or undesired situations.

Although criteria have not yet been developed for speech recognition involving nonnative listeners, experiments by Florentine (1985) and Nabelek (1983) indicate that these individuals need more favorable listening conditions (less background noise and reverberation) than their native- language counterparts. These findings have implications for air traffic control systems.

3. The effect of hearing protectors on speech and warning signal perception

Hearing protectors attenuate both noise and the desired signal by equal amounts in a given frequency band, reducing both to levels where the ear is less likely to distort. This process often improves speech recognition when the level of background noise exceeds 80 to 90 dB. However, because hearing protectors usually provide considerably more attenuation in the high frequencies than in the low frequencies, listeners who have high-frequency hearing losses are at a disadvantage. Many speech sounds and some warning signals will be attenuated beyond the range of audibility. This is especially true of individuals whose losses exceed an average of 30 dB at the audiometric frequencies 2000, 3000, and 4000 Hz (Lindeman, 1976). A potential solution for this problem lies in some newly developed hearing protectors with flat attenuation across the frequency spectrum (Allen and Berger, 1990; Killion et. al., 1988). One type of these protectors has already become popular with orchestral musicians (Killion et al., 1988) and even some rock musicians (Cohen, 1990).

Individuals tend to speak more softly when they wear hearing protectors, and consequently, speech communication is degraded when both talker and listener wear these devices (Hoermann et al,, 1984), Hearing protectors also interfere with the localization of sounds in space, and this is especially true of the ability to localize sounds in the vertical plane while wearing ear muffs (Noble, 1981). Both ear plugs and ear muffs cause these types of problems, but it appears that they are more pronounced with ear muffs (Howell and Martin, 1975; Abel et al., 1982). These findings can have serious implications for safety in some circumstances.

4. Scholastic performance

Noise can disrupt communication in the classroom to the extent that the instructional method used in schools close to airports is sometimes nicknamed " jet pause" teaching. Cohen and Weinstein (1981) have reviewed several studies, which, after controlling for socioeconomic factors, indicate that the academic performance of children in quiet schools is better than that of children in noisy schools.

For example, elementary school children on the side of a school facing train tracks. performed more poorly on a reading achievement test than children in classrooms on the quiet side of the school (Bronzaft and McCarthy,:1975).[14] Cohen and Weinstein also discuss research showing that skills, such as auditory discrimination and reading achievement can be adversely affected when children live in noisy circumstances, even though their schools may be no noisier than average. These latter studies indicate that interference with communication in the classroom is not the only

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[14] Bronzaft reported that in 1978 the city of New York reduced the noise of the elevated train and installed acoustical insulation in the affected classrooms, providing a total reduction in the A-weighted noise level of 6 to 8 dB (Bronzaft, 1981). By 1981, there was essentially no difference. in reading achievement between students on the two sides of the school for the classroom studied.

process at work here. Possible additional explanations include adverse effects on children's information processing strategies and their feelings of personal control[15] (Cohen and Weinstein, 1981).

5. Summary: Interference with communication

Interference with speech communication and other sounds is one of the most salient components of noise-induced annoyance. The resulting disruption can constitute anything from an annoyance to a serious safety hazard, depending on the circumstance.

Research over the past 2 decades has expanded and refined methods for predicting communication interference, but has not produced any major changes. Numerous adjustments have been suggested for the AI, the SIL has been modified and refined, and a new predictive method, the STI has been added. Criteria for determining acceptable background levels in rooms have also been expanded and refined, and progress has been made on the development of effective acoustic warning signals.

It is now clear that hearing protection devices can interfere with the perception of speech and warning signals, especially when the listener is hearing impaired, both talker and listener wear the devices, and when wearers attempt to locate a signal's source.

Noise can interfere with the educational process, and the result has been dubbed "jet-pause teaching" around some of the nation's noisier airports, but railroad and traffic noise can also produce scholastic decrements.

C. Effects of Noise on Sleep

Noise is one of the most common forms of sleep disturbance, and sleep disturbance is a critical component of noise-related annoyance. A study used by EPA in preparing the Levels Document showed that sleep interference was the most frequently cited activity disrupted by surface vehicle noise (BBN, 1971). Aircraft none can also cause sleep disruption, especially in recent years with the escalation of nighttime operations by the air cargo industry. When sleep disruption becomes chronic, its adverse effects on health and well-being are well-known.

1. Assessing sleep disturbance

Noise can cause the sleeper to awaken repeatedly and to report poor sleep quality the next day, but noise can also produce reactions of which the individual is unaware. These reactions include changes from heavier to lighter stages of sleep, reductions in "rapid eye movement" (REM) sleep, increases in body movements during the night, changes in cardiovascular responses, and mood changes and performance decrements the next day. The accuracy and efficiency with which these effects are measured has been greatly assisted by the use of contemporary computers. The most popular measurement tool nowadays is electro-encephalography, but other methods, such as electrocardiography, electromyography, and electrooculography are also used, as well as clinical observation, self-assessment surveys, and accelerometry to measure the motion of the bed frame.

As a result of many years of research on the effects of noise on sleep, it is clear that intermittent and impulsive noise is more disturbing than continuous noise of equivalent energy, and that meaningful sounds are more likely to produce sleep disruption than sounds with neutral content. Also, older people are more likely to have their sleep disturbed by noise than younger people. In fact, children appear to be about 10 dB less sensitive to noise-induced sleep disruption than adults (Eberhardt, 1990). Sleep disturbance from noise tends to be greater in the early hours of the morn-

[15] See also the discussion of noise, performance, and behavior in sections D.4, and D.5. below.

ing, when individuals spend more time in lighter sleep stages, and this is particularly true of the elderly.

2. Criteria for sleep interference

In the Levels Document EPA identified an indoor DNL of 45 dB, which translates to a nighttime average sound level of 35 dB, as necessary to protect against sleep interference. However, consensus on the levels of noise that can be tolerated without sleep disruption is incomplete at this time. In an attempt to develop a quantitative model for predicting noise-induced sleep interference, Pearsons et al., (1989) reviewed and analyzed 21 studies. However, the authors there unable to derive dose-response relationships from these studies because of large discrepancies between studies conducted in the laboratory and those conducted in the field.

In a recent review of the noise and sleep research, Griefahn (1990) recommends that the nighttime average sound level be kept below 45 dB in the sleeper's quarters. She cites research by Eberhardt (1987 and 1990; Eberhardt et al., 1987;) and Vallet et al., (1976 and 1990) showing self- reported adverse effects from continual road traffic when the average sound level is 40 dB and physiological responses at an average level of 37 dB. For intermittent road traffic noise, maximum recommended levels for single events (as opposed to average levels) range from 45 to 68 dB, depending on the investigation (Griefahn, 1990). Vallet et al. (1990), recommend maximum outside levels of 65 dB, which, of course, relies on some attenuation by the residence. Griefahn also points out that higher maximum levels can be tolerated if the ambient noise level is not very low, and that the difference between single events and the ambient level should not exceed 8 to 10 dB.

3. After-effects and habituation

Numerous recent investigations have revealed after-effects due to noisy nights. Ohrstrom (1983) found mood changes on the day following nights when the average sound level was as low as 35 dB. Adverse effects on performance, such as increased reaction time, have also been measured (Jurriens et al., 1983), and it appears that older peoples' next day performance is more adversely affected by noise than that of younger people (Griefahn and Gros, 1983).

Although people often believe they get used to nighttime noise, physiological tests point to the contrary. Studies have shown that while the subjective response improves with time, cardiovascular responses remain unchanged (Muzet, 1983). Vallet et al. (1990) conclude that habituation is not complete, even after 5 years of exposure to noise.

4. Summary: Effects of noise on sleep

Noise-induced sleep interference is one of the critical components of community annoyance. It can produce short-term adverse effects, such as mood changes and decrements in task performance the next day, with the possibility of more serious effects on health and well-being if it continues over long periods.

EPA's identified indoor DNL of 45 dB has not been seriously challenged over the past decade, but consensus in this area is lacking. One problem is that different experimenters tend to use a variety of descriptors (DNL, Leq, and maximum single-event levels) and a variety of methods for evaluating the effects (EEG, EKG, self-report, etc.). Perhaps one reason for the lack of clear-cut criteria is that this a complex area to research, requiring considerable time and expense. Another is, of course, a need for more field studies in this area.

D. Effects on Performance and Behavior

EPA did not use the literature on the effects of noise on performance and behavior in the identification of its levels of noise to protect against activity interference. One reason may have been that much of the information at that time related to the occupational setting rather than the general environment. Another may have been the complexity of the topic and the difficulty involved in identifying a single noise level that could apply to a great variety of tasks and conditions. Although these difficulties still pertain, much research has been generated in this area over recent years.[16]

Noise can cause adverse effects on task performance and behavior at work, and in nonoccupational and social settings. These effects are the subject of some controversy, however, since they do not always occur as predicted. Sometimes noise actually improves performance, and sometimes there are no measurable differences between performance in noisy and quiet conditions. The presence and degree of effects depends on a variety of intervening variables.

1. Sensory and motor effects

Experiments on the effects of noise on vision have produced conflicting results, with the suggestion of some effects on visual discrimination (Cohen, 1977). There is evidence, however, that high levels of noise can produce shifts in visual field (Parker, et al., 1976, 1978). High levels of noise can affect vestibular function, especially when the presentation to the two ears is asymmetrical, (or the level of attenuation is greater in one ear) (Harris, 1968). Impulsive or other sudden loud sounds can produce a startle response that does not completely habituate with repeated, predictable exposures (May and Rice, 1971).

2. Noise variables

Sound level is one of the most important parameters when predicting performance effects. The level of noise necessary to produce adverse effects is greatly dependent upon the type of task. Simple tasks remain unaffected at noise levels as high as 115 dB or above, while more complex tasks are disrupted at much lower levels. Until fairly recently, the level of beginning effects was thought to be around 95 dB for most conditions, but a summary of recent research (Jones, 1990) points to effects at much lower levels. Effects on serial reaction tasks have been noted for continuous noise with C-weighted noise levels of 90 dB (Jones, 1983) and for intermittent noise with C-weighted levels of around 80 dB (Lahtela et al., 1986).

Frequency and temporal characteristics also play a part. High-frequency sound is more disruptive titan low-frequency sound, and intermittent noise can affect performance more adversely titan continuous noise of equivalent energy. Aperiodic intermittencies are more likely to produce adverse effects than regular ones, and impulse noise may be even more disruptive. Again the effects are variable, depending upon task complexity and other factors.

Much of the important research in the effects of noise on performance conducted over the last decade has focused on the effects of irrelevant speech.[17] The adverse effects of irrelevant speech appear to be fairly independent of sound level, at least in the 55-95 dB range, and therefore, are not mitigated simply by attenuating them by 10 dB or so (Jones, 1990). It also appears that irrelevant speech affects processes involving memory (e.g., reasoning, mental arithmetic, and problem solving)

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[16] For a comprehensive review of the effects of noise on job performance, see Suter, 1989.

[17] The initial work was performed by Salame and Baddeley (1982, 1983, and 1987), and has been summarized by Jones (1990) at a recent conference in Stockholm.

rather than attention. With respect to reading tasks, however, meaningful speech is more disruptive than meaningless speech (Jones, 1990). These findings have significance for many modern work and school environments, where information processing and exchange is so important, especially those of the "open plan" variety.

3. Task variables

Task complexity has been identified in numerous experiments as a crucial determinant of the effects of noise on performance. Noise exposure usually leaves simple routine tasks unaffected, and can even improve performance of monotonous tasks, presumably by elevating one's level of arousal (Broadbent, 1971). Some tasks, such as tracking and jobs requiring intellectual function, can be momentarily disrupted without decrements in overall performance (Broadbent, 1979). But if the noise level is sufficiently high or if the task becomes more complex, noise will have an adverse effect. When two or more tasks must be performed simultaneously in a noisy environment, performance on the primary task usually remains unaffected, while performance on the subsidiary task deteriorates (Hockey and Hamilton, 1970; Davies and Jones, 1975; Finkleman and Glass, 1970).

4. After-effects

It seems that noise can have even greater effects after than during exposure. The most common after-effect appearing in the experimental literature is a reduced tolerance for frustration, manifested in a series of experiments as a reduction in willingness to persist in trying to solve insoluble puzzles (Glass and Singer, 1972; Percival and Loeb, 1980). This research also indicates that predictability of the noise signal greatly reduces its adverse after-effects (Glass and Singer, 1972). One study found that the type of noise also influenced the after-effect. Aircraft noise modified to produce sudden onsets and offsets resulted in a lower tolerance for frustration after the exposure than white noise that ad been similarly modified (Percival and Loeb, 1980).

5. Effects of noise on social behavior

There is an extensive literature concerning the effect of noise on social behavior, and just a few examples of this research will be discussed here. Singer et al. (1990) point out that noise has been used as a noxious stimulus in a variety of investigations because it produces the same biological and psychological effects as other stressors. In fact, they observe that the effects of noise combined with perceived control have been frequently demonstrated, and these investigations have also been extended to many other situations where the presence of control reliably moderates the effects of stress.[18]

In a frequently-cited laboratory study, Matthews and Cannon (1975) found that fewer subjects there willing to help someone who had "accidentally" dropped materials when background noise levels there 85 dB than when they there 65 dB. In a subsequent field study, the same results there demonstrated in a background of lawn mother noise, and this time the addition of a cast on the "victim's" arm enhanced helping behavior under quiet conditions, but failed to do so during the noise episodes (Matthews and Cannon, 1975). In another such experiment, Sauser et al. (1978) found that subjects recommended lower salaries for fictitious employees when exposed to A-weighted levels of office noise at 70 to 80 dB than in quiet. Broadbent (1979 and 1983) cites additional evidence suggesting that subjects will give each other increased amounts of shock and noise when they themselves are exposed to noise, and also cites evidence that noise increases anxiety levels (Broadbent, 1983).

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[18] Singer et al. (1990) cite the research of Langer and Rodin on the effects of patient control in a nursing home situation.

As mentioned above, the presence of control, or even perceived control, is one of the most important predictors of adverse behavioral effects. Subjects who perceive that they have control over the noise show significantly greater tolerance for frustration than subjects without control, even if the control is never exercised (Glass and Singer, 1972). In a recent experiment, Singer and his colleagues found that subjects who there told that they had control of an A-weighted, 103-dB noise stimulus showed significantly greater persistence on a difficult task than subjects who had no control or subjects that had control for only part of the experiment (Singer et al., 1990). This finding occurred despite the fact that the subjects with only partial control reported feelings of control no different from those with full control. To the extent that these findings can be generalized to populations living in noisy areas, this kind of research may have significant sociological implications.

6. Summary: Effects on performance and behavior

Noise can adversely affect task performance in a variety of circumstances. In the past, research in this area has focused mainly on the occupational setting, where noise levels must be sufficiently high and the task sufficiently complex for performance decrements to occur. Recent research implicates more moderate noise levels, especially when speech is the disruptive noise stimulus. Some research indicates that noise can also produce disruptive after-effects, commonly manifested as a reduced tolerance for frustration, and it appears that the presence and timing of control over the noise are critical to the prediction of after-effects. Even moderate noise levels can increase anxiety, decrease the incidence of helping behavior, and increase the risk of hostile behavior in experimental subjects. These effects may, to some extent, help explain the "dehumanization" of today's urban environment.

E. Extra-Auditory Health Effects

Noise has been implicated in the development or exacerbation of a variety of health problems, ranging from hypertension to psychosis. Some of these findings are based on carefully controlled laboratory or field research, but many others are the products of studies that have been severely criticized by the research community. In either case, obtaining valid data can be very difficult because of the myriad of intervening variables that must be controlled, such as age, selection bias, preexisting health conditions, diet, smoking habits, alcohol consumption, socioeconomic status, exposure to other agents, and environmental and social stressors. Additional difficulties lie in the interpretation of the findings, especially those involving acute effects. For example, if noise raises blood pressure on a temporary basis, will prolonged exposure produce permanent changes? In cases where these effects are permanent but slight, what are the long-term implications? These types of questions and problems have caused this particular area of noise research and criteria development to be very controversial.

1. Theoretical basis

Noise is considered a nonspecific biological stressor, eliciting a response that prepares the body . for action, sometimes referred to as the "fight or flight" response. The physiological mechanism thought to be responsible for this reaction is the stimulation by noise (via the auditory system) of the brain's reticular activating system (Cohen, 1977). Neural impulses spread from the reticular system to the higher cortex and throughout the central nervous system. Noise can, therefore, influence perceptual, motor, and cognitive behavior, and also trigger glandular, cardiovascular, and gastrointestinal changes by means of the autonomic nervous system. Evidence of these effects, however, is not easy to. come by. Despite decades of research and probably hundreds of studies, relatively little can be said with much confidence.

2. Effects on blood pressure

Probably the most attention has been directed toward cardiovascular effects, especially potential elevations in blood pressure. Many studies of the stressful effects of noise have been conducted on rodents and other laboratory animals. the advantage of these studies is that they offer a greater degree of control and it is possible to have longer exposures than with human subjects. The disadvantages are that there is difficulty generalizing to humans, especially with the smaller animals, the expense involved when larger animals are used, and the prevailing public sentiment against animal experimentation.

EPA sponsored one of the most notable animal studies of noise exposure, in which Peterson and his colleagues performed five sets of experiments on the cardiovascular effects of noise on monkeys (Peterson et al., 1978, 1981, and 1983). The stimulus consisted of A-weighted levels of workplace noise at 85 to 90 dB, and the exposures there as long as 9 months. The results showed significant elevations of both systolic and diastolic blood pressure the fact that these changes persisted long after exposure cessation argues for a chronic effect, at least in this case. Unfortunately, an attempt to replicate this experiment with another primate model was discontinued for lack of funding after only two subjects had been exposed (Turkkan, et al., 1983). Relatively few animal experiments have been conducted in this area over recent years.

With respect to laboratory investigations involving human subjects, Rehm (1983) cites six studies showing increases in blood pressure, but questions whether these effects would be permanent. In an attempt to identify more susceptible populations, Michalak et al. (1990) investigated the effects of low-flying aircraft on elderly subjects. Using recorded aircraft sounds, they found significant increases in both systolic and diastolic blood pressure after exposure to the two types of noise, with significantly greater response to the rapid-onset flyover noise. Whether or not these increases would become permanent with protracted exposure is not known.

Field studies of noise and blood pressure among workers or community residents are becoming increasingly popular, but the results are not always consistent. Rehm (1983) has reviewed 14 field studies, mostly of occupational noise exposure, and reports that the majority showed significant increases in either systolic or diastolic blood pressure, or both. Van Dijk et al. (1983), however, reports that six other studies of exposure to occupational noise found no significant differences between exposed and nonexposed groups.

Knipschild and Oudshoom (1977) avoided some of the pitfalls characteristic of epidemiological studies by examining a population near the Amsterdam airport before and after an increase in exposure to aircraft noise, and comparing it to a nonexposed population nearby. The dependent variable was the purchase of certain prescription drugs: tranquilizers, sleeping pills, antacids, and cardiovascular drugs. The investigators found that the use of these drugs in the nonnoise area was essentially stable, whereas the use of most types of these drugs in the area newly impacted by noise increased steadily over the years investigated. This increase was especially noticeable for antihypertensive drugs.

In a more recent review, van Dijk (1990) analyzed 12 cross-sectional studies, with half of them showing a positive relation between noise exposure and blood pressure, and the others no significant effects. Van Dijk criticizes these kinds of investigations for the following kinds of weaknesses: inadequate description of noise and blood pressure measurements; absence or inadequate control of intervening variables; use of hearing loss as a determinant of exposure magnitude; use of hearing. protectors; and questionable interpretation of the results. Part of the problem may be that the investigators often come from only one discipline, when, in fact, a multi-disciplinary team is needed.

Thompson and Fidell (1990) recommend the use of prospective or case-control models, rather than the more convenient cross-sectioned study, and they stress the importance of adequate sample size. They maintain that because any changes in blood pressure resulting from community noise are likely to be small, careful controls, large sample sizes, and at least 5 years of exposure to noise would be nerved to identify significant effects.

3. Effects on blood chemistry

Blood chemistry is also of interest in studies of wire exposure and the cardiovascular system. In the review cited above, Rehm (1983) reports on a series of experiments, both laboratory and field, which show increased levels of the catecholamines epinephrine and norepinephrine. Among them are the series of experiments by Ising and his colleagues (1981a, 1981b, 1981c), showing a connection between noise exposure and magnesium metabolism and humans and animals. According to Rehm, this finding suggests a possible mechanism for cardiovascular effects in that a chronic magnesium imbalance can lead to increased intracellular levels of calcium (in the heart, for instance), which, in turn, can cause vasoconstriction and increases the sensitization for catecholamines.

A large epidemiological study, the Caerphilly and Speedwell Heart Disease Study in England, holds some promise for investigating the effects of road traffic noise (Babisch and Gallacher, 1990). This study of heart disease and a variety of environmental factors uses both the cross-sectional and prospective approaches, and should continue for more than 10 years. The investigators have performed detailed noise exposure measurements. Sample sizes of more than 2000 men have been drawn from both the Caerphilly and Speedwell communities, and controls for age, socio-economic factors, family history, body weight, smoking habits, alcohol, and physical activity have been instituted. Initial results (from the cross-sectional study) indicate significant noise related elevations of serum cholesterol and glucose levels, and plasma viscosity, with an absence of significance for blood pressure or any of the other cardiovascular risk factors. The authors point out that all of the effects there slight, but even small increases, should they prove to be real, would be relevant to the public health.

4. Interactions

Several investigators have suggested that aversion to noise may be more highly correlated with health problems than the noise itself. For example, a study by Rehm (1983) found a significant correlation between noise annoyance and cardiovascular disorders. Her data also suggest that those with existing health problems are more annoyed by environmental factors, such as noise. Similarly, Rovekamp (1983) found that subjects who described themselves as sensitive to noise showed significantly greater noise-induced increases in peripheral vasoconstriction than their "normal" counterparts. Finally, a recent study . of road traffic and aircraft noise failed to show a significant increase in blood pressure resulting from noise, but did show a correlation between the presence of noise and subjective health complaints (Pulles et al.,1990). Differences in effects between noise and non-noise groups there dependent upon the subjects' perceived control over the noise, but independent of noise level.

5. Other adverse effects

Adverse health effects from noise exposure other than cardiovascular effects are even more difficult to isolate. Several studies have investigated the effects of noise on fetal development, with inconclusive results. Some have shown an indication of reduced birth weight or an increase in premature births, but the effects are usually slight, and (except in one case, McDonald et al., 1988), not statistically significant (Rehm and Jansen, 1978; Knipschild et al.., 1981).

The effects of noise on documented mental health disorders are likewise inconclusive. Rehm (1990) cites a series of studies showing increased numbers of psychoneurotic and psychosomatic complaints due to noise exposure, but whether or not these complaints lead to chronic disfunction or illness is not obvious.

6. Summary: Extra-auditory effects

As a biological stressor, noise can influence the entire physiological system. Most effects appear to be transitory, but with continued exposure some effects have been shown to be chronic in laboratory animals. Probably the strongest evidence lies in the cardiovascular effects. However, many studies show adverse effects, while many others show no significant differences between experimental and control populations.

Undoubtedly because of the lack of consistent evidence in thin area, EPA could not use data on extra-auditory health effects in its identification of safe levels of environmental noise. Instead, this subject was relegated to a brief discussion in an appendix in the Levels Document. Although considerable attention was devoted to this topic at the international conference in Yugoslavia, and some coverage was given in the 1973 Criteria Document, the evidence was far from sufficient and much too complex to enable the formulation of dose-response relationships. Later, EPA did fund some promising research in this area (Hattis and Richardson, 1980; Peterson et al., 1978, 1981, 1983; Turkkan, 1983), some of which has clearly demonstrated adverse cardiovascular effects at noise levels typical of occupational settings.

In the interim, there has been considerable European research activity in this area, but nearly 20 years later, criteria are still lacking. What is available, however, should give public policymakers as well as noise producers some reason for concern, especially in situations where those impacted by the noise have no control over or perceive they have no control over their exposures.

F. Annoyance

Annoyance is the measured outcome of a community's response to survey questions on various environmental and other factors, such as noise exposure. Although annoyance in individuals is sometimes measured in the laboratory, field evaluations of community annoyance are most useful for predicting the consequences of planned actions involving highways, airports, road traffic, railroads, or other noise sources. Factors directly affecting annoyance from noise include interference with communication and sleep disturbance, which have been discussed in earlier sections. Other less direct effects are disruption of one's peace of mind, the enjoyment of one's property, and the enjoyment of solitude. The consequences of noise-induced annoyance are privately felt dissatisfaction, publicly expressed complaints to authorities, and potential adverse health effects, as suggested above.

"Annoyance" has been the term used to describe the community's collective feelings about noise ever since the early noise surveys in the 1950s and 1960s, although some have suggested that this term tends to minimize the impact. While "aversion" or "distress" might be more appropriate descriptors, their use would make comparisons to previous research difficult. It should be clear, however, that annoyance can connote more than a slight irritation; it can mean a significant degradation in the quality of life. This represents a degradation of health in accordance with the WHO's definition of health, meaning total physical and mental well-being, as well as the absence of disease.

1. Predicting annoyance for public policy purposes

To facilitate the development of criteria and public policy, Schultz (1978) summarized and analyzed a large number of studies of community annoyance from aircraft, road traffic, and railroad noise. As

part of this effort, Schultz made several simplifying assumptions, among them that the percentage of the population determined to be "highly annoyed" would be the only parameter plotted as a function of day-night average sound level. The resulting curve portrays annoyance as independent of noise source, and it has been dubbed the Schultz curve.

Recently, Fidell et al. (1991) reanalyzed the original data used by Schultz, adding new data from it community noise surveys. The resulting function shows slightly greater annoyance in the range between DNLS of 51 dB and 72 dB, and slightly less annoyance above about a DNL of 76 dB than the original curve. In general, the two curves are fairly close, indicating that the new studies have not drastically altered the prediction of community annoyance, at least when reactions to various noise sources are plotted together. When annoyance from various noise sources is analyzed separately, however, the new data are quite revealing, as will be discussed below.

Although it has been used internationally in the formation of noise policy, the Schultz curve has been the subject of much debate (Kryter, 1982a, 1982b; Griffiths, 1983). For example, Griffiths (1983) criticizes Schultz for treating attitudinal data categorically (highly annoyed or otherwise) rather than scaling it, for failing to analyze the distribution of annoyance, for assuming a fixed threshold for noise-related annoyance, and for choosing such an extreme criterion as highly annoyed. Perhaps because of these reasons, as well as a number of others, researchers and policymakers are beginning to examine alternatives to the Schultz curve for predicting community annoyance from noise.

2. Metrics

The metrics most commonly used to describe the relationship between noise and community annoyance are the equivalent continuous sound level, and the day-night average sound level (DNL), composite ratings based on the A-weighted sound level. The DNL is used almost exclusively for airport planning in the U.S., but this practice has recently been called into question. For example, the importance of communication and relaxation in the evening hours has been recognized (in California and occasionally in Europe) by the use of the community noise equivalent level (CNEL), a metric that includes a 5-dB penalty for noises occurring between 7:00 and 10:00 pm as well as the 10-dB nighttime penalty (California Code of Regulations, 1990). In a study of the communities surrounding two French airports, residents expressed the greatest annoyance during the hours between 7:00 and 11:00 pm (Francois, 1977).

Some authorities are considering the use of the sound exposure level (SEL) for evaluating the effects of single events, such as aircraft flyovers (EPA/FAA, 1990). The importance of other parameters are also being considered, such as rise time (or onset time) as an indicator of the annoyance from low-flying military aircraft (Harris, 1989). Officials from the U.S. Forest Service report that their agency has begun to use an aircraft detectability criterion to site recreational facilities (Harrison et al., 1990).

3. Criteria

Community annoyance resulting from noise-induced activity interference was one of the most important considerations in EPA's identification of an outdoor DNL of 55 dB as the "safe" level of environmental noise (EPA, 1974a). Some years later, a Federal Inter-Agency Committee on Urban

Noise (FICUN) developed guidelines for considering noise in land-use planning and control (DOT, 1980).[19]

In its noise zone classification table, "minimal" exposures to noise there defined as DNLS below 55 dB, and between DNLS of 55 and 65 dB, the exposures there labeled "moderate." However, all of these exposures there considered "acceptable" according to land-use planning standards specified by the Department of Housing and Urban Development (HUD). No research was cited to support these conclusions. In a footnote, FICUN stated the following:

HUD, DOT and EPA recognize Ldn = 55 dB as a goal for outdoors in residential areas in protecting the public health and welfare with an adequate margin of safety (Reference: EPA "Levels" Document.) However, it is not a regulatory goal. It is a level defined by a negotiated scientific consensus without concern for economic and technological feasibility or the needs and desires of any particular community.

The Department of Transportation's Federal Aviation Administration (FAA) has adopted a DNL of 65 as the point above which residential land-use becomes "normally unacceptable." Below this level, the FAA does not require airport authorities to draw noise contours or discuss the impact of airport noise on the surrounding communities for purposes of compatibility planning or to receive grants under the Part 150 program.[20] Thus, public policy decisions, at least on the federal level, have not considered the annoyance of individuals living in the DNL 55-65 dB range.

Recent research confirms the findings of earlier investigations relied upon by the EPA, that annoyance is often generated at day-night average sound levels well below 65 dB (Fidell et al., 1985; Fidell et al., 1991; Hall et al., 1981). Figures 4 and 5 from Fidell et al. (1991) portray the responses from surveys of two mid-sized airports in California: Burbank Airport and the Orange County Airport. The percentage of respondents highly annoyed is depicted as a function of DNL, and compared to the Schultz curve. Both studies show significantly greater numbers of people highly annoyed than would have been predicted by the Schultz curve. For example, at 60 dB, as many as 70 percent of the Burbank population described themselves as highly annoyed and some 40 percent near the Orange County Airport.

Presumably because of this kind of evidence, another interagency task force has convened to discuss the extent to which day-night average sound levels below 65 dB should be taken into account in assessing the impact of aircraft/airport noise, and to examine the possible need for a single-event metric to supplement the DNL (EPA/FAA, 1990).[21]

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[19] FICUN was an ad-hoc interagency panel composed of representatives from EPA, FAA, HUD, the Department of Defense, and the Veterans Administration. In 1990 another such group, the Federal Interagency Committee on Noise (FICON) has been activated (focussing mainly on aircraft noise), but a report has not been published to date.

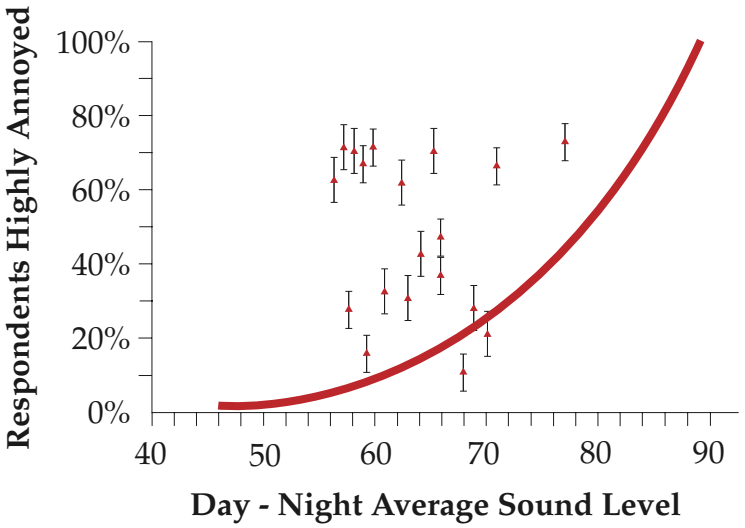
[20] Part 150 studies are conducted at airports where the noise generated by airport construction or expansion is potentially incompatible with the surrounding community. These studies must follow the procedure set out by Federal Aviation Regulations (FAR) Part 150.

[21] The U.S. EPA and FAA put together an intragency agreement to examine the extent to which single event analyses and information beyond the Ldn = 65 contour provide useful additions to current methods of evaluating potential airport noise impacts. Under this agreement, a contractor would identify eight existing airports and perform a quantitative analysis using existing data. No new annoyance data would be developed.

4. Sources

The sources of noise producing community annoyance are primarily aircraft, road traffic, and railroad noise, although noise from industry, construction, and within buildings can also be problematical. The leading offenders are usually aircraft and road traffic noise, although the hierarchy depends upon many factors, such as urbanization, numbers of noise events, and proximity to the sources. Recent research indicates that, despite equivalent noise levels, some sources of community noise are more annoying than others, providing further indication that the Schultz curve cannot be valid for all circumstances.

Treating annoyance from all sources with one predictive curve provokes the hoards of oversimplification. De Jong (1990a) reports that an analysis of Dutch studies carried out over the previous 15 years showed that aircraft and highway noise produced considerably more annoyance than equivalent levels of train, tramway, and urban road noise (Miedema, 1988). The divergence was particularly pronounced at high noise levels. The fact that aircraft generate more annoyance than surface transportation is portrayed dramatically in the analysis described above by Fidell et al. (1991), where annoyance related to mid-sized airports appears substantially greater than that predicted by the Schultz curve, while annoyance from urban sources, such as trains, trams, and street traffic, is considerably less than that predicted by the Schultz curve.[22] Figures 6 and 7, also from Fidell et al. (1991), depict data from British and Swedish railroad studies, showing somewhat less annoyance from these sources in relation to the Schultz curve.



Relationship of data from Burbank Airport Study to 1978 synthesis (Schultz) curve, showing percentage of respondents highly annoyed as a function of day-night average sound level. (After Fidell et al. 1991)

[22] See also Fidell et al. (1985), Hall et al. (1981), and de Jong (1990).

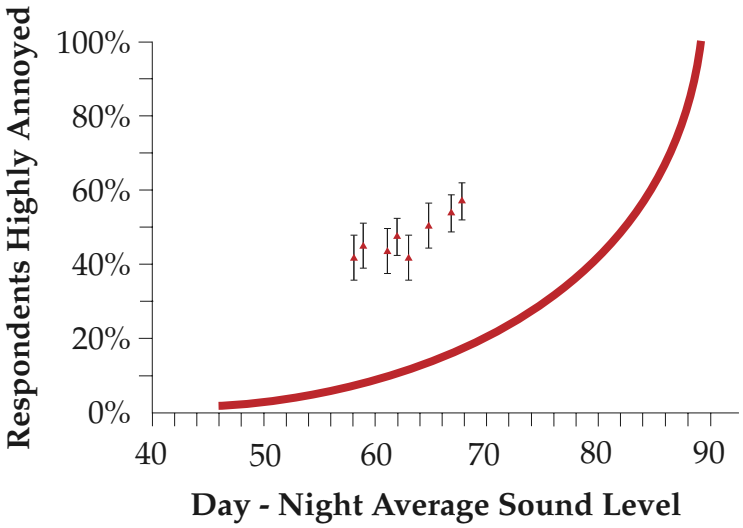


Figure 5
Relationship of data from Orange Country Airport Study to 1978 synthesis (Schultz) curve, showing percentage of respondents highly annoyed as a function of day-night average sound level. (After Fidell et al., 1991).

The explanation for these source-related differences is not necessarily that aircraft noise is inherently more annoying than surface transportation noise. It may be related to differences in people's criteria for responding to various noise sources (de Jong, 1990b; Green and Fidell, 1991). Or it may be caused by differences in sensitivity which are actually biologically based.[23] Green and Fidell (1991) point out that this evidence does not discredit the predictive validity of the DNL, but suggest that communities adopt a more sensitive criterion when evaluating the impact of aircraft noise.[24]

Impulse noise also appears to be more annoying than continuous noise of equivalent energy, and various penalties have been proposed ranging from 0 dB at relatively high ambient noise levels of about 67 dB, to 10 dB at ambient levels as low as 35 dB (Rice, 1983). Vos and Smoorenburg (1983) have recommended a formula for computing the impulse noise penalty, taking into account the type of noise source, the signal level, and the ambient noise level.

As de Jong points out (1990b), most people are exposed to some combination of noise sources, posing a very complex predictive problem. Several models for predicting noise annoyance from complex sources have been proposed, but most fail to solve the difficult theoretical problems involved (de Jong cites Berglund et al., 1981, and Miedema, 1985). Among the groups working on these models are the Institute for Sound and Vibration Research in England, and the Netherlands' Organization for Applied Scientific Research, TNO.

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[23] De Jong (1990b) cites the work of Di Nisi et al. (1987) and Ising, et al.(1981b) to support this theory.

[24] Green and Fidell found a difference of 5.2 dB bettheen the noise levels at which the same percentage of people are highly annoyed by aircraft noise versus noise from surface transportation.

5. Nonacoustics variables

Although it is dear that community annoyance is positively correlated with noise exposure level, other variables also appear to be important, such as ambient noise level, time of day and year, location, and socioeconomic status. None of these other variables, however, is as powerful as the attitude of the residents surveyed. This is a good example of the fact that the human being is not a black box, where the effect is a simple consequence of the input. In a recent analysis of 280 social surveys, Fields (1990) examined 17 hypotheses as they relate to community annoyance from noise. Besides noise exposure level, the only variables Fields identified as strongly correlated with noise annoyance there the attitudinal hypotheses: (1) fear that the noise source might be a danger to the neighborhood, (2) belief that the noise is preventable, (3) awareness that non-noise problems are associated with the noise source, (4) stated sensitivity to noise, and (5) belief that the economic activity represented by the source is not important for the community.

6. Habituation

The evidence is fairly dear that so long as the stimulus remains the same, noise annoyance does not subside over time (e.g., Fields, 1990). Griffiths (1983) cites studies showing no habituation for highway noise 4 months to 2 years after the opening of new routes. De long (1990) found that annoyance in a previously surveyed community increased by 10 percent with no change in noise levels. He suggests that this increase could represent a shift of internal criteria due to increased publicity and other factors, or perhaps an increase in physiological sensitization.

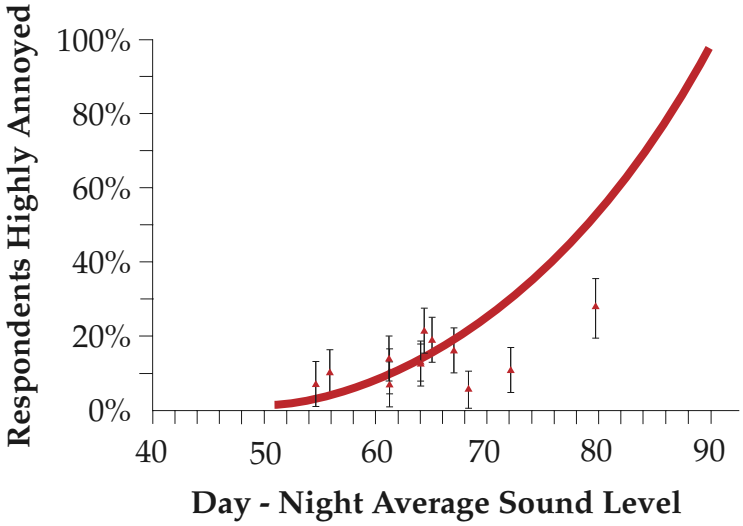

Figure 7 - Relationship of data from Swedish Railroad Study to 1978 synthesis (Schulz) curve, showing percentage of respondents highly annoyed as a function of day-night average sound level. After Fidell et al, 1991).

There has been very little study of the effects of noise-related annoyance on general health, although this would appear to be a fertile field. The study mentioned in section E.4, above by Rehm (1983) suggests a relationship between annoyance and cardiovascular disorders. Likewise, another study indicates a connection between noise and subjective health complaints (Pulles, et al., 1990). De Jong (1990a) refers to the recent use in Germany of the concept of "substantial annoyance" as a

predictor of possible health damage.[25] He recommends the development of an integrated theory of noise effects "to uncover the relationships among medical, physiological, behavioral, and ecological effects of environmental noise. " (de Jong, 1990a, p.520)

8. Summary: Annoyance

Annoyance can be viewed as the expression of negative feelings resulting from interference with activities, as well as disruption of one's peace of mind and the enjoyment of one's environment. Although this reaction can run the gamut of mild irritation to extreme distress, only responses categorized as "highly annoyed" (and greater) have been used to measure the impact of noise on communities. The most respected and widely used criterion to assess community annoyance in the U.S. has been the Schultz curve, although this criterion has been the subject of heated debate. Several recent studies indicate that the Schultz curve underestimates annoyance due to aircraft noise and overestimates annoyance from the noise of urban traffic and trains, leading to the conclusion that annoyance from these categories should be assessed separately. In addition, there has been growing interest in supplementing the traditional DNL with a descriptor for single events.

EPA's Levels Document identified the outdoor level to protect against activity interference as a day-night average sound level of 55 dB. This identification was not to be construed as a standard or regulation,[26] but as information to aid states, localities, and the general public. Later, an interagency task force identified average levels between 55 and 65 dB as "acceptable" for purposes of land-use planning. The DNL 65-dB criterion, which has been applied particularly to airport noise assessments, is now being reconsidered by another interagency task force.

There is evidence that impulse noise is more annoying than continuous noise of equivalent energy, and various correction factors have been proposed to account for the difference. In addition, most people are exposed to a combination of noise sources, and models for predicting the resulting annoyance are in the formative stages.

The most important variables other than noise exposure level relate to people's attitudes about the noise, such as fear of possible danger, stated sensitivity, and the belief that the noise is preventable. Finally, it appears that noise-related annoyance does not subside over time.

VI. Conclusions

Noise has a significant impact on the quality of American life. There is no evidence that the impact has diminished in the years since ONAC was abolished. Rather, it appears that the impact is at least as great, and most probably greater, than it was 10 years ago, due to population growth, especially in urban areas, and the proliferation of certain noise sources.

A considerable amount of noise effects research has been conducted over the last decade, much of it taking place in the European nations where governmental concern about noise is greater than it is in the U.S. at this time. These studies have expanded the knowledge base and filled certain gaps. Many of them suggest important interrelationships between the various noise effects that remain largely unexplored. For example, perceived control over noise appears to decrease its adverse effects on the subsequent performance of certain tasks. The concept of control also has a bearing on annoyance from noise, as do several other nonacoustic factors. Annoyance appears to be related to

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[25] De Jong cites Jansen (1986).

[26] See Foreword, Levels Document (EPA, 1974a).

extra-auditory health effects, and chronic sleep interference, which is a component of annoyance, can have adverse effects on health and well-being.

All of these effects are, to a varying degree, stress related. Nowadays there is increasing evidence in the medical literature on the relationship between stress and illness, one which is often exacerbated by lack of control.

Cumulatively, this evidence suggests the potential for a unifying hypothesis that may well explain some of the health effects that have been observed in connection to noise exposure, but have usually been dismissed because of the absence or insufficiency of direct cause and effect relationships. Such a hypothesis, however, can only be validated by a new interdisciplinary approach, one which takes a broader and somewhat different perspective than is currently employed. This approach could very well provide the key to understanding a great deal more about the general impact of noise on society, and the extra-auditory effects in particular.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

THE HEALTH EFFECTS OF AIR POLLUTION ON CHILDREN

Fall 2000

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Introduction

Air pollution has many effects on the health of both adults and children. The purpose of this article will be to examine what is known about how air pollution affects health, especially children's.

Over the past several years the incidence of a number of diseases has increased greatly. Asthma is perhaps the most important disease with an increasing incidence, but other diseases, such as allergic reactions, bronchitis and respiratory infections also have been increasing. The cause of these increases may be due at least in part to the effects of air pollution. This review will address the following questions:

1. Why are children more susceptible to the effects of air pollution than adults?
2. Which air pollutants have the greatest impact on the health of children and adults?
3. What can be done to reduce the effects of air pollution on children's health?

Why are Children More Susceptible to Air Pollution Than Adults?

In many health effects research studies, children are considered as if they were small adults. This is not really true. There are many differences between children and adults in the ways that they respond to air pollution. For example, children take in more air per unit body weight at a given level of exertion than do adults. When a child is exercising at maximum levels, such as during a soccer game or other sports event, they may take in 20 percent to 50 percent more air -- and more air pollution -- than would an adult in comparable activity.

Another important difference is that children do not necessarily respond to air pollution in the same way as adults. Adults exposed to low levels of the pollutant ozone will experience symptoms such as coughing, soreness in their chests, sore throats, and sometimes headaches. Children, on the other hand, may not feel the same symptoms, or at least they do not acknowledge them when asked by researchers. It is currently not known if children actually do not feel the symptoms or if they ignore them while preoccupied with play activities.

This probably does not mean that children are less sensitive to air pollution than adults. There are several good studies that show children to have losses in lung functions even when they don’t cough or feel discomfort. This is important because symptoms are often warning signals and can be used to trigger protective behavior. Children may not perceive these warning signals and might not reduce their activities on smoggy days.

Children also spend more time outside than adults. The average adult, except for those who work mostly outdoors, spends most of their time indoors -- at home, work, or even at the gym. Children spend more time outside, and are often outdoors during periods when air pollution is at its highest.

The typical adult spends 85 percent to 95 percent of their time indoors, while children may spend less than 80 percent of their time indoors. Children may also exert themselves harder than adults when playing outside.

Perhaps the most important difference between adults and children is that children are growing and developing. Along with their increased body size, children's lungs are growing and changing, too.

The Lung's Important Role in Health
The lung is an extremely complex organ. While most organs in your body are made up of a few different types of cells, the lung contains more than 40 different kinds of cells. Each of these cells is important to health and maintaining the body's fitness.

Air pollution can change the cells in the lung by damaging those that are most susceptible. If the cells that are damaged are important in the development of new functional parts of the lung, then the lung may not achieve its full growth and function as a child matures to adulthood. Although very little research has been conducted to address this extremely important issue, this review will discuss the information that is available.

USC Children's Health Study
Recent results from the Children's Health Study, conducted by investigators at the University of Southern California, suggest that children with asthma are at much greater risk of increased asthma symptoms when they live in communities with higher levels of ozone and particles and participate in three or more competitive sports. Having said all this, the purpose of this review is not to discourage children or adults from normal daily activities and outdoor exercise. Exercise has very important, beneficial outcomes. Appropriate exercise and prudent exposures of children and adults should be encouraged even in an environment that may always contain some amount of air pollution.

Which Air Pollutants Have the Greatest Impact on the Health of Children and Adults?

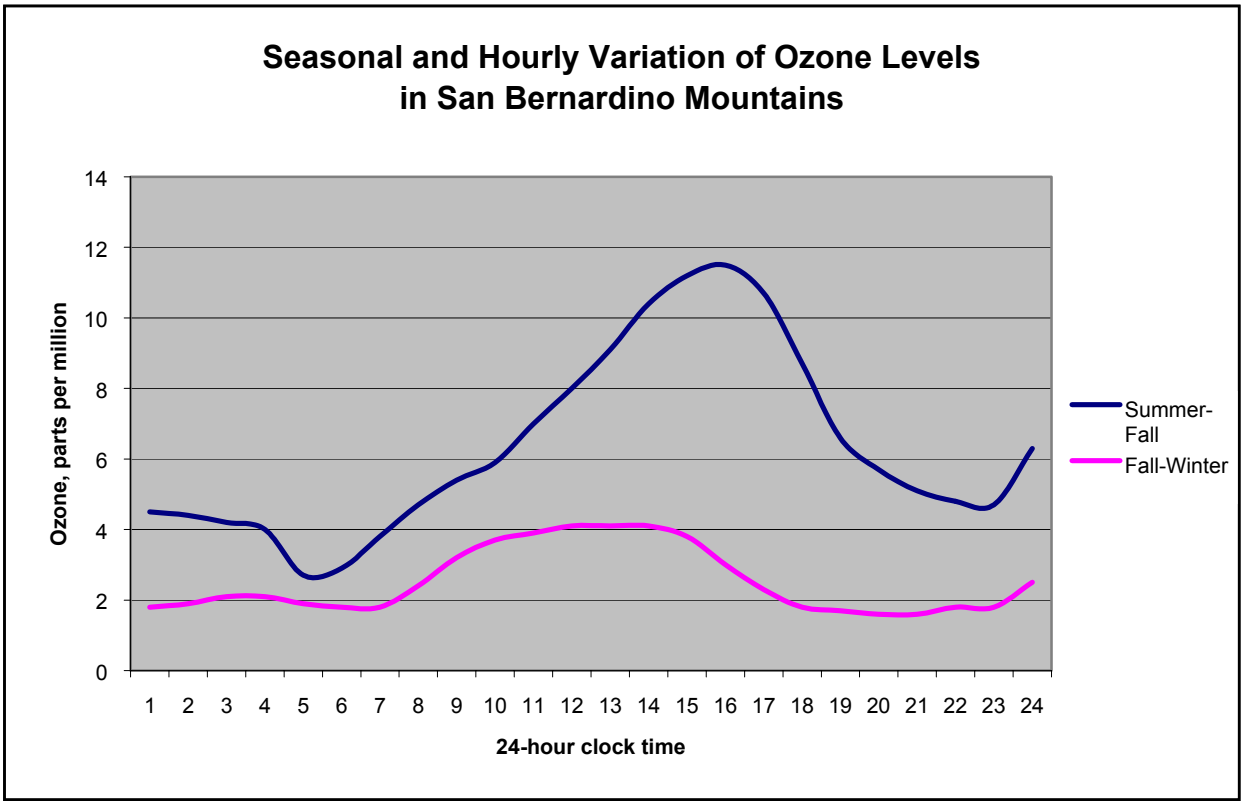
Ozone

Ozone is one of the most important air pollutants affecting human health in regions like Southern California.

Ozone (O_3) is a molecule built of three atoms of oxygen linked together in a very energetic combination. When ozone comes into contact with a surface it rapidly releases this extra force in the form of chemical energy. When this happens in biological systems, such as the respiratory tract, this energy can cause damage to sensitive tissues in the upper and lower airways.

Ozone formation

Because ozone forms as a product of solar energy and photochemical reactions of pollutants, it is not surprising that the highest concentrations of ozone in the atmosphere occur when sunlight is most intense. Thus, ozone generally reaches peak levels during the middle of the day in the summer months. These types of air pollution patterns are called diurnal and seasonal variations. The following graph shows that ozone levels in the San Bernardino Mountains are highest in the summer and fall, and peak in the late afternoon.



Ozone Air Quality Standards

Federal and state agencies have set air quality standards for ozone. An ozone level greater than 0.08 parts per million (ppm) averaged over eight hours is considered unhealthful. This level has been set because both laboratory and community studies have demonstrated measurable effects of ozone at or above that threshold.

The effects of ozone on people include:

- irritation of the nose and throat;
- increased mucus production and tendency to cough;
- eye irritation and headaches for some; and
- during severe episodes, chest pain and difficulty taking a deep breath without coughing.

How Ozone Damages Lungs

What happens when you breathe air that is contaminated with ozone? Like oxygen, ozone is soluble in the fluids that line the respiratory tract. Therefore some ozone can penetrate into the gas-exchange, or alveolar, region of the deep lung.

The following photos show how ozone affects the sensitive tissue in the deep lung. The pictures are from the lungs of rats exposed to ozone in a laboratory under carefully controlled conditions. The human lung is similar --although not identical -- to the rat's lung in terms of the types of cells and the overall structure of the alveolar region.

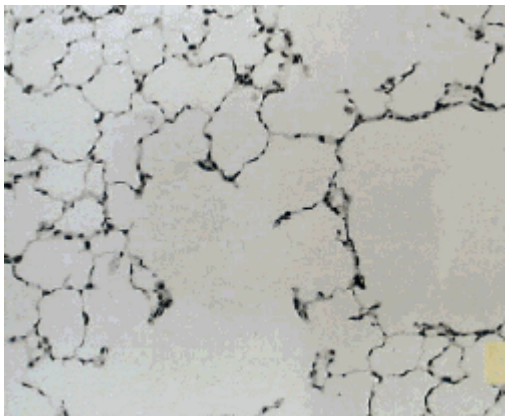


Figure 1

Figure 1 shows a magnified view of the structure of the normal gas-exchange region of the lung. It is called the gas-exchange region because oxygen inhaled from the air is transferred to the hemoglobin in blood in small blood vessels located inside the thin walls separating the alveolar air spaces.

At the same time, carbon dioxide, produced by normal metabolism and dissolved in the blood, is excreted into the air and expired when you breathe out.

The walls of a normal alveolus are very thin. There are only two layers of cells and a thin interstitial matrix separating the air in the alveolar space, or lumen, from the fluid inside the blood vessels. The cells that line the healthy alveoli are mostly very broad and very thin, and are called Type I lung cells or Type I pneumocytes. This provides a very large surface area across which gases can be efficiently transported.

Figure 2 shows the effects of breathing 0.2 ppm ozone for 4 hours. In Southern California air pollution levels can approach 0.2 ppm -- a Stage 1 ozone alert -- during the smoggiest summer days. The photo shows evidence of additional cells, called macrophages, and some material that may be fragments of ozone-injured alveolar wall cells inside the alveolar space.

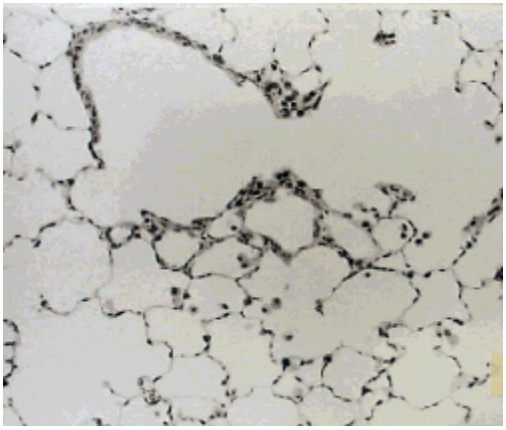


Figure 2

Macrophages are immune system cells that respond to the injury of the delicate cells that line the alveolar lumen. These macrophages play important roles in protecting the lungs from inhaled bacteria,

fungi and viruses, and are also important in helping to repair lung tissue injury caused by inhaled pollutants.

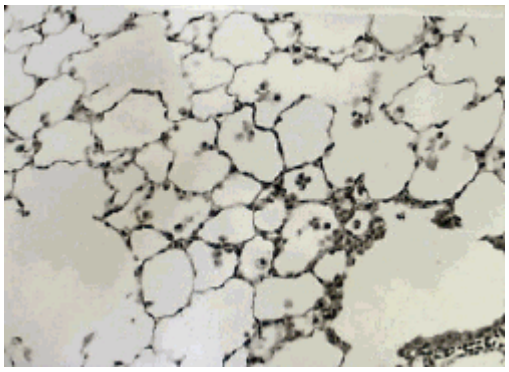


Figure 3

Figure 3 shows more extensive damage following exposure a higher concentration of ozone, 0.6 ppm. The alveolar walls are thicker and there is evidence of cells infiltrating within the walls. There are more macrophages in the alveolar spaces and the thin, Type I cells have been damaged and replaced with thicker Type II, almost cube-shaped cells that are more resistant to the toxic effects of ozone. All of these changes occurred within 48 hours after exposure. If exposure continues for more than three days, the evidence of cell injury seems to be reduced, except for the continuing presence of the Type II cells.

Is Ozone-Related Lung Damage Permanent?
People actually report that the symptoms they feel when first exposed to ozone seem to go away, even though their exposure continues.

Following ozone injury, if the lung is not exposed to ozone for approximately five to seven days, it can for the most part repair itself provided the injury is not too extensive. However, long-term studies with laboratory animals have shown that there may be residual and in some cases permanent damage. This damage might be thought of as accelerated aging of the lung. Thus, frequent exposures to ozone can cause transient damage. The lung's defenses can repair most but probably not all of that damage within a relatively short time in most healthy individuals.

Research and Air Quality Standards
Health scientists probably know more about the effects of ozone on human health than about any other pollutants. This is because ozone is pervasive in the environment. Also there are excellent methods of measuring ozone so the pollutant can be studied using epidemiological methods. The findings of these epidemiological studies can be verified using well-controlled laboratory studies with human volunteers and laboratory animals. Thousands of scientific papers on the health effects of ozone have been published and these have been critically reviewed in documents that provide the scientific basis for National and State Ambient Air Quality Standards. (Ambient refers to outdoor air.)

These so-called Criteria Documents are important because they are extensively reviewed by scientists, public agencies, industry representatives, environmental groups such as the American Lung Association and the Natural Resources Defense Council,

and the public. National and state ambient air quality standards set the goals for healthy air quality in Southern California and across the country.

Based upon the most recent studies, it is now apparent that ozone plays an important role in causing acute health effects, such as heightening asthma symptoms and developing bronchitis symptoms.

The role of ozone in producing long-term or chronic effects is less clear, at least from the available epidemiological studies. However, laboratory animal studies suggest that there can be long-term consequences.

How to Reduce Ozone Exposure
The U.S. Environmental Protection Agency (EPA) has recommended that ozone should not exceed 0.08 ppm averaged over an 8-hr period. When ozone exceeds this level, active children and adults, those with respiratory disease such as asthma, and other people with unusual susceptibility to ozone should limit prolonged outdoor exposure.

Incidentally, personal tobacco smoking during periods of high ozone exposure doubled the risk of asthmatic individuals needing to go to the emergency room for treatment of asthma symptoms.

Carbon Monoxide

Carbon monoxide (CO), a colorless, odorless gas, is a byproduct of combustion.

When inhaled, carbon monoxide reacts very rapidly with hemoglobin in the blood, preventing uptake and transport of oxygen. Because carbon monoxide readily and firmly attaches to hemoglobin, it stays in the blood for a relatively long time. Thus, during an exposure carbon monoxide concentrations in blood can rise in a matter of minutes, then stay high for hours.

Who is Most Sensitive to the Health Effects of Carbon Monoxide?
Most of the health effects directly associated with carbon monoxide are most likely due to decreases in oxygen delivery to vital organs such as the heart and the brain.

People with heart disease may be especially sensitive to the effects of carbon monoxide. In addition, people with lung diseases that limit efficient use of inhaled oxygen, such as asthma and emphysema, may also be susceptible. Even in people without heart or lung diseases, reduced delivery of oxygen to skeletal muscles, especially during exercise, can reduce the ability to perform strenuous work.

At high levels of carbon monoxide exposure, impaired delivery of oxygen to the central nervous system can reduce the ability to respond quickly to external stimuli. After exposures that convert 5 percent to 10 percent of the circulating hemoglobin to carboxyhemoglobin (COHb), people's ability to recognize and react to flashes of light in a test system are reduced. At 10 percent to 30 percent carboxyhemoglobin, nausea,

headaches, unconsciousness, and sometimes death can result. The severity of symptoms increases with the concentration of carboxyhemoglobin.

Air Quality Standards for Carbon Monoxide
Both the EPA and the State of California have set air quality standards for carbon monoxide based on the results of epidemiological and laboratory findings. Ambient levels of carbon monoxide should not exceed 9 ppm, when averaged over an 8-hour interval, and should not exceed 20 ppm in any one-hour period. (The USEPA has a slightly higher 1-hour standard of 35 ppm).

Sources of Carbon Monoxide
The major sources of carbon monoxide pollution are automotive exhaust and emissions from large industrial combustion sources such as electrical power plants. Because these sources produce many contaminants in addition to carbon monoxide -- such as fine particles and nitrogen oxides -- it is often difficult to isolate the health effects of ambient carbon monoxide from those of other pollutants.

In addition to carbon monoxide generated outside, there are also important indoor sources of the pollutant. The most important of these are combustion sources such as gas ovens, gas burners, water heaters, and heating systems. However, in most cases emissions from well-maintained and vented gas appliances are small.

Tobacco smoking is a more significant source of carbon monoxide. Tobacco smoke can contain very high concentrations of carbon monoxide (1,000 ppm to 50,000 ppm). Carbon monoxide levels in the homes of children whose relatives smoke tobacco products can be higher than the carbon monoxide levels outdoors.

Health Effects of Carbon Monoxide
There are hundreds of cases per year of deaths or severe illness due to carbon monoxide poisoning from faulty appliances, indoor emissions of automobile exhaust and industrial exposures. These cases show that carbon monoxide poisoning causes symptoms very similar to those of the flu. In fact, the true number of cases is not really known because many people may have been poisoned slightly and thought that they were just fighting off a cold or the flu. Thus it is very important to make sure that home appliances are well-maintained and that all combustion sources are properly vented to the outdoors.

Epidemiological studies have shown significant association between several health effects and carbon monoxide, although as mentioned earlier it is difficult to completely isolate carbon monoxide's effects from those of other air pollutants.

For example, asthmatic children in Taiwan who were exposed to high levels of traffic-related air pollution -- using carbon monoxide and nitrogen dioxide as marker compounds-- reported more respiratory symptoms than children with lower exposures.

A study of physician office visits in London showed associations between air pollution and doctor visits for asthma and other lower respiratory disease. For children, levels of nitrogen dioxide, carbon monoxide, and sulfur dioxide were associated with increased numbers of medical consultations. However, in adults, the only consistent association was with levels of airborne particles. This suggests that children and adults might respond differently to pollution exposures.

Prenatal Effects of Carbon Monoxide

Carbon monoxide may also have prenatal effects. Pregnant women who were exposed to high levels of ambient carbon monoxide (5 ppm to 6 ppm) were at increased risk of having low birth-weight babies. It has long been known that women who smoke cigarettes during pregnancy have low birth-weight babies, but this is the first study of similar findings in women exposed to environmental carbon monoxide.

Babies exposed to carbon monoxide during the maturation of their organs may suffer permanent changes to those organs. Studies using newborn rats showed that carbon monoxide exposure could cause changes in the heart muscle tissue. This is turn could increase the severity of effects of artery constrictions when they became adults. Other animal studies have shown that long-term carbon monoxide exposure can contribute to a disease called ventricular hypertrophy, in which the cells of the heart's ventricle chambers are enlarged and possibly weakened.

Airborne Particles

Particles, including nitrates, sulfates, carbon[1] and acid aerosols[2] are a complex group of pollutants.

Unlike ozone, which has a specific chemical composition, airborne particles vary in size and composition depending on time and location. Although the components of particles may have common sources, the types and amounts of particles collected at any one time and location may be unique.

To add to the problem, gaseous pollutants including ozone, sulfur dioxide, nitrogen dioxide and carbon monoxide often are present in the atmosphere at the same time as are particles. It is not always possible to clearly differentiate between the health effects of the gases, the particles, and possibly the combination of particles and gases. This complexity presents a tremendous challenge to the scientific community and to public in trying to understand how inhaled particles affect human health.

The Challenge of Measuring Particle Pollution

Precisely measuring particulate pollution is more difficult and labor intensive than measuring gaseous pollutants such as ozone. For this reason, particle concentrations are not measured on a daily basis in most communities. Frequently, they are measured once every six days.

[1] Both elemental and organic. Elemental carbon is pure carbon from combustion sources, including diesel particulate. Organic carbon is a semi-volatile hydrocarbon from combustion and some evaporative sources.
[2] Aerosol is the scientific term used to describe particles suspended in a fluid, such as air.

Particle samples are collected on filters that are then weighed. Particle concentrations are reported in terms of micrograms of particles per cubic meter ($\mu g/m^3$) of collected air.

Originally, the particle samples were relatively indiscriminate with respect to particle size and often contained very large particles. These large particles contributed a great deal to the weighed particle mass, but might not have been very important with respect to lung health. This is because most of the particles were too large to penetrate through the nasal and head airways to reach the lung. A more health-related sample was needed.

After a great deal of scientific consideration it was decided that particulate matter with aerodynamic diameters[3] less than or equal to 10 microns (μm) should be collected. Ambient air quality standards were developed for this material, which is called PM_{10}.

Sources of Particle Pollution

Researchers noted that the sources of relatively large-size particles (greater than 3 microns in aerodynamic diameter) were quite distinct from the sources of particles less than 1 micron in diameter.

The larger, so-called "coarse" particles are mostly produced by mechanical processes, such as automobile tire wear on the road, industrial cutting, grinding and pulverizing processes and re-suspension of particles from the ground or other surfaces by wind and human activities. The chemical composition of coarse particles may be somewhat similar to the chemical composition of soil in that area, along with industrial compounds from activities such as mining or smelting operations. The coarse fraction of urban aerosols also contains bits of plants, molds, spores and some bacteria. Thus the characteristics of the coarse particles may vary greatly in different communities.

In contrast, the smaller or so-called "fine" particles in the urban aerosol come from combustion sources, such as power plants, automobile, truck, bus and other vehicle exhaust or from the reactions that transform some of the pollutant gases into solid or liquid particles. These distinctions may be important because the current air pollution health effects literature suggests, although not with certainty, that for some key health effects the fine particles are more important than the coarse particles. These findings have led EPA to propose a new nationwide $PM_{2.5}$ standard that would reduce exposure to particles that are 2.5 microns or less in diameter.

Historic Air Pollution Disasters

Epidemiological studies have consistently associated adverse health effects with exposures to particulate air pollution. Early studies implicated particulate and sulfur dioxide pollution in the acute illnesses and premature deaths associated with extremely

[3] Aerodynamic diameter is used to define particles' size. Particle deposition on a surface, or in the lung, depends on the particle's aerodynamic and diffusion characteristics. A particle's aerodynamic characteristics depend on its density, shape, actual size, and velocity while its diffusion characteristics are functions of its size and the density of the air in which it is suspended.

severe pollution episodes in Donora, Penn., London, and New York in the 1940s, 1950s, and 1960s. The particle levels in a four-week pollution disaster in London in 1955 were more than 50 times higher than the California standard.[4] Twenty percent of that aerosol was composed of acid sulfates -- probably sulfuric acid. The number of people hospitalized for lung or heart-related diseases was extraordinarily high, but more importantly there were more than 4,000 premature, or "excess," deaths in the London population.

Fortunately, major efforts by government agencies, the public, and industries have made it very unlikely there will ever be a similar episode in modern urban communities. However, the lessons learned from these disasters are still relevant. Despite the fact that our levels of airborne particles are much lower than those that occurred during the disasters, EPA estimates that there are still more than 6,000 excess deaths in the United States that could be associated with inhaled particles.

Health Effects of Particulate Pollution

Current ambient levels of PM_{10} -- 30 to 150 micrograms per cubic meter -- are associated with increases in the numbers of people that die daily from heart or lung failure. Most of these deaths are among the elderly. However there is a strong body of evidence that some children are also adversely affected by particulate matter.

The American Thoracic Society's Environmental and Occupational Health Assembly reviewed current health effects literature. They report that daily fluctuations in PM_{10} levels have been related to:

- acute respiratory hospital admissions in children;
- school and kindergarten absences;
- decreases in peak lung air flow rates in normal children; and
- increased medication use in children and adults with asthma.

The USC Children's Health Study suggests that children with asthma living in a community with high particle concentrations may have suppressed lung growth. After children moved into cleaner cities their lung growth returned to the normal rate, but they did not recover the lost potential growth, according to John Peters, the study's principle investigator.

It is difficult to positively assign a quantitative risk associated with particulate matter because nearly all studies of its health effects find other pollutants present that may account for some of the effects.

Part of the problem is due to the nature of the data being collected. The levels of particulate matter vary during the course of the day and peak values can be quite high. Few studies have evaluated the effect of these short-term "spikes." However, at least one epidemiological study of children with asthma suggested that changes in symptoms

[4] The California standard for particulate matter (PM_{10}) is 50 micrograms per cubic meter averaged over 24 hours

and lung function correlate more strongly with 1-hour peaks than with 24-hour average concentrations.

Other studies, primarily with laboratory animals, suggest that the chemical composition[5] and surface areas of the particles may be more important than particle mass. Scientists are continuing to study the health effects of particles and are developing better methods for measuring the important constituents. It may be possible in the near future to more accurately assess the effects of inhaled particles on human health.

Nitrogen Oxides

Nitrogen oxides are produced during most combustion processes. Mobile sources and power plants are the major contributors in Southern California.

About 80 percent of the immediately released nitrogen oxide is in the form nitric oxide (NO). Small amounts of nitrous oxide (N_2O) are also produced. Nitrous oxide is a "greenhouse" gas that is suspected of playing an important role in global warming.

Nitric oxide reacts with oxygen in the air to produce nitrogen dioxide (NO_2). Further oxidation during the day causes the nitrogen dioxide to form nitric acid and nitrate particles. In the dark, nitrogen dioxide can react with ozone and form a very reactive free radical. The free radical then can react with organic compounds in the air to form nitrogenated organic compounds, some of which have been shown to be mutagenic and carcinogenic.

Health Effects of Nitrogen Dioxide

Nitrogen dioxide is the most important nitrogen oxide compound with respect to acute adverse health effects. Under most chemical conditions it is an oxidant, as is ozone. However, it takes about 10 times more nitrogen dioxide than ozone to cause significant lung irritation and inflammation.

Nitrogen dioxide differs from ozone in that it suppresses the immune system to a much greater degree. As discussed below, some epidemiological studies have shown that children exposed to high levels of ambient nitrogen dioxide may be at increased risk of respiratory infections. Studies with laboratory animals have indeed shown that if mice are exposed first to nitrogen dioxide and later to bacteria at a level that would not infect a healthy control animal, their normal lung defense mechanisms are suppressed and the bacteria are able to infect the host.

[5] The idea that all particles are equally toxic is not scientifically justified. There are many good examples that can be taken from studies of particles in the workplace. For example, certain types of particles that contain quartz --a natural mineral composed of silicon dioxide but with a specific crystal structure -- are very potent lung irritants. Repeated exposures to this material can lead to a serious, permanent lung disease called lung fibrosis. Other mineral particles that are fibrous, such as specific forms of asbestos, can cause lung cancer. Other particles such as titanium dioxide do not seem to cause occupational diseases.

Average levels of nitrogen dioxide in the United States range from 0.02 to 0.04 ppm. Levels in major urban areas in Southern California may be higher, but the region has not exceeded the federal standard[6] for nitrogen dioxide since 1991.

During the 1970s, one of the first studies relating respiratory illnesses and changes in lung function to ambient nitrogen dioxide concentrations reported that children living in areas with high nitrogen dioxide concentrations had greater incidences of lung-related illness than children living in areas with lower concentrations. Since then, other epidemiological studies have suggested that children with asthma are more likely than children without asthma to have reduced lung function and symptoms of respiratory irritation, such as cough and sore throat, when outdoor average nitrogen dioxide concentrations exceed about 0.02 ppm.

Some studies also have suggested that children younger than five years old may be more severely affected by nitrogen dioxide than older children. Several epidemiological studies have suggested that for children, the most important effect of ambient exposure to nitrogen dioxide might be increased susceptibility to respiratory infections and increased severity of responses to inhaled allergens.

Although many epidemiological studies show significant associations between outdoor nitrogen dioxide concentrations and adverse health outcomes, some studies do not corroborate these effects. In part, this is because it is often difficult to fully account for the influences of indoor sources of nitrogen dioxide.

Improvements in Nitrogen Dioxide Measurements

More recent studies have used special devices, called passive dosimeters, that can be worn by children to collect nitrogen dioxide for later analysis. These measurements give epidemiologists the ability to better assess a child's total nitrogen dioxide exposure over the course of the day. These studies show that there can be a great deal of individual variation in exposures, even for children living in the same communities. Thus, it is not surprising that epidemiological studies that do not estimate a nitrogen dioxide dose may reach different conclusions.

However, laboratory studies involving controlled exposures of human volunteers and laboratory animals have demonstrated plausible effects of nitrogen dioxide on human health. For example, if one exposes rats or other animals to nitrogen dioxide, and then examines their respiratory tract tissues, it is very evident that the pollutant can cause short-term injury similar to that seen after ozone exposure.

Long-term exposures to high concentrations of nitrogen dioxide can produce chronic damage to respiratory tract tissue that resembles the lung disease emphysema.

The pollutant's suppression of immune system functions reduces the ability of the host to fight off bacterial and viral infections. Human volunteers who inhaled weakened

[6] 0.053 ppm as an annual average

influenza virus after being exposed to nitrogen dioxide in laboratories were more susceptible to the infection than a control group that did not inhale nitrogen dioxide.

Other studies show that nitrogen dioxide decreases the body's ability to generate antibodies when challenged by pathogens, and may reduce the ability of the respiratory system to remove foreign particles such as bacteria and viruses from the lung.

Lead

People can be exposed to lead (Pb) through air, food and water. Lead is a toxic heavy metal that causes nerve damage and impairs the body's ability to make hemoglobin, leading to a form of anemia.

Sources of Lead Pollution

Large amounts of lead were emitted to the atmosphere when it was used as a gasoline additive.[7] The emitted lead could be inhaled. In addition, lead fallout from the air caused widespread contamination of soil, plants, food products, and water.

Lead is often measured in children's blood as an index of environmental exposure. Even low levels[8] of lead in the blood of children aged 6 to 7 are linked to measurable changes in intelligence quotient and certain perceptual-motor skills. Higher levels of lead exposure can also result in kidney damage and may be related to high blood pressure in adults.

Sulfur Oxides

Most manmade emissions of the gas sulfur dioxide (SO_2) come primarily from the combustion of fossil fuels such as coal, oil, and diesel fuel.

Most of the sulfur in fossil fuel is converted sulfur dioxide, but a small amount is also converted to sulfuric acid. In the atmosphere, gaseous sulfur dioxide can also be converted to sulfuric acid and sulfate-containing particles. Thus, atmospheric concentrations of sulfur dioxide are often highly associated with acidic particles, sulfuric acid particles and sulfate particle concentrations.

The current National Ambient Air Quality Standards for sulfur dioxide are 18 micrograms per cubic meter averaged annually, and 365 micrograms per cubic meter averaged over 24 hours. Southern California does not exceed the national air quality standard because its industries primarily burn low-sulfur fuels such as natural gas. Much of the sulfur oxide air pollution in Southern California is likely to be associated with diesel emissions.

[7] Lead in the form of tetraethyl lead was added to gasoline in the United States in large amounts from the 1950s until it was banned in the mid-1970s.

[8] 10 to 30 micrograms per 100 milliliters

Sulfur dioxide is a very water-soluble gas and therefore most of the sulfur dioxide that is inhaled is absorbed in the upper respiratory tract and does not reach the lung's airways. However, the small amount of sulfur dioxide that does penetrate into the airways can provoke important health effects, primarily in individuals with asthma.

For those with asthma, even relatively short-term, low-level exposures to sulfur dioxide can result in airway constriction leading to difficulty in breathing and possibly contribute to the severity of an asthmatic attack.

A number of epidemiological studies have shown associations between ambient sulfur dioxide and rates of mortality (death) and morbidity (illness). However, because sulfur dioxide is often strongly correlated with fine particles and especially sulfate-containing particles, it is difficult to separate the effects of sulfur dioxide from those of the particle compounds.

A study in France found an increase of 2.9 visits to the emergency room for every 20 micrograms per cubic meter increase in atmospheric sulfur dioxide. The results pertained to days when the average sulfur dioxide levels were above 68 micrograms per cubic meter but below the U.S. health standard.

In London, asthma and other lower respiratory diseases in children were most significantly associated with exposures to nitrogen dioxide, carbon monoxide, and sulfur dioxide. In adults the only consistent association was with particulate matter.

Hospital admissions for children with asthma may increase by 20 percent following acute exposure to ozone peaks and possibly with sulfur dioxide. Chronic exposure to increased levels of fine particles, sulfur dioxide, and nitrogen dioxide may be associated with up to threefold increase in nonspecific respiratory symptoms. Thus, recent literature suggests that sulfur dioxide affects adults and children differently and that chronic and acute effects may also be different.

Diesel Emissions

Diesel fuel is burned to power buses, trucks, road-building equipment, trains, boats and ships and electricity-generating equipment. When diesel fuel is burned, the exhaust includes both particles and gases. Diesel emissions are important constituents of ambient air pollution.

What's in Diesel?

Diesel particles consist mainly of elemental carbon and other carbon-containing compounds. Hundreds of compounds have been identified as constituents of diesel particles. These include polycyclic aromatic hydrocarbons (PAHs) and other compounds that have been associated with tumor formation and cancer. In 1998, the California Air Resources Board designated diesel particulate a cancer-causing toxic air contaminant.

Diesel particles are microscopic. More than 90 percent of them are less than 1 micron in diameter. Due to their minute size, diesel particles can penetrate deeply into the lung. There is evidence that once in the lung, diesel particles may stay there for a long time.

In addition to particles, diesel exhaust contains several gaseous compounds including carbon monoxide, nitrogen oxides, sulfur dioxide and organic vapors, for example formaldehyde and 1,3-butadiene. Formaldehyde and 1,3-butadiene have been classified as toxic and hazardous air pollutants. Both have been shown to cause tumors in animal studies and there is evidence that exposure to high levels of 1,3-butadiene can cause cancer in humans.

AQMD's recent landmark research project, the Multiple Air Toxics Exposure Study II, found that diesel particulate is responsible for about 70 percent of the total cancer risk from all toxic air pollution in the greater Los Angeles metropolitan area.

Diesel emissions may also be a problem for asthmatics. Some studies suggest that children with asthma who live near roadways with high amounts of diesel truck traffic have more asthma attacks and use more asthma medication.

Some human volunteers, exposed to diesel exhaust in carefully controlled laboratory studies, reported symptoms such as eye and throat irritation, coughing, phlegm production, difficulty breathing, headache, lightheadedness, nausea and perception of unpleasant odors. Another laboratory study, in which volunteers were exposed to relatively high levels of diesel particles for about an hour, showed that such exposures could cause lung inflammation.

Thus current epidemiological and laboratory evidence suggests that at typical urban concentrations, diesel exhaust may contribute significantly to the health effects of air pollution.

What Can Be Done to Reduce the Effects of Air Pollution on Children's Health?

After reviewing the literature on how children’s exposures differ from those of adults, it is evident that:

- children are outdoors more hours per day than most adults;
- they exert themselves to a greater degree while they are outside than most adults; and
- they participate in more organized activities than adults.

There are definite health benefits to having children participate in outdoor activities. However, scientific evidence also suggests that air pollution exposures can injure children’s lungs and other organs.

Air quality information in the form of health reports and air quality advisories are now a regular part of life in California. One logical step is to reduce strenuous activities during pollution episodes and try to take advantage of those hours when airborne pollutant levels are lower.

At the public level there is a long-standing commitment to improve air quality. When you look at the air pollution levels in California today you can see that a great deal of progress has been made. There has been a cost for this progress. For instance, some products are more expensive. In return, the lower levels of pollutant exposure compared to 20 years ago should decrease the adverse effect of air pollution on the long-term health of our developing children.

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AGRICULTURAL MITIGATION POLICIES

Background

LAFCO's mission is to encourage orderly growth and development, discourage urban sprawl, preserve open space and prime agricultural lands, promote the efficient provision of government services and encourage the orderly formation of local agencies. LAFCO will consider impacts to agricultural lands along with other factors in its evaluation of proposals. LAFCO's Urban Service Area (USA) Amendment Policies discourage premature conversion of agricultural lands, guide development away from existing agricultural lands and require the development of existing vacant lands within city boundaries prior to conversion of additional agricultural lands. In those cases where LAFCO proposals involve conversion of agricultural lands, LAFCO's USA Amendment Policies require an explanation of why the inclusion of agricultural lands is necessary and how such loss will be mitigated.

Purpose of Policies

The purpose of these policies is to provide guidance to property owners, potential applicants and cities on how to address agricultural mitigation for LAFCO proposals and to provide a framework for LAFCO to evaluate and process in a consistent manner, LAFCO proposals that involve or impact agricultural lands.

General Policies

1. LAFCO recommends provision of agricultural mitigation as specified herein for all LAFCO applications that impact or result in a loss of prime agricultural lands as defined in Policy #6. Variation from these policies should be accompanied by information explaining the adequacy of the proposed mitigation.
2. LAFCO encourages cities with potential LAFCO applications involving or impacting agricultural lands to adopt citywide agricultural mitigation policies and programs that are consistent with these policies.
3. When a LAFCO proposal impacts or involves a loss of prime agricultural lands, LAFCO encourages property owners, cities and agricultural conservation agencies to work together as early in the process as possible to initiate and execute agricultural mitigation plans, in a manner that is consistent with these policies.
4. LAFCO will work with agricultural entities, the County, cities and other stakeholders to develop a program and public education materials to improve the community's understanding of the importance of agriculture in creating sustainable communities within Santa Clara County.

5. LAFCO will review and revise these policies as necessary.

Definition of Prime Agricultural Lands

6. "Prime agricultural land" as defined in the Cortese Knox Hertzberg Act means an area of land, whether a single parcel or contiguous parcels, that has not been developed for a use other than an agricultural use and that meets any of the following qualifications:

    a. Land that qualifies, if irrigated, for rating as class I or class II in the USDA Natural Resources Conservation Service land use capability classification, whether or not land is actually irrigated, provided that irrigation is feasible.

    b. Land that qualifies for rating 80 through 100 Storie Index Rating.

    c. Land that supports livestock used for the production of food and fiber and that has an annual carrying capacity equivalent to at least one animal unit per acre as defined by the United States Department of Agriculture in the National Handbook on Range and Related Grazing Lands, July, 1967, developed pursuant to Public Law 46, December 1935.

    d. Land planted with fruit or nut-bearing trees, vines, bushes, or crops that have a nonbearing period of less than five years and that will return during the commercial bearing period on an annual basis from the production of unprocessed agricultural plant production not less than four hundred dollars ($400) per acre.

    e. Land that has returned from the production of unprocessed agricultural plant products an annual gross value of not less than four hundred dollars ($400) per acre for three of the previous five calendar years.

Mitigation Recommendations

7. Proposals involving the conversion of prime agricultural lands should provide one of the following mitigations at a not less than 1:1 ratio (1 acre preserved for every acre converted) along with the payment of funds as determined by the city / agricultural conservation entity (whichever applies) to cover the costs of program administration, land management, monitoring, enforcement and maintenance of agriculture on the mitigation lands:

    a. The acquisition and transfer of ownership of agricultural land to an agricultural conservation entity for permanent protection of the agricultural land.

    b. The acquisition and transfer of agricultural conservation easements to an agricultural conservation entity for permanent protection of the agricultural land.

c. The payment of in-lieu fees to an agricultural conservation entity that are sufficient to fully fund*:

   1. The cost of acquisition of agricultural lands or agricultural conservation easements for permanent protection, and

   2. The cost of administering, managing, monitoring and enforcing the agricultural lands or agricultural conservation easements, as well as the costs of maintaining agriculture on the mitigation lands.

   * with provisions for adjustment of in-lieu fees to reflect potential changes in land values at the time of actual payment

8. Agricultural lands or conservation easements acquired and transferred to an agricultural conservation entity should be located in Santa Clara County and be lands deemed acceptable to the city and entity.

9. The agricultural mitigation should result in preservation of land that would be:

   a. Prime agricultural land of substantially similar quality and character as measured by the Average Storie Index rating and the Land Capability Classification rating, and

   b. Located within cities' spheres of influence in an area planned/envisioned for agriculture, and

   c. That would preferably promote the definition and creation of a permanent urban/agricultural edge.

10. Because urban/non-agricultural uses affect adjacent agricultural practices and introduce development pressures on adjacent agricultural lands, LAFCO encourages cities with LAFCO proposals impacting agricultural lands to adopt measures to protect adjoining agricultural lands, to prevent their premature conversion to other uses, and to minimize potential conflicts between the proposed urban development and adjacent agricultural uses. Examples of such measures include, but are not limited to:

    a. Establishment of an agricultural buffer on the land proposed for development. The buffer's size, location and allowed uses must be sufficient to minimize conflicts between the adjacent urban and agricultural uses.

    b. Adoption of protections such as a Right to Farm Ordinance, to ensure that the new urban residents shall recognize the rights of adjacent property owners conducting agricultural operations and practices in compliance with established standards.

    c. Development of programs to promote the continued viability of surrounding agricultural land.

Agricultural Conservation Entity Qualifications

11. The agricultural conservation entity should be a city or a public or non-profit agency. LAFCO encourages consideration of agricultural conservation entities that:

    a. Are committed to preserving local agriculture and have a clear mission along with strategic goals or programs for promoting agriculture in the areas that would be preserved through mitigation,

    b. Have the legal and technical ability to hold and administer agricultural lands and agricultural conservation easements and in-lieu fees for the purposes of conserving and maintaining lands in agricultural production and preferably have an established record for doing so, and

c. Have adopted written standards, policies and practices (such as the Land Trust Alliance's "Standards and Practices") for holding and administering agricultural lands, agricultural conservation easements and in-lieu fees and are operating in compliance with those standards.

Timing and Fulfillment of Mitigation

12. LAFCO prefers that agricultural mitigation be in place at the time of LAFCO approval or as soon as possible after LAFCO approval. The mitigation (as detailed in the Plan for Mitigation) should be fulfilled no later than at the time of city's approval of the final map, or issuance of a grading permit or building permit, whichever occurs first.

13. Cities should provide LAFCO with information on how the city will ensure that the agricultural mitigation is provided at the appropriate time.

14. Cities should provide LAFCO with a report on the status of agricultural mitigation fulfillment every year following LAFCO approval of the proposal until the agricultural mitigation commitments are fulfilled.

15. The agricultural conservation entity should report annually to LAFCO on the use of the in-lieu fees until the fees have been fully expended.

Plan for Mitigation

16. A plan for agricultural mitigation that is consistent with these policies should be submitted at the time that a proposal impacting agricultural lands is filed with LAFCO. The plan for mitigation should include all of the following:

    a. An agreement between the property owner, city and agricultural conservation entity (if such an entity is involved) that commits the property owner(s) to provide the mitigation for the loss of prime agricultural lands and establishes the specifics of the mitigation. Upon LAFCO approval of the proposal, the agreement should be recorded with

the County Recorder's office against the property to be developed. The agreement should specify:

1. The type of mitigation that will be provided in order to mitigate for conversion of agricultural lands. (purchase of fee title or easement or payment of in-lieu fees)
2. The agricultural conservation entity that will be involved in holding the lands, easements, or in-lieu fees.
3. The acreage that would be preserved through mitigation and /or the amount of in-lieu fees that would be paid (with provisions to adjust fees to reflect land values at time of payment) along with the methodology adopted by the entity for calculating the in-lieu fees.
4. The location of the mitigation lands, when possible.
5. Information on the specific measures adopted by the city as encouraged in Policy #10 (mitigation for impacts to adjacent agricultural lands)
6. The time-frame within which the mitigation will be fulfilled, which should be no later than at the time of city's approval of the final map, or issuance of the grading permit or building permit, whichever occurs first.
7. The mitigation agreement is to be contingent on LAFCO approval of the proposal.

b. Applicant should provide all other supporting documents and information to demonstrate compliance with these policies.

Construction Noise: Exposure, Effects, and the Potential for Remediation; A Review and Analysis

(Part of AIHA Journal (63) November/December 2002)

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More than one-half million construction workers are exposed to potentially hazardous levels of noise, yet federal and state Occupational Safety and Health Administration (OSHA) programs provide little incentive to protect them against noise-induced hearing loss. Construction noise regulations lack the specificity of general industry noise regulations. In addition, problems that characterize the construction industry, such as worker mobility and the large proportion of small businesses, make implementing hearing conservation measures more difficult. The apparent severity of exposure depends greatly on the measurement method, with the 3-dB exchange rate almost always showing higher average exposure levels than the 5-dB (OSHA) rule. Construction workers demonstrate hearing threshold levels that generally conform to those expected in manufacturing. The prevalence of hearing protection device (HPD) use among U.S. construction workers is very poor, partly because of perceived difficulties in hearing and understanding speech communication and warning signals. In addition, masking by noise of necessary communication and warning signals is of particular concern in construction, where recent research demonstrated the association between fatalities and the failure to hear reverse alarms. Judicial use of HPDs is of the utmost importance, along with avoiding overattenuation, selecting HPDs with uniform attenuation, and using noise-attenuating communication systems when possible. A successful hearing conservation program in British Columbia can serve as a model for the United States, with a long-standing positive safety culture, a high percentage of HPD use, improvement in average hearing threshold levels over the last decade, and a centralized record-keeping procedure, which helps solve the problem of worker mobility. However, controlling construction noise at the source is the most reliable way to protect worker hearing. US manufacturers and contractors should benefit from the activities of the

European Community, where noise control and product labeling in construction has been carried out for more than 20 years.

Keywords: construction workers, hearing conservation, noise exposure

The fact that US construction workers are exposed to hazardous levels of noise and sustain significant hearing impairments is not news. That these impairments are at least as great as would be expected from an industrial population became evident during the 1960s and 1970s. [1,2] Estimated numbers of construction workers exposed to potentially hazardous levels of noise range from about half a million to 750,000. [3,4] In 1988 the National Institute for Occupational Safety and Health (NIOSH) recommended that the Occupational Safety and Health Administration's (OSHA's) noise regulation, including the hearing conservation provisions, be extended to construction workers as well as to other occupations not then covered. [5] A 1995 conference jointly sponsored by NIOSH and the National Hearing Conservation Association identified construction workers as an ‘‘undeserved" population. [6]

In the United States there are separate noise regulations for construction (29 CFR 1926.52 and 1926.101) and general industry (29 CFR 1910.95). The permissible exposure limits (PEL) and requirements for noise control are essentially the same, an 8- hour time-weighted average exposure level (TWA) of 90 dBA with a 5-dB exchange rate between allowable duration and noise level. Engineering or administrative controls are required to be implemented above this level, and hearing protection devices (HPDs) must be issued and worn when exposures exceed the PEL. Both regulations require hearing conservation programs (HCPs) for overexposed workers, but there are two essential differences: (1) the noise regulation for general industry requires the initiation of HCPs at an action level of 85 dBA, whereas the construction regulation does not use an action level; and (2) the general industry regulation gives detailed requirements for noise exposure monitoring, audiometric testing, (HPDs), worker training and education, and record keeping, whereas the construction regulation (1926.52) has only a general requirement for ‘‘continuing effective hearing conservation programs" above the PEL. Construction regulation 1926.101 merely mandates the use of hearing protection above the PEL and requires insert devices to be fitted or determined individually by ‘‘competent persons."

Current enforcement of these noise regulations is not rigorous, particularly in construction. Neither the noise reduction nor the hearing conservation provisions are well enforced in construction. For example, of more than 18,000 federal construction inspections during

fiscal year 1998, only 63 inspections were conducted for the noise regulations, resulting in a total of 79 citations. [7] Lack of enforcement characterizes state as well as federal programs. Even those states that have adopted the general industry noise regulation for construction, such as the state of Washington, have failed to enforce the hearing conservation provisions.

Part of the problem has been a perceived lack of information about the noise exposures of construction workers, although several studies have been conducted over recent decades in the United States and Canada. A more salient reason for the lack of activity in this area is the impracticality of the usual approaches to HCPs in the construction arena. Mobility among construction workers, short periods of employment, and the consequent difficulty in record keeping and follow-up present daunting obstacles. This report attempts to address these issues and offer possible solutions.

NOISE EXPOSURE LEVELS OF CONSTRUCTION WORKERS

Evidence of Overexposure

Several studies conducted in the 1960s and 1970s indicated that construction workers were overexposed. In the early 1980s NIOSH estimated the numbers of workers in various occupations, including construction, exposed to noise levels above 85 dBA. [8] Table I gives the estimated percentage of workers in various construction trades exposed to noise levels above 85 dBA. Although the percentages were derived in the early 1980s, the data on numbers of employees in the various trades has been updated to 1995. [4]

TABLE I. Construction Employment Data (1995) and NIOSH Estimates (1981-1983) of Numbers Exposed at or Above 85 dBA (Adapted from Hattis [4])

SIC	Industry Description	1995 1000s Employees	NIOSH % Exposed .85 dBA A,B
152	Residential builders	609	12
154	Nonresidential builders	567	12
161	Highway and street construction	223	27
162	Other heavy construction	526	17
171	Plumbing, heating, and air conditioning	712	7
172	Painting and paper hanging	179	20
173	Electrical work	593	13

174	Masonry, stonework, and plastering	409	8
175	Carpentry and floor laying	219	32
176	Roofing, siding, and sheet metal	208	11
177	Concrete work	248	40
179	Miscellaneous special trade contractors	548	14
Total (in 1000's)		5041	
A Percentages were rounded to the nearest integer. B Total number exposed .85 5 754,174. [4]			

The highest percentages of overexposed workers occur in highway and street construction, carpentry, and concrete work. Of the approximately 5 million construction workers in 1995, the total number exposed to noise levels of 85 dBA and above was about 754,000. Because NIOSH sampled noise levels rather than exposures, these are not TWAs, and the actual numbers would be somewhat lower when using TWA, but these numbers are useful for ranking the extent of the hazard by trade and to estimate the upper bound of the total number exposed.

Studies of Noise Exposure in Construction Workers

Recent studies have supplemented the earlier ones with noise dosimetry, providing a more precise and comprehensive picture of construction workers' exposures. Table II, containing information from Sinclair and Haflidson, [(9)] shows average daily noise exposures of construction workers by type of construction. The authors obtained samples of up to 5 hours in 27 construction projects during 1991-1992, which, due to the repetitive nature of the work, they considered representative of a full shift. They measured according to the proposed Ontario Noise Regulation, which specifies a 3-dB exchange rate. [(10)] TWA sound levels using the 3-dB exchange rate are sometimes referred to as ‘‘equivalent continuous sound levels" or L^{eq}. Of the 103 workers sampled, the average noise exposure level was approximately 99 dBA.

TABLE II. Average Noise Exposure Levels (Daily L_{eq}) by Type of Construction (Adapted from Sinclair and Haflidson [(9)])

Type of Construction	Number Samples	Average dBA [A]	Range dBA [A]
Residential	7	93	87-96

Roads/bridges	16	93	84-100
Shop work [B]	26	95	85-104
Maintenance	2	95	91-97
ICI [C]	23	96	81-108
Sewer/water	17	99	85-108
Plant work [D]	6	101	87-106
Power station	6	108	93-113
Total	103	99	81-113

[A] Rounded to the nearest integer

[B] Shop work = work in a contractor's fabrication shop.

[C] ICI = industrial, commercial, or institutional.

[D] Plant work = work in a construction contractor's plant.

Table III, also from data gathered by Sinclair and Haflidson, [(9)] shows daily average noise exposure levels by trade, activity, or equipment. The authors caution that in many cases the samples are too small to state definitively which sectors of construction have the greatest risk, but, in their words, ''the magnitude of the problem is obvious." [(p. 459)] From Table III it is clear that boiler- makers and iron workers, at least those studied here, are heavily exposed, with average exposure levels of 108 and 105 dBA, respectively. The authors concluded that pneumatic tools were largely responsible.

TABLE III. Average Noise Exposure Levels (Daily L_{eq}) by Trade, Activity, or Equipment (Adapted from Sinclair and Haflidson [(9)])

Trade, Activity, or Equipment	Number of Samples	Average dBA [A]	Range dBA [A]
Install rebar	2	89	88-90
Carpenter	3	90	82-94
Mason	14	91	84-97
Framer	7	93	87-96
Sprinkler	6	94	86-97
Forming	5	94	87-97
Refractory	2	95	91-97
Sheet metal	17	96	85-104

Ironworker	2	105	98-108
Boilermaker	6	108	93-113
Paver	6	90	84-92
Front-end loader	2	90	87-92
Scraper	5	90	88-91
Curb machine	3	93	86-96
Roller	2	98	93-100
Crane	3	99	95-102
Dozer	6	102	85-108
Heavy equipment	4	90	86-94
Gravel plant	4	102	88-106
Other	4	88	81-90
Total	103	99	81-113
[A] Rounded to the nearest integer			

In another Canadian study, Legris and Poulin [(11)] reported on the noise exposure of heavy equipment operators and laborers. The data were collected in Quebec in the late 1980s and the measurements used a 5-dB exchange rate. The average duration of the work shift was 9.5 hours with a range of 8-12 hours, and the data were normalized to an 8-hour shift. Of the 250 samples taken, 65 were from laborers and 185 from heavy equipment operators.

Table IV gives 8-hour average noise exposure levels for heavy equipment operators and laborers according to Legris and Poulin. The authors explained the variations in exposures by such factors as the location and type of muffler, amount of time the equipment was idling or under load, the power rating of the engine, and the nature of the task. Of particular importance were the presence or absence of an insulated cab and the design of the equipment. Note the 10-dB difference between insulated and noninsulated cabs and the 13-dB difference between crawler and rubber-tired cranes weighing more than 35 tons with noninsulated cabs.

TABLE IV. Average Daily Noise Exposure Levels (8-Hour TWA) of Heavy Equipment Operators and Associated Laborers in dBA (Adapted from Legris and Poulin [(11)])

Operator or Task	Mean TWA	SD	Range
Heavy-duty bulldozer	9	5	91-107
Vibrating road roller	97	4	91-104

Light-duty bulldozer	96	2	93-101
Asphalt road roller	95	4	85-103
Wheel loader	94	4	87-100
Asphalt spreader	91	3	87-97
Light-duty grader	89	1	88-91
Power shovel	88	3	80-93
Laborers	90	6	78-107
Crawler crane .35 ton Noninsulated cab	97	2	93-101
Crawler crane ,35 ton Noninsulated cab Insulated cab	 94 84	 3 3	 90-98 80-89
Rubber tired cane .35 ton Noninsulated cab Insulated cab	 84 74	 5 9	 78-90 59-87
Rubber tired crane, 35 ton Insulated cab	81	4	77-87
Truck-mounted crane	79	2	76-83
Tower crane	74	2	70-76

The results of another, smaller study of operating engineers and laborers are in general agreement with those of Legris and Poulin. Greenspan et al. [(12)] found 8-hour TWAs ranging from about 68 to 103 dBA, with a mean TWA of 89 dBA, although five of the eight samples were above 90 dBA. The study should not be considered conclusive because of the small sample size (N58) and the wide range of exposures, but it gives a clear example of the benefits of noise reduction in machinery design. The 68-dBA exposure was achieved in a Caterpillar 980 front-end loader with an enclosed, sound insulated cab.

Data from the Worker Compensation Board of British Columbia [(13)] are also in general agreement with the above data, although such factors as occupations, sample sizes, and the exchange rate vary from study to study.

Several factors make it difficult to draw comparisons between these kinds of studies. First, the exchange rate has an effect, with the 3-dB exchange rate almost always producing higher exposure levels than the 5-dB exchange rate. Second, the length of the work shift, of course, increases the exposure level; and third, the amount of time each worker spends on each piece of equipment also has an effect.

Effect of the Exchange Rate

Varying and intermittent noise environments are typical of the construction industry, unlike many manufacturing industries in which the noise is relatively continuous. Much of the construction process takes place outdoors, without the reverberant buildup typical of factories, and it is often characterized by the high-level short-duration sounds of hand tools. When noise from heavy equipment predominates, however, the sound tends to be more continuous. Thus, the differences between measurements using the 3- and the 5-dB exchange rate become more pronounced as the type of construction moves from site preparation, which involves much use of heavy equipment, to finishing work involving carpentry and the use of hand tools.

Neitzel, Seixas, and their colleagues at the University of Washington measured the noise exposure levels of 133 carpenters, laborers, ironworkers, and operating engineers with data-logging dosimeters. [14,15] They found that using the 5-dB exchange rate (‘‘OSHA TWA"), 13% of their samples exceeded the 90-dBA criterion and 40% exceeded the 85-dBA criterion. Using the 3-dB exchange rate (‘‘ISO-slow TWA"), 45% exceeded the 90-dBA criterion and 80% exceeded the 85-dBA criterion. These large differences, according to stage of construction, are presented graphically in Figure 1. [14] The boxes represent the range of noise exposure between the 25th and 75th centiles, the brackets show the entire range of exposures, and the horizontal lines within the boxes represent medians. One can see that the differences are larger in finish work than in site preparation and structural work. The authors found the differences to be statistically significant for both finish work and structural work, although not for site preparation.

FIGURE 1. Comparison of OSHA and NIOSH/ISO TWAs by site stage of construction. Reprinted from Neitzel et al. [14] with permission of the first author.

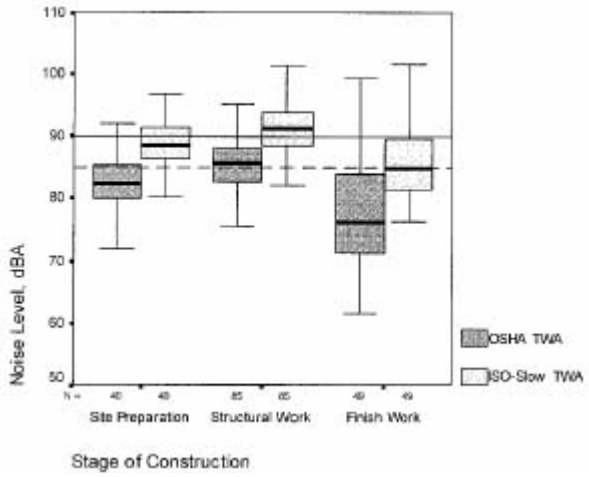
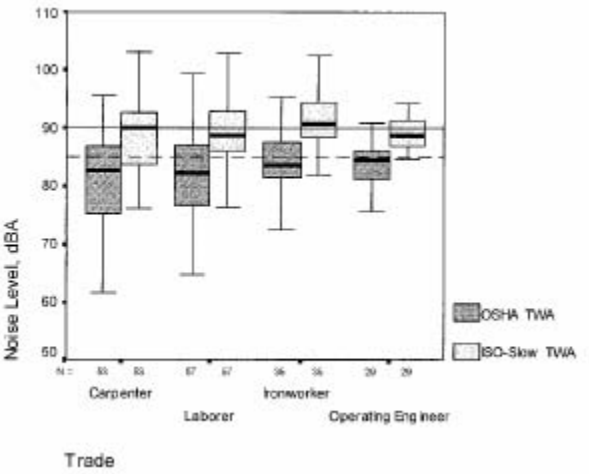


Figure 2, also from Neitzel et al., compares noise exposure levels using the 3- and 5-dB exchange rates by construction trade. The differences are smallest for the operating engineers and greatest for carpenters, but they are also substantial for ironworkers and laborers. In this case all of the differences were significant at the 0.05 level. The authors found an overall difference between the 3- and 5-dB exchange rates of about 7 dB.

FIGURE 2. Comparison of OSHA and NIOSH/ISO TWAs by trade. Reprinted from Neitzel et al. [(14)] with permission of the first author.



Relative Hazard of Construction Equipment

Because construction workers often use several different pieces of equipment, Neitzel and Seixas developed a method by which the average noise contribution of the various tools and equipment could be assessed. Table V gives ‘‘1-min sound levels" of construction equipment. This term represents an average of the 1-min dosimeter readings in L_{eq} (3-dB exchange rate) that came from periods when workers reported using a particular piece of equipment. For example, there was a total of 255 min during which workers reported using an air compressor, and the median sound level, integrated during each 1-min period, was 96 dBA, with a range of 70 to 114 dBA and a standard deviation of 11.2 dBA. The large standard deviations for most pieces of equipment reflect the variations of sound levels and conditions of use.

TABLE V. Median 1-Min Sound Levels in L_{eq} by Equipment/Tool (Adapted from Neitzel et al. [14] Using Additional Data Supplied by Neitzel [16])

Tool Name	Tool Drive Type	Minutes	Median dBA	SD dBA	Range dBA
Air compressor	pneumatic	255	96	11.2	70-114
Backhoe	gasoline	1908	86	6.0	70-108
Bulldozer	gasoline	494	89	8.2	70-104
Chipping gun	pneumatic	1151	93	13.1	70-120
Chopsaw	electric	631	80	8.6	70-106
Crane	electric	3059	78	7.7	70-110
Forklift	gasoline	3727	85	5.8	62-125
Hand hammer	mechanical	4443	85	8.0	56-110
Jackhammer	pneumatic	267	104	11.4	70-112
Lejeune gun	pneumatic	390	89	8.4	70-120
Truck	gasoline	970	78	8.0	70-123
Welding torch	other	1923	84	8.9	70-118

These 1-min average noise levels do not represent noise doses or 8-hour time-weighted exposures, but they do provide a means for estimating the relative hazard of the various pieces of equipment. The reason they may be somewhat lower than measurements taken with a sound level meter is that they tend to incorporate some amount of time when the equipment is either idling or actually turned off. Although it would be useful to have data on additional types of equipment, as well as various models of the same type of equipment,

these data show that pneumatic tools, such as jackhammers and chipping guns, pose a greater risk than those powered by other means.

Chemical and Combined Exposures

In recent years there has been a substantial increase in information on the adverse auditory effects of chemicals, especially when combined with high levels of noise. OSHA estimates nearly one million construction workers are occupationally exposed to lead, [17] a substance known to be ototoxic. [18,19] Solvents, such as toluene and xylene, have been implicated as causes of occupational hearing loss, and, particularly when combined with noise, appear to exacerbate the hazard to hearing. [20-23] In a report on construction laborers, Burkhart et al. [24] placed toluene and xylene high on the list of hazardous chemicals and physical agents in terms of estimated number of exposed workers. Until more details are known about the combined exposures of construction workers, the existing data in this area should be used as added incentive for diligence in protecting workers, both from noise and from potentially hazardous chemicals.

HEARING THRESHOLD LEVELS OF CONSTRUCTION WORKERS

Although there is not nearly as much information on hearing threshold levels of construction workers as there is on noise exposure levels, fortunately, some data do exist. Studies as early as the 1960s and 1970s pointed out the problem. LaBenz et al. [1] measured the hearing of 66 operators of earth-moving vehicles and found considerably more hearing loss than in a population not exposed to noise for all age groups. Kenney and Ayer, [2] with more sophisticated audiometric equipment, measured hearing threshold levels of 33 sheet metal construction workers who regularly used handheld power tools. They found noise-induced threshold shifts that were significant for every age group and greatly exceeded expected hearing threshold levels for the older age groups.

Ohlin [25] prepared an inventory of civilian job specialties giving the number and percentage of workers in each specialty with hearing loss, defined as hearing threshold levels (HTLs) greater than an average of 25 dB at 1000, 2000, and 3000 Hz. The list, found in Table VI, includes several jobs that are associated with construction activity.

TABLE VI. Job Specialties Showing Incidence of Hearing Loss (Adapted from Ohlin [25])

Job Title	No. Audiograms in Specialty	No. with Hearing Loss [A]	Percentage with Hearing Loss[A]
Crane operator	116	38	33
Welder	602	176	29
Carpenter	811	214	26
Engineering equipment operator	340	84	24
Wood worker	258	61	24
Motor vehicle operator	983	185	19
Electrician	495	92	19
[A] HTLs greater than an average of 25 dB at 1000, 2000, and 3000 Hz.			

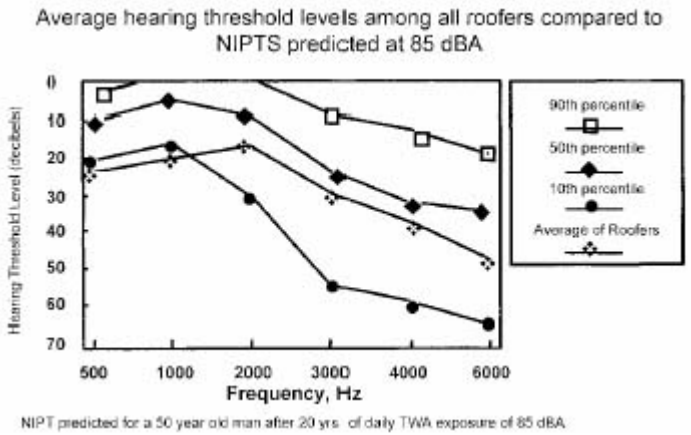
Waitzman and Smith [(26)] performed a multivariate regression analysis based on the combined data from the Public Health Service and Health Examination Surveys of 1960-1961 and 1971- 1975. The authors divided industrial workers into three categories: construction, manufacturing/mining, and other. They found that the construction category showed the greatest amount of hearing loss for all degrees of severity and at all ages, demonstrating the magnitude of the problem in construction and indicating that the onset of noise-induced hearing loss starts early. The relative risk for blue-collar construction workers was three times that of white-collar workers. In addition, white-collar construction workers also had more hearing loss than their counterparts in other industries.

A recent study of hearing loss among 66 roofers was conducted by Schneider and Tennenbaum. [(27)] Subjects completed a questionnaire that included information on other hazards, such as exposure to vibration, fuels, thinners/solvents, paints, glues, lead, extreme heat, and extreme cold, as well as information on hypertension and shooting habits. The average age was 48 years with 20 years on the job. Subjects reported that they generally worked slightly more than half time and they wore hearing protection infrequently (2 always, 7 often, 11 sometimes, and 46 never). The only confounding variables that showed an effect were hypertension and shooting. The authors adjusted the data for shooting by using only the right ear of the 18 subjects that reported use of weapons.

Figure 3, from Schneider and Tennenbaum, [(27)] shows the average hearing threshold levels of roofers compared with the median, 90th, and 10th centiles predicted by ISO 1999 for the same age group exposed for 20 years to average levels of 85 dBA. The roofers' hearing

threshold levels fall between the median and 10th centiles of the ISO prediction.

FIGURE 3. Average hearing threshold levels among roofers compared with those of a hypothetical 50-year-old population exposed to 85 dBA for 20 years as predicted by ISO 1999 using Annex B. Reprinted from Schneider and Tennenbaum [27] with permission of the first author.

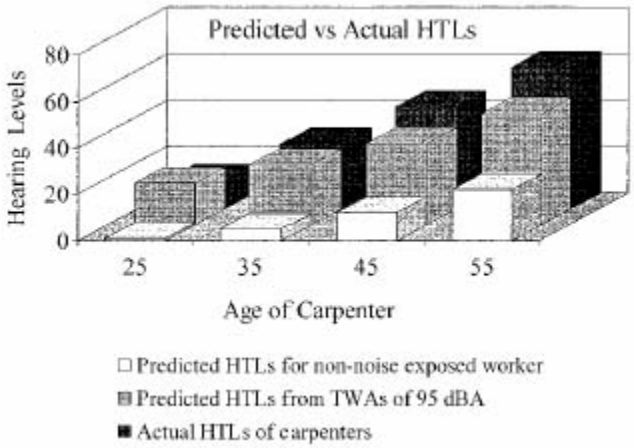


Two factors might cause these thresholds to be overestimates of the true hearing thresholds of roofers. First, the audiometric room was quiet but not soundproofed, which would be likely to produce elevated thresholds in the low and middle frequencies, although lack of soundproofing is unlikely to affect thresholds above 1000 Hz, where the major differences manifest. Secondly, a self-selection bias could occur because these subjects were volunteers at a convention. The bias could, however, work the other way in that some roofers might not volunteer because they did not want to confront the fact of hearing loss. One factor that would cause these thresholds to be underestimates is that they are part-time exposures that are compared with full-time exposures in the ISO method. Thus, to the extent that other roofers work longer hours their hearing losses could be more severe.

Figure 4, from Stephenson, [28] shows predicted compared with actual hearing threshold levels at 4000 Hz for carpenters. The data were collected by NIOSH personnel at a convention, so once again, self-selection may have introduced a bias, either to higher or lower hearing threshold levels. The results are interesting, however, because the author compares mean hearing levels of carpenters with a control group not exposed to noise (Annex A of ISO 1999 or ANSI S3.44, which comprises hearing threshold levels of an ontologically normal [highly screened] population) and to median hearing levels predicted

by ISO 1999 (or ANSI S3.44) of persons exposed to average daily levels of 95 dBA for the same age groups. One can see that the carpenters' hearing threshold levels are considerably greater than those of the subjects not exposed to noise in all age groups, and worse than the 95-dBA populations in the older age groups. These data would indicate, to the extent that this is a representative sample, that the exposures of carpenters equal or exceed an average Leq of 95 dBA.

FIGURE 4. Predicted compared with actual hearing threshold levels at 4000 Hz for carpenters. Reprinted from Stephenson [28] with permission of the author.



Undoubtedly, the most comprehensive HCPs for construction workers are those of the Worker's Compensation Board (WCB) in British Columbia. Figure 5, supplied by the WCB, shows HTLs of carpenters dating from 1988 and 1997. [29] These HTLs are plotted against a population from ISO 1999 Annex B (hearing threshold levels listed in Annex B of ISO 1999 [and ANSI S3.44] are for an unscreened population in an industrialized country) not exposed to noise and predictions of expected hearing threshold levels (noise-induced permanent threshold shift plus age) calculated from the measured exposures of a group of 63 carpenters in British Columbia. The carpenters' data are for the right ear and Annex B data are for the better ear, although any effect caused by this difference should be minimal. The average exposure of the measured group was an Leq of 91.3 dBA. One can see that the carpenters' HTLs were slightly worse than that of the population not exposed to noise but somewhat better than the predictions based on ISO 1999. Also, there is a slight improvement between the measured thresholds in 1997 and those from 1988 in the 6000- and 8000-Hz frequencies.

FIGURE 5. Hearing threshold levels of British Columbia carpenters (triangles, 1988; open circles, 1997) plotted against a population not exposed to noise (closed circles) and predictions of expected hearing threshold levels due to average measured exposures of carpenters of L_{eq} 91.3 dBA (dashed line). Reprinted from Gillis and Harrison [29] with permission of the first author.

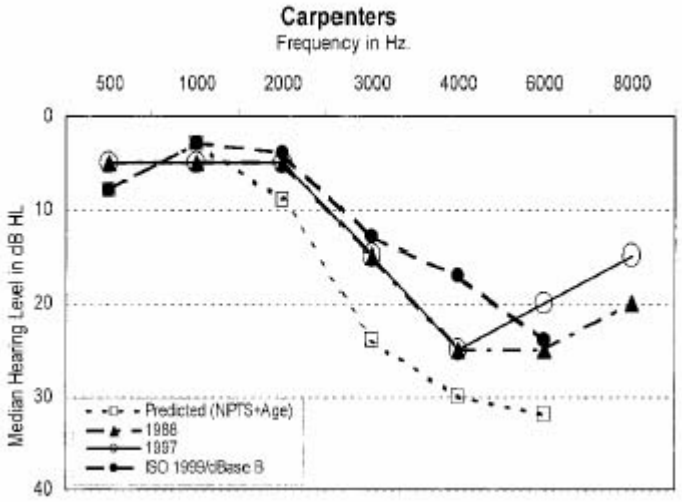
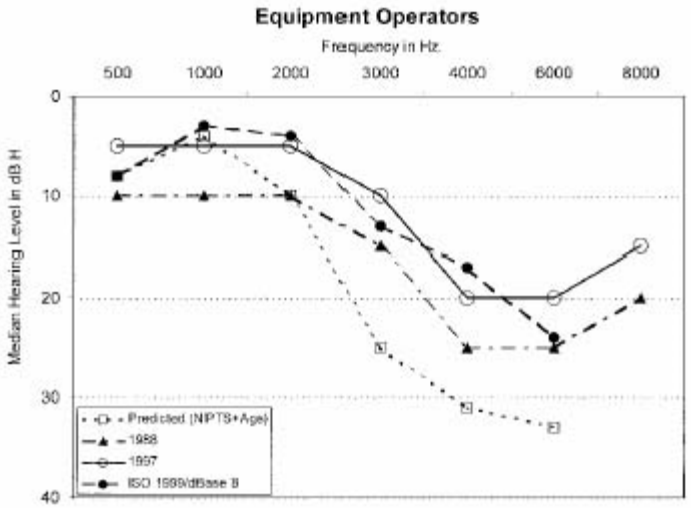


Figure 6 shows the same kind of data for equipment operators. [29] The ISO 1999 estimates of HTL are based on the measured noise exposures of 46 workers with an average L_{eq} of 91.6 dBA. Once again the 1988 HTLs are worse than those of the control population not exposed to noise and better than would be predicted according to the ISO standard. HTLs of the 1997 population, however, mimic the nonexposed curve and are substantially better than would be predicted by the average exposure level of a similar group of equipment operators. The reasons for these improvements are most likely attributable to the success of HCPs, which will be discussed further in the following sections. It is possible that some of the improvements may be due to the learning effect, an artifactual improvement in HTLs that occurs when people take several audiometric tests over a period of time. However, one cannot dispute the large differences between HTLs of these workers and the HTLs that would be predicted from their noise exposures.

FIGURE 6. Hearing threshold levels of British Columbia equipment operators (triangles, 1988; open circles, 1997) plotted against a population not exposed to noise (closed circles) and predictions of expected hearing threshold levels due to average

measured exposures of equipment operators of L_{eq} 91.6 dBA (dashed line). Reprinted from Gillis and Harrison [29] with permission of the first author.



HEARING PROTECTOR USE AMONG CONSTRUCTION WORKERS

Prevalence of Use

The use of HPDs by US construction workers has been notoriously poor, although it has improved slightly in recent years. For example, a 1967 study of occupational health in California noted that HPDs were not considered practical because of heat, dust, dirt, and lack of washing and fitting facilities on job sites. [30] This attitude was probably typical of construction in the United States until fairly recently. Even today, the use of HPDs in construction is not widespread. Greenspan et al. [12] found that only one individual out of the group of operating engineers and laborers they studied used HPDs, and this individual reported that he already had a hearing loss. Most of the group was older than 50 years and most reported that HPDs interfered with communication.

Table VII gives estimated numbers of workers exposed to noise levels of 85 dBA and above in various segments of the construction industry and the reported percentage using HPDs. The numbers of exposed workers are based on NIOSH estimates from 1981-1983, updated to reflect 1995 construction employment data. [4] The percentages are based on NIOSH observations from 1981-1983. One should keep in mind that the numbers exposed include

all of those exposed to levels, not TWAs, of 85 dBA and above. Even so, the percentage observed using HPDs is quite low, and virtually nonexistent in certain trades.

TABLE VII. Estimated Numbers of Workers Exposed at or Above 85 dBA and Percentage Using HPDs (NIOSH Percentage Estimates [1981- 1983] Using 1995 Construction Employment Data. Adapted from Hattis [(4)])

SIC	Industry Description	NIOSH Est. No. Exposed >85 dBA	Reported % Using Hearing Protection
152	Residential builders	75,500	1
154	Nonresidential builders	66,300	15
161	Highway and street construction	60,400	11
162	Other heavy construction	90,500	44
171	Plumbing, heating, and air conditioning	52,700	16
172	Painting and paper hanging	35,100	0
173	Electrical work	74,100	0
174	Masonry, stonework, and plastering	33,500	11
175	Carpentry and floor laying	70,700	0
176	Roofing, siding, and sheet metal	22,300	3
177	Concrete work	98,500	19
179	Miscellaneous special trade contractors	74,500	35
Total		754,100	avg. 15%

The information in Table VIII summarizes the prevalence of HPD use according to various studies. In their survey of operating engineers, carpenters, and plumbers/pipefitters, Lusk and her colleagues found that overall, 24% of those surveyed never used HPDs when exposed to high levels of noise, and only 5.3% always wore them when exposed. [(32)]

TABLE VIII. Summary of Prevalence of HPD Use According to Various Studies

NIOSH (NOES) (1981-1983)[A]
Highway and street construction, 11%
Carpentry and floor laying, 0%
Plumbing, heating, and air conditioning, 16%
Overall average, 15%

Lusk et al. [31]		
Operating engineers, 49%		
Carpenters, 18%		
Plumbers/pipefitters, 32%		
Overall average, 33%		
British Columbia WCB [29]	1988	1998
Equipment operators	74%	90%
Carpenters	49%	77%
Electricians	55%	87%
Laborers	64%	64%
Truck drivers	46%	73%
Welders	76%	94%
Overall average	56%	75%

[A] Examples from Table VII

By contrast, the majority of British Columbia construction workers regularly used HPDs, even in 1988, when hearing conservation efforts were formally initiated in construction. According to Harrison, [33] British Columbia has required the use of HPDs since 1967, and a positive safety culture has existed there since the early 1970s, when hard hats and HPDs were fairly widely accepted. Enforcement of hearing conservation requirements was stepped up in the early 1970s, mainly in the forestry industry, but compliance appeared to spread into other sectors at that time. The widespread use of HPDs by 1988 is likely to be the primary reason for the better-than-expected hearing threshold levels of the carpenters and equipment operators shown in Figures 5 and 6.

Practical Considerations

The need for construction workers to communicate with each other is as great or greater than in most manufacturing industries. This is particularly true of personnel operating heavy and mobile equipment, such as loaders, dozers, and cranes, as well as personnel on the ground or in structures who need to communicate with them. Unless these workers are fitted with effective two-way or multiway communication systems, HPDs are likely to be viewed as a hindrance to communication and the perception of warning signals. This is especially true of workers who have already incurred a noise-induced hearing loss.

Most of these noise-induced hearing losses occur in the frequencies above 1000 Hz, which

is the area most critical for the understanding of speech. Unfortunately, HPDs attenuate most effectively in this same frequency range. Consequently, spoken communication and indeed many warning signals become more difficult to perceive and understand when the person with noise-induced hearing impairment wears HPDs. There is a considerable body of research indicating that persons with noise-induced hearing loss are at an increased disadvantage in the perception of speech and warning signals when they wear HPDs. (34)

By contrast, a recent laboratory study of the effects of HPDs and hearing loss on the ability to perceive a common back-up signal indicated that persons with fairly severe losses could still detect a common reverse alarm at a signal-to-noise ratio of 0 dB. (35) These results are not definitive, however, because of the small size of the experimental population and because the subjects had no additional demands on their attention. It does suggest that even hearing-impaired persons wearing HPDs are able to perceive warning signals under certain favorable conditions.

There is also a body of research on listeners with normal hearing that shows that the use of HPDs can actually improve the perception of speech and warning signals in high-noise conditions. This is especially true when the noise is continuous. It appears that the point at which HPDs no longer provide an advantage for normal-hearing listeners is between about 80 and 90 dBA. (34)

However, much of construction noise tends to be intermittent or varying. Intermittent noise, which is typical of carpentry and finishing operations, is characterized by large differences in sound level and periodic interruptions at relatively low levels. Varying noise, which is more typical of the heavy equipment noise generated during site preparation, is characterized by ample differences between maximum and minimum levels, but low-to-moderate levels in between are present for a considerable amount of time. (36,37) Although HPDs may benefit communication during high noise periods, they are likely to be an impediment during the periods of intermittency when noise is below 80-90 dBA, and yet construction workers need to communicate and hear warning sounds during these periods.

This problem would suggest the need for HPDs that can be easily put on and taken off, such as muffs or semiaurals. There are, however, drawbacks to both of these protectors in the construction environment. First, muffs are sometimes incompatible with hard hats and safety glasses. Some muffs can be worn with the headband under the chin, but this position may be awkward. Muffs that are actually attached to the helmet are a popular alternative, but the attenuation is not always as great as with standard muffs because of difficulties in

proper orientation and fit. The temple bars of safety glasses will often break an earmuff 's seal and attenuation will be reduced. Semiaurals may be useful as they are very easy to don and doff, but workers often find them uncomfortable and dislike the effects on the perception of their own voices due to the ‘‘occlusion effect" they sometimes generate. (38)

Interestingly, most workers in the British Columbia program, where the rate of use is highest, prefer to wear earplugs rather than earmuffs or semiaurals. In 1997, 64% of the construction workers reported using plugs, 13% used muffs, 1% used a combination of plugs and muffs, and 22% used no HPD. The use of plugs in British Columbia has greatly increased since a previous survey in 1981, and the use of muffs has decreased. (39)

Earplugs also have their disadvantages, aside from the fact that they require more time and effort to put on and take off than muffs or semiaurals. User-molded plugs, which have become by far the most popular type of plug, require clean hands to roll down and insert. The dust and dirt typical of construction sites can become imbedded in the plug and therefore a possible hygiene problem.

Localization of the sound source can be very important in construction. Workers need to be aware of warning signals, shouts from coworkers, and back-up alarms from moving vehicles. Both plugs and muffs degrade the ability to localize in the horizontal plane (left-right) and muffs have a devastating effect on localization in the vertical plane. (34,40,41) This fact has particular implications for the safety of iron workers and others who depend on communication in the up-down dimension.

It is true that hearing loss itself degrades the ability to localize (42) and to perceive speech and warning signals, (34) and one of the best ways to prevent hearing loss is the effective use of HPDs. This presents a difficult paradox because one is reluctant to generate safety problems in the effort to reduce an adverse effect on both safety and health.

The most recent noise regulation in British Columbia, which applies to construction as well as general industry, requires the posting of noise hazard areas when average exposure levels exceed 85 dBA (L_{eq}) or peak sound levels exceed 135 dBA. Employers must supply HPDs and workers must wear them in areas that have been posted. (43) This would presume that construction workers would be obliged to wear HPDs during the quiet periods and in noise levels between 80 and 90 dBA, even if they should pose a safety hazard. The regulation does state, however, that workers must wear HPDs ‘‘in accordance with instructions provided by the employer." Hopefully, employers would see fit to allow, even encourage

workers to remove protectors when noise levels drop below about 85 dBA, but such flexibility on the part of both contractors and workers may not be easy to achieve. Employers often have the idea that bigger is better, and seek out HPDs with the most attenuation, regardless of an employee's noise environment and job needs. This practice can lead to overprotection, when too much attenuation can prevent workers from hearing sounds that are necessary to their job performance and safety. HPDs with only mild or moderate levels of attenuation can be quite adequate, as long as they are worn properly.

The British Columbia noise regulation requires certain selection criteria for HPDs, which are based on the Canadian Standards Association Standard, Z94.2-94, ‘‘Hearing Protectors" and its appendix. These criteria include communication demands on the worker as well as the worker's hearing ability and daily noise exposure. (43) The requirements should have the effect of encouraging employers not to overprotect.

In the United States the ANSI standard (S12.6) for estimating the attenuation of HPDs has recently been revised to include a subject-fit protocol (Method B) in addition to the traditional experimenter- fit method (Method A). (44) Using the new subject-fit procedure results in noise reduction ratings (NRRs) that are somewhat lower, but considerably more realistic than those derived by the earlier method, which is still printed on the HPD's package. US employers should be encouraged to use the newer Method B values whenever available, and to understand that they are more reflective of real-world use. In other words, employers should understand that hearing protector attenuation needs to be adequate but not excessive, and that overkill is a bad idea.

Regardless of whether HPDs improve or interfere with the perception and identification of warning sounds in specific cases, many construction workers believe that they will be a hindrance and therefore resist wearing them. A survey of carpenters' attitudes showed that nearly 50% believed they would be unable to hear warning sounds when wearing HPDs, and an additional 17% was unsure. (45) This problem calls not only for improved training, but an educated sensitivity on the part of those who dispense and supervise the wearing of HPDs.

Potential Solutions

Over recent decades, certain HPDs have been developed with speech communication and warning signal detection in mind. They may be classified as passive attenuators, attenuators aided by electronics, and communication systems. (For a comprehensive review of

technology advances in HPDs, see Casali and Berger. [46])

Passive attenuation is characteristic of conventional plugs and muffs that do not use electronic systems. An example of a relatively new passive device is the Ultra 9000 (Aearo Co. Indianapolis, Ind.), a level-dependent earmuff that uses a valve system to achieve low levels of attenuation in low noise levels, with substantial attenuation in impulsive noise conditions. [47] Although this muff provides somewhat less attenuation in the low frequencies than in the middle and high frequencies, the slope between 500 and 8000 Hz is relatively flat (when worn correctly), which is desirable for speech communication. Other earmuffs without the level-dependent characteristic are currently being marketed for their communication advantages. An example is the Bilsom NST (Bacou-Dalloz Inc., Reading, Pa.), which has a relatively uniform attenuation between 250 and 6000 Hz.

Another promising development in the passive category are the ER-15 and the ER-25 plugs (Etymötic Research, Elk Grove Village, Ill.). The former provides a uniform attenuation of approximately 15 dB throughout nearly the entire frequency range, and the latter 25 dB of attenuation, although it rolls off slightly in the low frequencies. According to Killion et al., [48] the acoustics of the ER-15 plug were developed to mirror the natural response of the open ear while providing some amount of attenuation. It has become known as the ‘‘musician's earplug" because of its popularity among musicians, who require spectral ‘‘fidelity." Because its official NRR is only 7 dB, it is not appropriate for all occupational uses. The ER-25, however, does provide more attenuation, with an NRR of 16. The major drawback to these HPDs is that they must be custom molded to the user's ear, which adds considerably to the cost.

There are some conventional earplugs that attempt to achieve a flat attenuation at much lower cost. For example, Aearo's Ultratech plugs, with NRRs of 12 or 16 dB, are premolded plugs that have a slope of only 10 dB between 125 and 8000 Hz when worn correctly. Even though the NRRs of these devices are not as impressive as the 25-to-30 dB of many other HPDs, their attenuation would be sufficient for many construction activities, as long as they are inserted and worn properly.

There are two types of earmuffs that employ electronics. One uses noise cancellation to achieve attenuation. The other uses amplification to permit the passage of low and moderate levels of sound, maintaining a constant level at the ear. It then acts as a passive attenuator at high levels. An example of the latter is the Peltor Tactical 7-S (Aearo Co., Indianapolis, Ind.). This type of HPD offers promise of protection against high-level impulses

superimposed against a background of relative quiet. (46)

Noise canceling earmuffs use electronics to generate an ‘‘antinoise" signal that reduces incoming noise levels by 20 dB or so in the low frequencies. An example of this HPD would be the ProActive 3000 muff (Noise Cancellation Technologies Inc., Stamford, Conn.), with an NRR of 21 dB assessed in the passive mode. These devices are useful mainly in environments characterized by high levels of low-frequency noise, where C-weighted levels exceed A-weighted levels by at least 10 dB. Because the electronics take up considerable room in the earcup, they cannot achieve as much passive attenuation as certain other protectors. However, they can produce a flatter attenuation curve when the active noise reduction feature is activated by boosting attenuation in the low frequencies and they can also reduce the troublesome masking properties of low-frequency noise. As of 1989, at least seven different companies had working models of active noise reduction headsets using noise cancellation technology, (49) but that number is probably lower today. Cost is a drawback, with prices ranging from $150 up to $1000 per set. (46)

It appears that there has been little laboratory or field testing of speech recognition with either type of electronically aided muffs. These HPDs may indeed be of benefit to speech communication and warning signal detection, but further evaluation is indicated before they are relied on in situations when speech communication is critical.

Communication headsets, however, have been used successfully over the years when communication at a distance is necessary. Although they cost anywhere from $200 to over $600, the expense can be more than offset by the benefits of clear and necessary communication. Noise cancellation may be used in these devices as an added benefit in the reduction of low-frequency noise, as in the Aviation Headset X (Bose Corp., Framingham, Mass.). Passive attenuating muffs may be plugged into existing radio systems, or self-contained units are also available for communication at distances of up to 2 miles. Several companies manufacture HPDs as communication headsets, with NRRs ranging from 21 to 29 dB. (50)

With the passage of the Americans with Disabilities Act in 1990, it is within reason to speculate that employers, including construction contractors, may need to provide workers who have hearing losses with HPDs that are suited to their communication needs, both in terms of spoken communication and the perception of warning signals. (51)

Clearly, the only practical, long-term solution to the many problems of hearing protector use

in construction is noise control, both in the design and manufacture of construction equipment and at the construction work site.

AUDIOMETRIC MONITORING/ RECORD KEEPING

Audiometric testing is of little value unless serial audiograms can be compared, threshold shifts detected, and measures taken to halt the progression of noise-induced hearing loss. Single audio-grams may indicate hearing loss, but unless a series of audiograms imply an occupational cause, the process is only one of documentation rather than conservation of hearing.

Barriers to Successful Audiometric Monitoring and Record Keeping

There are several reasons why meaningful audiometric testing and the proper keeping of records are difficult in the construction industry. These include (1) mobility of construction workers, (2) the temporary and seasonal nature of employment, (3) the small size of construction companies, and (4) the prevalence of self-employment.

The Center for the Protection of Workers Rights has compiled a substantial amount of information about the construction industry and its workers from the Bureau of Labor Statistics, the Bureau of the Census, and other sources, which can illuminate these issues. (52)

Mobility. Depending on the size and nature of the project, construction workers may work for one company for only a matter of weeks or months, or up to many years. The average duration, however, is less than in the manufacturing industries. Job tenure in construction also depends on whether an employee belongs to a union. In 1993 the median job tenure in construction for union employees was 5 years and for nonunion employees, 3 years. (52, chart 20b) However, nearly 80% of construction employees are not unionized. (52, chart 14a)

Temporary and Seasonal Nature of Employment. Temporary unemployment is common among construction workers, and seasonal breaks are particularly common in the northern states. Unemployment ranges from 5 to 10% higher in construction than in the general population (52, chart 20c) and the rate of failure in construction companies has been consistently greater than in other industries as a whole. (52, chart 11a)

Small Size of Construction Companies. Small businesses are less likely to conduct

audiometric testing, and those with 10 employees or fewer are generally exempt from record-keeping requirements. Nearly 82% of construction establishments have less than 10 employees and less than 1% have more than 100 employees. (52, chart 3c)

Prevalence of Self-Employment. Construction workers who are self-employed are less likely to be part of an employer's safety and health program, and are unlikely to have their own hearing tested. About 2 million of the estimated 5 million construction workers list themselves as self-employed, and 75% of these are unincorporated. (52)

Potential Solutions

Centralized Systems

British Columbia. The most successful HCP for construction workers is the program conducted by the Worker Compensation Board (WCB) of British Columbia. One measure of its success can be seen in the better-than-expected hearing threshold levels of construction workers and the improvements between the thresholds in 1988 and those measured in 1997. The examples given in Figures 5 and 6 are representative of all of the trades measured. (29) This program has the advantage of being centralized in the WCB, which is supported from fees taken out of the worker compensation premiums of British Columbia employers.

The program has been in effect for construction workers since 1987, when audiometric tests were initiated, and since then tests have been conducted annually. An updated noise regulation specifies a PEL of 85 dBA, a 3-dB exchange rate, a peak sound level limit of 135 dBA, and engineering controls above these limits whenever practicable. (43) Noise exposure monitoring and training and education are required at an action level of 0.5 (an L_{eq} of 82 dBA), but these latter requirements are not rigorously enforced in the construction industry. (53)

The WCB trains and certifies all technicians, who then provide audiometric testing, training, and counseling to construction workers. Audiometric information, including a medical history, is collected by the technicians on an optical-read form and scanned onto a WCB mainframe. In addition, workers carry with them a ‘‘WorkSafe" card, which contains a record of their hearing test, the date of the test, and boxes in which the technician may check whether the worker has received an explanation of the results, a fit test of hearing protection, or whether the requirement to wear HPDs has been discussed. Workers are advised to show the card at the next test in one year. The regulation requires also that the

employer maintain, ‘‘in a manner acceptable to the board," (sec. 13.120) a record of the hearing tests for each worker as long as the worker is employed by that employer. (43)

Information about noise control and other aspects of hearing conservation is made available to employers through a WCB newsletter as well as through the technicians. Roberts (53) reports that compliance with the regulations is fairly good in heavy construction, commercial building, and road construction, but poorer in housing construction and among small-business contractors (which is not surprising). Also, because the regulation requires hearing tests ‘‘not later than 6 months after the start of employment, " (sec. 13.116) workers on short jobs are likely to be overlooked.

European Programs. Bygghälsan, the Swedish Foundation for Industrial Safety and Health in the Construction Industry, was founded in 1968. Its support was generated by assessing contractors for fees based on hours worked, and, like the British Columbia program, provided a central repository for hearing test data and other types of information. Its activities in recent years have been severely curtailed because of government cutbacks. The CPWR Chart Book, however, does contain data showing the decreased prevalence of ‘‘severe high-tone hearing loss" in Swedish construction workers between 1971-1974 and 1986-1990. (52, chart 40c)

In Germany, Arbeitsmedizinischer Dienst, state-run occupational health centers assist small companies with audiometric testing and the retention of audiometric records. (54)

Requirements of Other OSHA Regulations. Welch and Roto (55) report that of the 21 OSHA regulations requiring medical monitoring, 13 apply to construction. Both lead and asbestos have their own construction versions, although lead is, at this time, a final interim rule. The lead standard, 29 CFR 1926.62, requires a full medical examination when blood-lead or air sampling levels exceed certain criteria. The asbestos standard, 29 CFR 1926.1101, requires medical monitoring for all employees who are exposed above the PEL or an ‘‘excursion limit" for a combined total of 30 days or more per year. A medical exam must be given at least annually. It should include pulmonary function tests and may include a chest X-ray at the discretion of the physician. An exam is not required if records show that an employee has been examined within the past year.

The general industry regulation for hazardous waste operations, 29 CFR 1910.120, also requires medical examinations, and the revised respirator standard, 1910.134, requires

physician clearance for workers to wear continuous-flow respirators. These standards also apply to construction.

Employers, including construction contractors, are required to ensure that these tests are performed and must pay for them. The problem is that the many complex characteristics of construction mentioned above (mobility, seasonal and short-term nature of the work, prevalence of self-employment, etc.) work against efficient medical monitoring programs, especially the keeping of records. OSHA's record-keeping rules, which have the same provisions for construction as for general industry, limit the requirements for short-term employment and for companies with 10 or fewer employees, except in cases of fatalities or multiple hospitalization accidents. Clearly, great numbers of construction workers are falling through the cracks.

Even for those companies that would be responsible for keeping records of medical monitoring, the question remains as to what to do when employees move on. The construction regulation for access to medical records (29 CFR 1926.33), which is identical to the general industry regulation (29 CFR 1910.1020), states that employers need not retain records after an employee's termination, but may simply give the records to the employee, provided that the employee has not worked there for more than 1 year.

But the question of effective follow-up remains open, especially in the case of audiometric testing, which is so dependent on the comparison of serial audiograms. There appears to be little experience with effective records management for construction employees for any health hazard outside of British Columbia. The one exception may be joint labor-management programs.

Joint Programs. Several of the unions whose members perform construction work have negotiated medical monitoring, testing, and training programs through the collective bargaining process. Examples of these are ironworkers, painters, carpenters, laborers, and sheet metal workers. All of these unions have centralized funds used mainly for training, but that also pay for some medical testing, such as asbestos exams, lead, and clearance for working with hazardous waste. (56)

A good example of this type of program is the MOST (Mobilization Optimization, Stabilization, and Training) program run by the boilermakers union. (57) The program covers drug, pulmonary function, and respirator fit testing, as well as safety glasses and safety training for some 20,000 boilermakers at this time, and it will soon involve 26,000 construction workers in Michigan. In addition, it is now open to all crafts in the nation. One

of its most interesting aspects is the Employee Verification System, the ability of employers to call in to the program headquarters and obtain information on pulmonary function levels, as well as the dates on which all testing and training occurred. The program used to include full medical exams, including audiometric testing, but that segment was discontinued due to expense.

Unfortunately, there is no evidence in the United States of joint labor-management programs for construction workers that include audiometric testing and record keeping.

Even though these joint programs may be very successful, there are two principle disadvantages. First, union members are understandably reluctant to pay for medical monitoring and training when OSHA regulations have mandated these as employer responsibilities. Even though it is actually the employer who pays, workers may be reluctant to use collective bargaining to achieve benefits that are their right by law. The second and most obvious disadvantage is that 80% of the construction work force is not organized and therefore would not benefit from this type of arrangement.

There is no reason, however, why contractors could not pay into a fund for purposes of medical monitoring, including audiometric testing and record keeping, which would be managed by a public or private agency. This fund would then cover all construction workers, whether or not they were unionized.

State-Run Programs. There are, in fact, some states that have adopted OSHA's hearing conservation amendment for construction workers. For example, the State of Washington's Department of Labor and Industry is divided into a worker compensation section and an occupational safety and health section, the latter having jurisdiction over noise regulations. However, there has been virtually no enforcement or compliance with the construction noise standard, so merely adopting the federal hearing conservation standard for construction workers is not necessarily the answer unless the state is willing and able to enforce it.

It appears that the best solution would be a program like that of the WCB. Here, a centralized agency, in this case the WCB of the Province of British Columbia, not only keeps the records but trains the technicians, ensures follow-up, and provides quality control. This function could be carried out within the United States by state agencies, such as health departments.

There is a program called the Adult Blood Lead Surveillance program, funded by NIOSH

and the Centers for Disease Control and Prevention, in which 26 states keep a register of the effects of lead and other heavy metals. These data are generally used for epidemiological purposes, but in some cases for individual follow-up. In New York, for example, all blood lead levels are sent to the State Department of Health and high levels can trigger follow-up phone calls to lead-exposed individuals. (58) In addition, some states have cancer or silicosis registries.

Although a state-run program is likely to be the most efficient solution for HCP elements such as audiometric testing and record keeping, these programs are always susceptible to the whims of state legislatures or federal funding sources. The perfect solution is elusive.

Credit-Card Type Storage Devices

Contemporary technology could make the problem of construction worker mobility somewhat more tractable. These devices, like optical cards, may be carried in one's wallet and are capable of storing considerable amounts of information. Evidently they are already being used for documenting safety training. According to Stephenson, (59) any audiometer that can communicate with a personal computer (which is a great many audiometers nowadays) can handle these devices. All that is needed is the appropriate software and a special drive. NIOSH has this capability at this time.

An example of the effective use of these ‘‘smart" cards is the program that allows travelers to cross the US/Canadian border by inserting a card encoded with the individual's fingerprint into an optical reader. According to a press release issued by Canon USA in 1995, these cards can store the equivalent of 1600 pages of text or other digital data, and they are already widely used in the health care field as a portable clinical record. (60) No doubt the technology has advanced considerably since then.

NOISE, HEARING LOSS, AND ACCIDENTS IN CONSTRUCTION

Accidents in Construction

Traditionally there has been a high rate of occupational injuries in the construction industry. Sweeney and her colleagues collected the following data from the Bureau of Labor Statistics and various other sources: (61) Construction workers represent 6.5% of the work force, but 18% of the fatal injuries occur in construction. After mining and agriculture, construction ranks third for workplace fatalities and injuries. The leading causes of

construction fatalities include falls (31%) and transportation incidents (27%). Contact with or being struck by an object and musculoskeletal disorders account for more than 50% of all traumatic injuries. Construction workers are twice as likely as the average worker to be killed by a motor vehicle, and 40% of worker fatalities from motor vehicle accidents are pedestrians. Nearly 2000 machine-related deaths in construction occurred between 1980 and 1992 and in nearly one-third of the cases the worker was struck by a moving mobile machine. Laborers (23.5%) and operating engineers (22.6%) accounted for nearly half of the machine-related deaths.

Possible Contribution of Noise and Hearing Loss

There is little objective information linking noise exposure or hearing loss with accidents specific to construction, but common sense would suggest that many of these accidents might have been prevented had workers been able to perceive warning shouts or signals. The high incidence of fatalities from being struck by objects, of transportation incidents, and the frequency of fatal accidents from moving machines (especially with pedestrians as victims) all suggest a breakdown in communication.

Noise and hearing loss have been implicated in studies of other industries. For example, noise and hearing loss were found to be accountable for 43% of the injuries in a shipyard setting. (62) The authors considered other possible causes, such as alcohol consumption, cigarette smoking, and the use of earplugs, and found that alcohol consumption was the only significant factor besides noise and hearing loss. It appears that the authors controlled for age and job hazard.

Zwerling et al. (63) assessed the likelihood of occupational injuries in a large sample of workers drawn from the National Health Interview Survey. These workers had listed themselves as having some kind of preexisting impairment: visual or hearing impairment, back conditions, upper or lower extremity conditions, diabetes, epilepsy, and arthritis. The authors found that the highest risk of job-related injuries came from workers having sensory impairments with odds ratios for blindness of 3.21, deafness 2.19, hearing impairment 1.55, and visual impairment 1.37 (which was not statistically significant). Of the seven occupational groups studied, laborers represented about 8% of the total cohort, and approximately 36,000 in this group (13%) were construction laborers.(64) The remainder of the group included material handlers, as well as operators of various kinds of vehicles and equipment, some of whom might also be considered construction workers. The category titled laborers was one of three blue-collar categories, the others being mechanics/repairers,

and operators/assemblers. The odds ratio for injury among laborers was 4.16, the highest of any of the groups.

Another study of a large industrial population compiled accident data from factories over a 2-year period. [65] The authors found that the frequency of accidents and illness-related absences increased with increasing noise exposure levels for both men and women. The relationship between noise exposure and accidents was significant for men but not for women. Unfortunately, it can be very difficult to control for the hazardous nature of various jobs in this kind of study, and it is possible that high levels of noise may be related to jobs that are inherently hazardous.

Reverse Alarms

In recent years there has been some attention to the questionable effectiveness of back-up alarms in mobile machinery. A study by Laroche et al. [66] demonstrated that the audibility of back-up alarms on dump trucks is compromised because of the ineffectiveness of their acoustic signals. Laroche and Lefebvre [67] traced 22 fatalities to faulty back-up alarms in the Province of Quebec over a 15-year period. Table IX provides an updated version of these data, giving the cause of each accident and comments about noise levels and the back-up alarm specific to each situation. [68]

TABLE IX. Deadly Accidents Involving Heavy Vehicles and Noise (After Laroche et al.; [69] Updated, Expanded Version Translated into English Provided by Laroche [68])

Case No.	Date of Accident	Employee	Vehicle Involved	Cause of Accident	Comments
1	08-29-91		tow truck		noise level exceeded alarm
2	06-02-88	splitter/operator (aluminum co.)	forklift	poor visibility, plus backup alarm not detected	
3	04-28-88	water system installer	dump truck (?)	backup alarm not detected	poor synchronization of maneuvers
4	09-04-87	flag person (construction site)	dump truck (10 wheeler) backup alarm:	backup alarm not detected	alarm: 90 dBA; noise from steamroller: 87

			DAP		dBA
5	07-01-87	quality control attendant (construction site)	dump truck (10 wheeler) Kenworth 1974	backup alarm not detected	backup alarm in front of the 2 back axles and directed toward the left. alarm : 80-85 dBA; noise: 105-107 dBA
6	01-09-87	flag person (construction site)	dump truck (10 wheeler)	misjudgment by worker	alarm level greater than noise levels
7	08-08-86	marine docker	forklift	backup alarm not detected, plus driver's vision obstructed	noise: 84-96 dBA; alarm: 12 dBA
8	08-15-85	flag person (road repair)	5-ton truck backup alarm: DAP 50	backup alarm not detected, plus poor planning of operations	noise: 92 dBA; alarm: 75 dBA
9	11-21-83	shipping and receiving clerk (interior site of a pharmaceutical co.)	delivery truck	noise from truck was not detected	high noise level because of construction
10	10-06-82		loaded dump truck, Mack 76 (10 wheeler) (28,800 kg)		poor judgment or noise level same as alarm
11	09-24-82	docker (port)	road hauler	noise from hauler was not detected	high noise level, poor lighting; one-way circulation

12	09-17-82		10 wheeler dump truck		alarm was not functioning, high noise level
13	01-20-82	general foreman (James Bay site)	loaded cement mixer (82,000 kg)	backup alarm not detected	alarm: 83 dBA at 1 ft noise: 107 dBA at 3 ft
14	11-23-81	welder (railroad)	grinder, LORAM	horn was not detected	horn: 97 dBA welding noise: 90.5 dBA
15	08-10-81		loader		lack of good work method, no backup alarm
16	12-06-78	garbage collector assistant	garbage truck	backup alarm or noise not detected (?)	surrounding noise greater than truck noise
17	08-21-78	flag person (road repair)	dump truck (10 wheeler)	backup alarm not detected	noise level greater than alarm
18	01-08-76	digger operator (Miron)	Ford 8000 dump truck (8 wheeler) (10 tons)	noise from truck was not detected	no backup alarm
19	12-29-75	flag person (snow removal)	leveler	noise from leveler was not detected	no backup alarm
20	07-08-75	flag person (steel works site)	dump truck (19 tons)	noise from truck was not detected	worker was walking with his back to the truck
21	08-14-75	crane operator	platform type tow truck	noise from truck was not detected	no backup alarm
22	07-08-75	truck driver (road repair)	dump truck (7 tons)	noise from truck was not detected, also subject was very close to the back of the truck	high noise level

23	03-18-75	pedestrian (construction site)	dump truck	noise from truck was not detected	high noise level, no backup alarm
24	03-12-75	engineer (road excavation)	loader (2.5 tons)	noise from loader was not detected	high noise level

Laroche and Lefebvre [67] concluded that there are at least five principle causes for these types of accidents: (1) hearing loss among construction workers, (2) high noise levels on some sites, (3) worker attentional demand or complacency, (4) inadequate placement of alarms, and (5) deficient acoustic features of the alarms.

The adverse effect of hearing loss should be self-evident, as with high noise levels, because they both would degrade the ability to perceive back-up alarms as well as warning shouts. Worker at-tentional demand from complex tasks or stimuli could cause the failure not so much to hear but to attend to the warnings produced by back-up alarms (see review of this subject by Suter, Ref. 34, Chapter 4). Inattention caused by habituation also could reduce the ability to react appropriately to the sound of warning alarms.

Laroche and Lefebvre [67] reported that placement of the back-up alarm is often problematical. For example, some owners position the alarm underneath the vehicle to protect it against weather, which placement has an attenuating effect. With regard to deficient acoustic features, the authors found that most back-up alarms produce puretone signals around 1400 Hz or modulations of two neighboring sounds, 1250 and 1350 Hz. Reflections of these sound waves on the ground or diffraction by the sides of vehicles have the effect of reducing or even canceling them before reaching the listener. Within spaces of less than a few inches, Laroche and Lefebvre found variations in sound pressure level of more than 15 dB behind vehicles. Finally, the use of a pure tone in the 1500-3000 Hz range is not efficient for purposes of auditory localization. [69]

There are several reasonable solutions to these problems. First would be to prevent hearing loss through noise control, the judicial use of HPDs, and training. Second, noise levels on the construction site should be reduced through the manufacture and purchase of quieter equipment and the proper maintenance of all noise-producing equipment. Third, workers should be trained in the awareness of warning signals as well as all aspects of hearing conservation. Fourth, back-up alarms should be placed for optimal reception by the intended listener. Fifth, greater attention should be given to the workers' sound environment and sound propagation in the design of the alarm, as well as the psychoacoustics of audition.

Laroche and Lefebvre [67] caution that back-up alarms should not emit just one pure tone because of the considerable risk of sound cancellation, but instead should produce several frequencies in the 500 to 2000 Hz range that are not harmonically related.

In optimal conditions the sound level of an alarm should exceed the background noise by 10-15 dB. However, this can pose a problem to the residents neighboring construction sites, who often complain about the noise of back-up alarms. A partial solution could be found in the form of an auto-adjusting alarm, which senses noise in the environment and adjusts its signal to a level 10 dB above that of the background noise. An example is the Starmatic 63-000 (Star Warning Systems Co., Avon, N.Y.), an auto-adjusting back-up alarm, with a range of 87-112 dB.

One final recommendation came from a safety workshop attended by laborers, and that is that personnel backing heavy vehicles should use an additional worker as a ‘‘spotter." [56] This worker is presumably in a place where the operator can see him or her, and it is important that the worker is trained and alert because Laroche and her colleagues found that the ‘‘signalman" was sometimes the one who was fatally hit. [66]

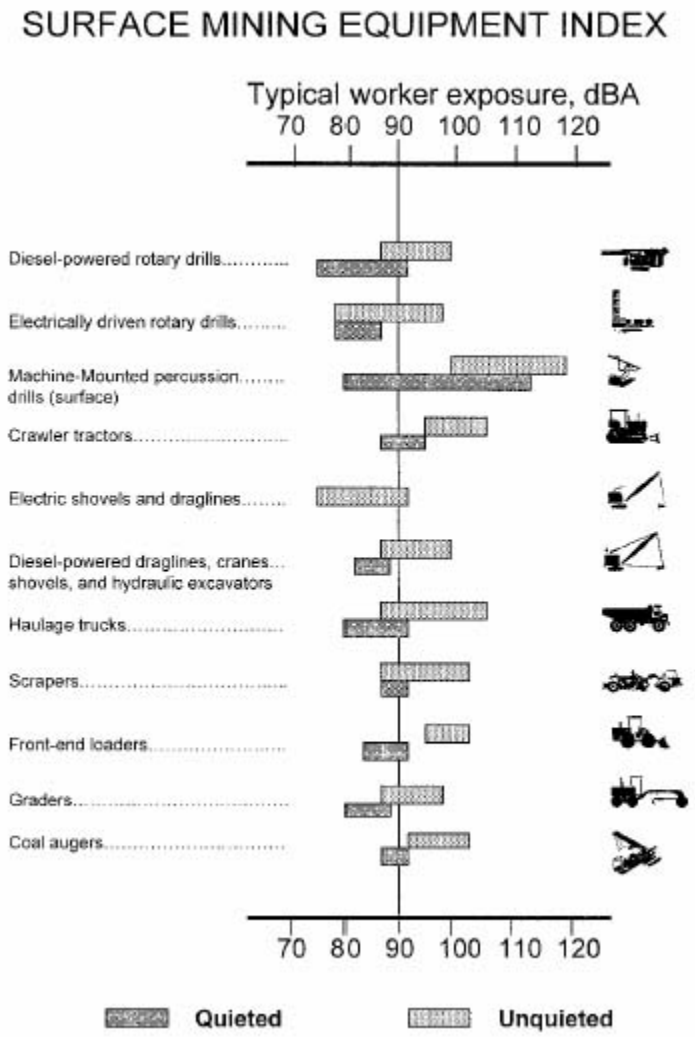
NOISE CONTROL IN CONSTRUCTION

There is a considerable amount of information available on the control of noise in the various aspects of construction, and a detailed discussion of this topic is beyond the scope of this report. A brief overview, however, would be useful. Noise control solutions include the efficient operation and maintenance of construction equipment, retrofit of existing equipment, and the design of quieter new equipment.

Feasibility

It appears that noise reduction in most construction sites and for most construction equipment is feasible. Although some tools will still require the use of HPDs for adequate protection, there is a great deal that can be done. Figure 7, from the Bureau of Mines, gives examples of how noise control could be applied to surface mining machines, several of which are used in construction. [70] Note the dramatic reductions achieved in haulage trucks, front-end loaders, and graders. Although some of these noise problems may have been mitigated in contemporary equipment, undoubtedly many have not yet been sufficiently quieted.

FIGURE 7. Examples of how noise control may be applied to surface mining equipment, some of which is used in construction. Reprinted from Bartholomae and Parker, [(70)] US Bureau of Mines publication.



Maintenance

One of the least expensive and most rewarding noise control practices is the proper operation and maintenance of equipment. This includes keeping noisy operations away from workers who are not involved in that process, lubricating parts, keeping saw blades

sharpened, and replacing worn bearings and other parts as needed. It also involves keeping the doors and windows of noisy vehicles closed to the extent possible to protect the operator from the engine and exhaust noise. Like any vulnerable part, noise control measures, such as gaskets and mufflers, need to be maintained and replaced when necessary to provide the desired attenuation.

Retrofit

Retrofit applications, such as those advocated in the Bureau of Mines Handbook, [70] include installing mufflers, enclosing and insulating the cabs of noisy vehicles, and enclosing parts of noisy machines. Table X, from Schneider et al. [51] lists types of construction equipment and suggested retrofit controls. The authors give references for each control measure. For example, they cite a report by the Society of Automotive Engineers, which found that changing from an inadequate to a better muffler could make a difference of 1-3 dB, and installing a muffler where one had been lacking could make a difference of 10-12 dB. [71]

TABLE X. Noise Controls for Construction Equipment (from Schneider et al. [51])

Equipment	Noise Controls
Pile driver	Enclosure, muffler
Stone cutting saw	Noise control pad with water
Handheld impact drills	Reduction of reflected sound
Circular saw blades	158 tooth angle, new tooth configuration, slotted saw blades, viscoelastic damping
Pneumatic tools	Muffler
Pavement breaker/Rock drill	Muffler, enclosure of cylinder case and front head, moil damping
Portable air compressor	Muffler, acoustic enclosures
Bulldozer	Cab-liner material, enclosure, sound absorption in canopy, sealing of all openings
Wheeled loader	Absorption of sound cooling air route
Vibratory roller	Flexible mounting for pump compartment
Joint cutter	Antivibration mounting fixtures

There may be times when retrofits yield only small improvements in noise level and HPDs

are still necessary to prevent hearing loss. Researchers at the Mine Safety and Health Administration found that retrofit controls tend to reduce high-frequency noise more readily than low-frequency noise, often resulting in differences between C-weighted and A-weighted noise levels that exceed the nonretrofit condition, even though A-weighted levels had been reduced. (72) Although this finding should not discourage the use of retrofit measures, it does provide additional support for choosing HPDs with good low-frequency attenuation and careful training in their effective use.

Design

The most efficient and economical stage at which to control noise is in the design phase. This is true both in the design of a potentially noisy work space and in the design of equipment. For example, changes in the pathways of ductwork can reduce fan noise, (73) and changing low-frequency jet noise to high-frequency can make it easier to control. (74)

At an Environmental Protection Agency (EPA) hearing many years ago, George Diehl, an acoustical engineer with the Ingersoll-Rand Co. (Woodcliff Lake, N.J.), reported on a ‘‘whisperized" air compressor, in which the noise level had been reduced from 110 dBA to 85 dBA. (75) At that time the company was also working on noise from rock drills (pavement breakers and jackhammers), and had reduced the noise between 8 and 10 dB, while simultaneously reducing vibration. Mr. Diehl also discussed another type of demolition tool called a ‘‘hobgoblin," which was mounted on a backhoe. Because it was hydraulically operated it had no air exhaust, and therefore, the major source of noise was reduced. He reported that it could do the work of 10 to 24 regular paving breakers while producing considerably less noise. (75) It appears that this kind of push for the control of construction noise in the United States has diminished, but it continues to progress in Europe.

There is, however, an interesting innovation being developed called the Raptor (Brookhaven National Laboratory, Upton, NY), a machine that fractures concrete by firing steel nails from silencer-equipped guns. It is reported to work more rapidly than the conventional jackhammer, does not rely on an air compressor, and the noise level is projected to be below 80 dB. (76)

Resources

There are many such reports on noise control solutions in the construction industry. Some of

them are consolidated in booklets or a series of articles. In addition to the sources cited by Schneider et al., (51) the following are some examples.

Mining Machinery Noise Control Guidelines, 1983, a Bureau of Mines Handbook. (70) This publication contains information on the noise levels of surface and underground mining equipment, some of which is used in construction, particularly in the site preparation phase of large construction projects. For each piece of equipment the booklet lists typical noise levels, along with recommended treatments, quieted noise levels, costs in dollars and labor in hours, and the availability of treatments. These descriptions include sources for commercially available noise control products and materials, technical reports on the development and demonstration of noise control treatments, and case histories.

Noise Control, Proceedings: Bureau of Mines Technology Transfer Seminars. (77) This book of proceedings contains specific articles covering some of the same types of information as above, with more text.

Constructional Noise: A Survey of Noise on Building Sites, Byggha¨lsan, Stockholm. (78) This booklet gives octave band and A-weighted noise measurement data for more than 30 examples of construction noise sources, along with information on the work operation, cause of the noise, and suggested control measures for each type of equipment or setting. Although these data are more than 25 years old, many are undoubtedly still applicable. It includes comments about controls and the need for hearing protection.

Noise Control: A Guide for Workers and Employers, US Department of Labor. (79) Although this guide pertains to general noise problems and their solutions, some of the principles of noise control also apply to construction. It was originally published by the Swedish Work Environment Fund, translated, then edited and adapted by OSHA.

‘‘Noise Control: Principles and Practice," published in *Noise News International* between June 1994 and June 1999, form a series of 15 articles by Stig Ingemansson, the original author of the Swedish guide previously cited. (80) The articles represent an edited and updated version of the older guide.

Many papers and articles on noise control, some of which deal with construction, are available in the publications of the Institute of Noise Control Engineering, which has headquarters in Pough-keepsie, NY These include Noise Control Engineering Journal, Noise News International, and the proceedings of annual conferences, both US and international.

In addition to the preceding suggestions, there are other publications, such as those cited by Neitzel and Seixas: [15] Alfredson and May, [81] Kessler, [82] and Mulholland and Attenborough. [83]

EPA

The Office of Noise Abatement in the US EPA, which functioned between 1972 and 1982, made significant efforts to control noise in the general environment, including construction noise. Funding for the program was terminated in 1982 by the Reagan administration, and the office was closed. However, the statutory requirements still stand because Congress has never rescinded them: the Noise Control Act of 1972 and the Quiet Community Act of 1988 (P.L. 92-574, 1972 as amended at U.S.C. 4901-4918, 1988).

Of interest in the area of construction are the regulations for medium- and heavy-duty trucks, air compressors, and regulations for the existing motor carrier fleet. These regulations are still in effect but are not being enforced. Two pieces of construction equipment, pavement breakers and rock drills, were identified as major sources of noise and set on the path toward regulation, but were ‘‘disidentified" when the program closed in 1982. The agency also considered the regulation of wheel and crawler tractor noise emission. The Noise Control Act required EPA to regulate the labeling of products that emitted or reduced noise, but EPA only promulgated one regulation in this category, the attenuation of HPDs.

A considerable amount of information about construction noise was generated by the agency, most of which is listed in EPA's *Bibliography of Noise Publications.* [84] Some titles pertaining to construction noise are listed in Appendix A. In addition, EPA has microfilmed much of the materials from the Office of Noise Abatement, and many of its contractor reports are still obtainable.

EUROPEAN STANDARDS AND DIRECTIVES

Activities of the European Community Undoubtedly the most interesting developments in noise standards and regulations are currently occurring in the European Community (EC), now known as the European Union (EU). With the economic unification of European countries, the effort to harmonize existing standards and to develop a unified approach to new standards has been taking place for nearly two decades. There are now a great many

European standards and directives in the field of noise measurement, effects, permissible limits, and control, including some that are specific to construction.

Although publications in this area tend to use the terms ‘‘standard" and ‘‘directive" interchangeably, the word ‘‘standard" is usually applied to measurement procedures or proposals set forward by consensus groups such as the International Organization for Standardization (ISO) or the International Electrotechnical Commission (IEC). The term ‘‘directive" usually applies to an order issued by the Council of the European Community (CEC), and this order is generally mandatory for implementation by the member states of the EU.

The EU speaks in terms of the ‘‘old approach" and the ‘‘new approach" to the issuance of directives. The old approach, taken prior to 1985, applied to one product at a time and was very time-consuming. The new approach resembles enabling legislation, in that these directives apply to broad categories of products. Under the new approach, the CEN prepares nonmandatory technical specifications, the purpose of which is to assist manufacturers in the design of products so that these products will meet mandatory directives. Although the new approach was followed for directives issued in 1985 and thereafter, directives issued under the old approach still apply. Some of the old approach directives are being revised, and some new directives are still being issued under the old approach. (85)

Construction Directives

One of the earliest directives issued by the EC specified measurement methods for determining the A-weighted sound power levels of construction plants and equipment. (86) This directive was followed in 1984 by several specific directives, (85) which stipulated measurement methods and permissible sound power levels for air compressors (84/553/EEC; 85/406/EEC), tower cranes (84/ 84/534/EEC), welding generators (84/553/EEC; 85/407/ EEC), power generators (84/536/EEC; 85/408/EEC), and concrete breakers and picks (84/537/EEC; 85/409/EEC). In 1986 the EC issued a directive on hydraulic and rope-operated excavators, dozers, loaders, and excavator-loaders (86/662/EEC; 89/514/EEC). Several of these directives have been revised (indicated by the second date). Tables 3-8 in Ref. 85 present a summary of the sound power level limit values for the construction equipment listed above. The permissible sound power levels range from 100 dBA to 118 dBA, depending on size, weight, and type of equipment. (One needs to keep in mind that the sound power level can be some 25 dB greater than the sound pressure

level at the operator's position.)

1986 Directive to Protect Workers Against Noise

In 1986 the CEC issued directive 86/188/EEC ‘‘on the protection of workers from the risks related to exposure to noise at work." (87) This directive required all employers to reduce TWA noise exposure levels (using the 3-dB exchange rate) to 90 dBA or ‘‘to the lowest level reasonably practicable, taking account of technical progress and the availability of measures to control the noise, in particular at source." (article 5-1) This means that employers must reduce noise to levels below 90 dBA whenever ‘‘reasonably practicable." (Article 5-2) Other measures, such as information and training, the provision of HPDs, and hearing testing must be instituted at an L_{eq} of 85 dBA. Those countries comprising the EC were required to have regulations that conformed to the CEC directive, or were at least as stringent, by January 1, 1990. Article 8 of the directive states that the design, building, and/or construction of new plants must comply with the 90-dBA exposure limit, and tools or machines that expose workers to daily average levels greater than 85 dBA must provide adequate information ‘‘about the noise produced in conditions of use to be specified."

Machinery Directive

In 1989 the CEC issued the Machinery Directive, under the procedures of the new approach. (88) This directive, 89/392/EEC, requires manufacturers of a wide variety of machines, including many that are used in construction, to make noise reduction an integral part of machinery design by implementing state-of-the art design methods. (85) Manufacturers must include information on noise levels when any machinery exceeds exposure levels of 70 dBA or 130 dBC at the operator's work station, or when sound power levels exceed 85 dBA. (88) Both the sound pressure and sound power level information are to be based on durations representative of the typical work-cycle of the machine. Noise emission information must be included in the instruction handbook of the machine (for the user's benefit) and in the technical information describing the machine (for the benefit of the purchaser.)

Since the promulgation of the machinery directive, several safety standards have been issued specific to certain machines. These standards contain a description of the hazard, the safety objectives to be achieved, measures for reducing the hazards, test methods to establish compliance, and user information. Lazarus and Zimmerman (89) present a

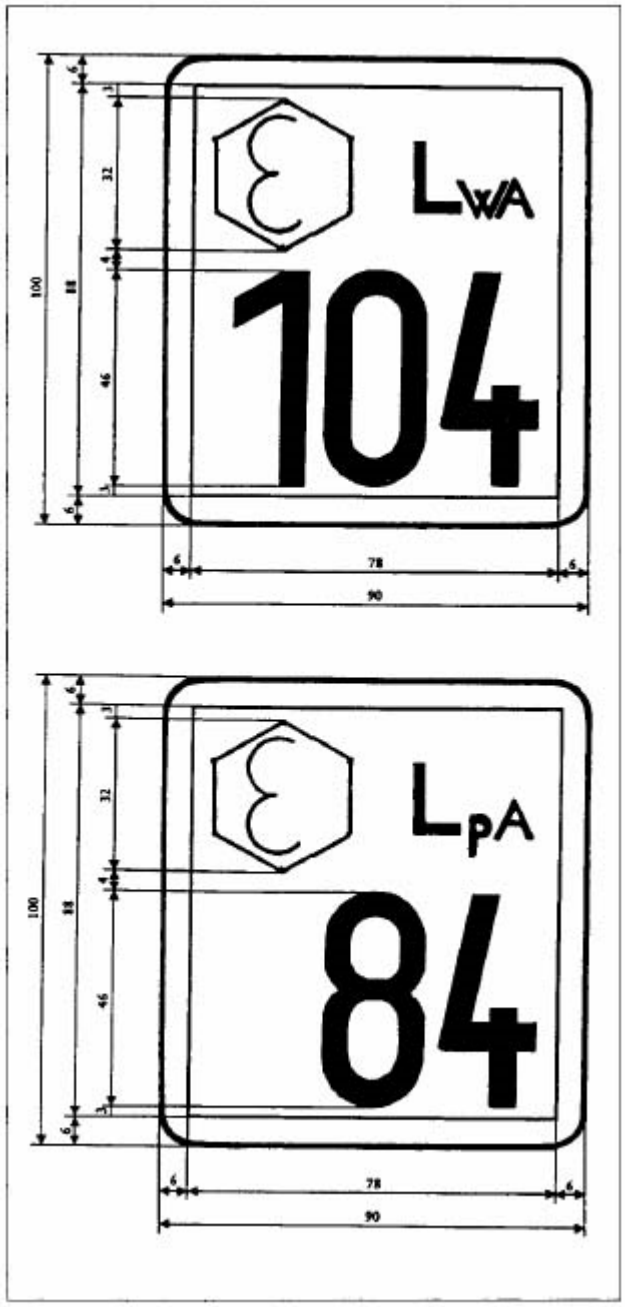
discussion of these standards, along with some of their limitations.

Draft standard EN 1746 gives the noise provisions that should be included in machine safety standards: the identification of a machine's main noise sources; reference to principles of low-noise design, along with examples of design for noise control; a compilation of ranges of noise emission values; and the development of information necessary for user instructions to allow for low-noise operation. The authors report that the majority of ‘‘framework" standards necessary for the preparation of machine-specific safety standards already exist for noise, but they need to be developed further and adapted to the practical problems of manufacturers and operators. For example, typical operating conditions still need to be agreed on and differences between the conditions specified in the standards and actual use need to be resolved. (89)

Labeling

Another interesting provision of the machinery directive is its requirement for compliant machinery to carry the ‘‘CE" mark. An amendment to the machinery directive gives the form in which the CE mark is to be displayed (93/68/EEC). In addition, the construction noise directive (79/113/EEC) requires manufacturers to display labels in the form of plates showing either the sound power level (L_{WA}) or sound pressure level (L_{pA}) at the operator's position. The specifications for these labels are shown in Figure 8.

FIGURE 8. Models of plates showing the sound power level (L_{WA}) and sound pressure levels (L_{pA}) at the operator's position required by the European Community's construction noise directive (79/113/EEC). Reprinted from Higginson et al. (85) with permission from Noise News International.



There is an ISO standard pertaining to the noise labeling of machinery and equipment, ISO 4871. [90] This standard prescribes the labeling of machines, or families of machines, with

the A-weighted sound power level in more than one mode of operation, preferably the mode resulting in the highest value. Although the labeled sound power level may be useful for deciding which machine to purchase, it gives relatively little information on the worker's exposure in actual use.

A draft American National Standard is currently being prepared by an ANSI working group [91] that adopts the provisions of ISO 4871, with the addition of a series of annexes. Proposed Annex E gives the option of including A-weighted sound pressure levels and C-weighted peak sound pressure instead of or along with sound power levels. A proposed modification to Annex B gives examples of declarations for both sound power level and sound pressure level in the ‘‘idle" and ‘‘operating" modes. It is important to remember, however, that the operating mode means under load but not necessarily in actual working conditions, as in the case of a tool contacting a work piece.

Evaluation of Noise Limits and Labeling Requirements

The success of these programs is bound to be variable because enforcement of the EC directives is carried out by the individual member states, some of which are likely to be more zealous than others. Also, the problems raised above by Lazarus and Zimmerman have been mentioned by other researchers. Kyttala and Airo [92] found that although a majority of the handheld power tools they surveyed carried noise declarations (labels), the authors questioned whether the information provided would apply to the tools as they were being used. They found that the declared noise levels were usually lower and sometimes considerably lower than those measured in actual use.

Irmer and Fischer-Sheikh Ali [93] pointed out that the primary purpose of the machinery noise directives was to enhance the functioning of the common market by eliminating trade barriers. Thus, noise limits were set high enough so that very few products would be excluded from the market. They maintain that setting an easily achieved upper limit for construction equipment removes any pressure to produce products with lower noise emission levels. They do mention, however, that the EC has recently published a proposal on the noise emission of equipment used outdoors, which will replace existing directives and revise existing noise limits in such a way as to give a higher priority to environmental concerns like construction noise. [93,94]

INCENTIVES FOR QUIET

Disincentives of the Last Two Decades

With the demise of EPA's Office of Noise Abatement in 1982 and along with it the regulatory program for construction equipment, the incentive for noise control has declined. This is true of equipment manufacturers as well as contractors. Some small incentive has been supplied by municipalities and local groups seeking to mitigate the noise exposure of communities, but the noise abatement capabilities of local governments were adversely impacted by the closing of the national noise office. Within the last few years there has been a rekindling of interest in environmental noise abatement, both on the national and local levels, but Congress has still not seen fit to appropriate funds for the implementation of the Noise Control Act. There are now two self-sustaining national organizations concerned with noise abatement: the Noise Pollution Clearinghouse and the League for the Hard of Hearing. There also has been considerable media attention to the problem in recent years, as well as increased interest in local ordinances throughout the nation.

Efforts to control noisy products and workplaces have been severely curtailed by OSHA's compliance directive of 1983, [95] which effectively raised the PEL to a TWA of 100 dBA and discouraged noise control even above that level due to extremely permissive enforcement procedures. [96] To the extent that manufacturers of construction equipment concerned themselves with the prospect of noise regulation from either EPA or OSHA, that incentive has disappeared.

The Blue Angel Program

Europe, however, does provide some incentive for noise reduction by the manufacturers of construction machinery, even in the United States. First, there are the directives for noise limits and labeling, with which American manufacturers must comply if they wish to sell their products on the European market. The advent of the ANSI standard on labeling of machinery for noise could possibly encourage US manufacturers to reduce product noise levels, even though the standard will not be mandatory.

The most promising development is Germany's ‘‘Blue Angel" program, which could have beneficial spillover for construction workers in the United States and which could also be used as a model in this country. The Blue Angel refers to a program for the voluntary designation of products as favorable to the environment. It was developed in Germany in 1977 and is flourishing today. The program's two main purposes are to assist customers in the choice of products and to encourage manufacturers to develop and market environmentally friendly products. Figure 9 shows the Blue Angel label with the

environmental logo of the United Nations, the inscription ‘‘Umweltzeichen" (environmental label) above, the words ‘‘weil la ¨rmarm" (because low-noise) below, and the words ‘‘Jury Umweltzeichen" (Environmental Label Jury) underneath.

FIGURE 9. The “Blue Angel'' label. Reprinted from Irmer and Fischer-Sheikh Ali [93] with permission from Noise News International.

Blue Angel awards for low-noise construction equipment were established in 1988. Irmer and Fischer-Sheikh Ali [93] reported that more than 40 companies had applied for the award with about 200 products displaying the label. Differences in sound levels between the existing noise limits in EC directives and those emitted by the Blue Angel products range from 5 to 14 dBA. In the early days of low-noise construction equipment the Federal Environmental Agency gave some financial support to interested manufacturers, but the authors report that the Blue Angel proved to be a good advertising tool and financial incentives are no longer needed.

Some local governments in Germany have given preference to Blue Angel construction products and are allowing them to be used in noise-sensitive areas, where the use of noisier products would be proscribed. Irmer and Fischer-Sheikh Ali [93] also mention that the

number of non-German applicants is steadily increasing, with about 15% of the Blue Angel manufacturers coming from outside Germany. A 1997 publication of the German government gives an overview of construction machinery bearing the Blue Angel label. (97) The Caterpillar Co. is one of 14 manufacturers of excavators, with four types of machines displaying the Blue Angel. Their sound pressure levels range from 72 to 77 dBA. Of the 12 manufacturers of loaders, Caterpillar manufactures six models with sound pressure levels ranging from 68 to 78 dBA. Other products listed include compressors, power generators, welding generators, paver-finishers, concrete mixers, and tower cranes. Additional products and companies are undoubtedly certified today. Current information on the Blue Angel program is available at http://www.blauer-engel.de.

Buy Quiet Programs

EPA's Office of Noise Abatement and Control initiated an ambitious Buy Quiet program during the 1970s. (98) Its purpose was to leverage the multibillion dollar public sector market to buy quiet products. This would be done by organizing government purchasing cooperatives and working through professional purchasing organizations. The agency's program included the Government Services Administration, the National Institute of Governmental Purchasing, the National League of Cities, and various federal, state, and local purchasing agencies and cooperatives.

The EPA's Buy Quiet program consisted of four parts: (1) a series of conferences to develop quiet product purchase descriptions, (2) local Buy Quiet programs in which governments and purchasing cooperatives agree to buy quiet products as an ongoing activity, (3) a data bank for quiet purchasing operated by the National Institute of Governmental Purchasing, and (4) demonstrations of quiet products loaned by the EPA to local governments. Bids were evaluated on the basis of both noise level and price. In 1981, 64 governments had either committed themselves to a Buy Quiet program or were considering doing so.

EPA's Buy Quiet program had a short life because the agency was closed in 1982. At present there are no data on the number of government agencies (federal, state, or local) with these kinds of programs, but it is likely to be relatively few.

There is evidence, however, that these programs may continue in some places. Haag (99) reported that the 1987 edition of the National Fire Protection Association (NFPA) Standard on Fire Department Occupational Safety and Health Program contained noise specifications. Section A-5-8.1 stated that ‘‘new fire apparatus should provide maximum

sound requirements that would allow members to ride in those vehicles without hearing protective devices. A maximum limit of 85 dBA without audible warning devices and 90 dBA with warning devices in operation is recommended." (99, p. F-22)

CONCLUSIONS

Approximately one-half million construction workers are exposed to hazardous levels of noise. Studies of construction workers' HTLs in the United States reflect excessive exposure, and it appears that the onset of noise-induced hearing loss starts early and continues throughout the career.

The prevalence of HPD use in the US construction industry is very poor and only recently has begun to improve. Anxiety concerning the ability to perceive and understand warning signals and communication is an important factor in resisting HPDs, and research over recent years supports the validity of this anxiety. In British Columbia, however, the use of HPDs is significantly higher than in the United States, which is related to the success of its overall HCP. Today's broad range of HPDs, with several models designed specifically to mitigate the problems of hearing and understanding communication and warning signals in noise, points toward the necessity of careful selection and fitting of HPDs.

Audiometric testing in industry is of virtually no value unless serial audiograms can be compared. The problem of audiometric record keeping is especially difficult in construction because of the mobility of construction workers and the small size of many construction companies. Some kind of centralization, such as that found in the British Columbia program, would appear to be the best solution. Credit card storage devices or ‘‘smart cards" could make audiometric record keeping considerably more efficient for mobile employees because workers could easily carry them from job to job.

Although there has been relatively little investigation into the effects of noise, hearing loss, and HPDs on accidents in the construction industry, the existing research, along with evidence from studies of other industries, demonstrates the likelihood of adverse effects in construction. There are several steps that can be taken to reduce this hazard.

Noise control is the most effective way to prevent noise-induced hearing loss in construction, and very possibly reduce the incidence of serious accidents. Although maintenance and retrofit are viable approaches, control at the design stage is most desirable. Considerable information in this area is available, although some of it may be dated.

European standards and directives have focused attention on noise emission in European countries. These directives, which limit noise exposure and mandate labeling and provision of information, must provide some incentive to manufacturers, even though these requirements need to be made more relevant to the workplace in some cases.

Incentives for noise control on construction sites in the United States have diminished over the last two decades. The most likely reasons are the closing of EPA's Office of Noise Abatement and the issuance of OSHA's compliance directive for general industry, which effectively raised the PEL to 100 dBA. European directives may provide some incentives to US manufacturers, especially in the form of programs like Germany's Blue Angel. Governmental Buy Quiet programs could also provide some incentive for noise control.

RECOMMENDATIONS

Professionals in industrial hygiene and hearing conservation should make every effort to control excessive noise on construction sites through the purchase of quieter equipment, as well as retrofit and proper maintenance of existing equipment. These efforts would not only conserve hearing but also aid in the prevention of noise-related accidents and fatalities.

Training programs should be developed for workers and contractors that include the importance of communication in the construction workplace, the dangers of overfitting HPDs, and how to tailor HPDs to communication needs. Contractors should be warned that they may have to spend more money on HPDs than they anticipated to ensure worker safety and efficiency, as well as the prevention of noise-induced hearing loss.

Manufacturers of reverse alarms and other warning devices should be encouraged to design their products for maximum audibility in the noise conditions most typical of their use, and to be perceived and understood by workers with noise-induced hearing loss, workers wearing HPDs, and workers under varying degrees of attentional demand. Contractors should be encouraged to purchase warning devices that are suitable for the work environments for which they are intended.

Pressure should be brought to bear on OSHA to move as rapidly as possible to extend the general industry noise regulation, including its amendment for HCPs, to cover construction workers. Although sections of the regulation would need to be tailored specifically to construction, it appears that the necessary knowledge and technology are available.

The agency should also be encouraged to rescind its instruction of Nov. 8, 1983, CPL

2-2.35 and all references to a TWA of 100 dBA in its directives and manuals. This policy was not subject to public notice and comment and provides a powerful disincentive for noise control and the conservation of workers' hearing in all industries, including construction.

Additional noise measurement data are needed on the sound levels of various types of construction equipment and various models within the same type. These data would facilitate the identification of low-noise and high-noise equipment, both for OSHA to assess the technological capabilities of the industry and for the sake of contractors who wish to purchase quieter equipment.

Consideration should be given to the identification and use of a centralized agency (or agencies) in which audiometric test results could be kept on a permanent basis.

The use of ‘‘smart cards" to store and transfer audiometric data should be further investigated.

A noise control database for the construction industry needs to be developed. It should include noise sources and levels, recommended treatments, quieted noise levels, estimated costs, and the availability of materials for treatments. The database should be made available electronically as well as on paper, and should be targeted to contractors, worker representatives, professionals in industrial hygiene and noise control, and federal and state compliance officers.

Government agencies should make financial and technical assistance available to organizations that could renew interest in Buy Quiet programs.

Organizations within the United States should obtain information about and publicize the achievements of all companies that currently display Germany's Blue Angel label for quiet equipment.

ACKNOWLEDGMENTS

The author wishes to thank her colleagues for contributions to and review of this manuscript, especially Elliott Berger, Rick Neitzel, Scott Schneider, and Jim Maddux.

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Diesel and Health in America:
The Lingering Threat

CLEAN AIR **TASK FORCE**

February 2005

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Printed by: **Spectrum Printing & Graphics, Inc.**

This report has been printed on recycled (20% post consumer waste), Processed Chlorine Free (PCF) paper with soy inks.

Acknowledgements –

The John Merck Fund, The Heinz Endowments, The Beldon Fund, The New York Community Trust, and The Turner Foundation have provided support for the Clean Air Task Force ***Diesel Initiative***, including this report. Dana Lowell and Tom Balon of M.J. Bradley & Associates and David Schoengold of MSB Energy Associates provided technical support. Patricia Monahan of the Union of Concerned Scientists provided valuable comments.

February 2005

Foreword

Scientists have been examining relationships between air pollution and death and disease for decades but only now are we beginning to understand the impacts of one of the most toxic sources of emissions today – the diesel engine. Diesels churn out a hazardous mix of gaseous and particle pollutants. What's more, diesel exhaust is emitted at ground level – where we breathe it – by trucks and buses around us in traffic, at school and transit bus stops, and by heavy construction or agricultural equipment. Diesel exhaust contains numerous dangerous compounds, ranging from respiratory irritants to carcinogens including a host of air toxics, particulate matter, carbon monoxide and nitrogen oxides.

While scientists have concluded that combustion-related particulate matter from all combustion sources is associated with premature death from heart attacks and cancer, we also are finding that carbon particles from mobile sources may be particularly unhealthy. These particles adsorb other metals and toxic gases produced by diesel engines – such as cancer causing-PAH (polycyclic aromatic hydrocarbons) – onto their surfaces making them even more dangerous. Furthermore, research on personal exposures demonstrates that these small particles easily penetrate our indoor environment where they may be trapped for days when ventilation is poor.

This report presents for the first time estimates of the health toll from diesel vehicle pollution. Using methodology approved by the U.S. Environmental Protection Agency's Science Advisory Board (SAB), the analysis finds that approximately 21,000 people die prematurely each year due to particulate matter pollution from diesels. Other serious adverse health impacts include tens of thousands of heart attacks, asthma attacks, and other respiratory ailments that can lead to days missed at work and at school.

Using more highly time-resolved studies we are increasingly able to understand the inflammation mechanism by which particles can lead to atherosclerosis, heart attacks, strokes and ultimately, untimely deaths. From all we know today, we can confidently say that reducing diesel exhaust in our environment will mean improving public health, and as this report demonstrates, reducing preventable premature deaths. We do not need to wait. Technology is available today that can reduce particulate matter emissions by up to 90 percent. Now is the time to clean up our old trucks, buses, heavy equipment and locomotives to provide a cleaner future for us and our children.

Howard Frumkin, M.D., Dr.P.H., FACP, FACOEM
Professor and Chair, Department of Environmental and Occupational Health
Emory University, Rollins School of Public Health

Executive Summary

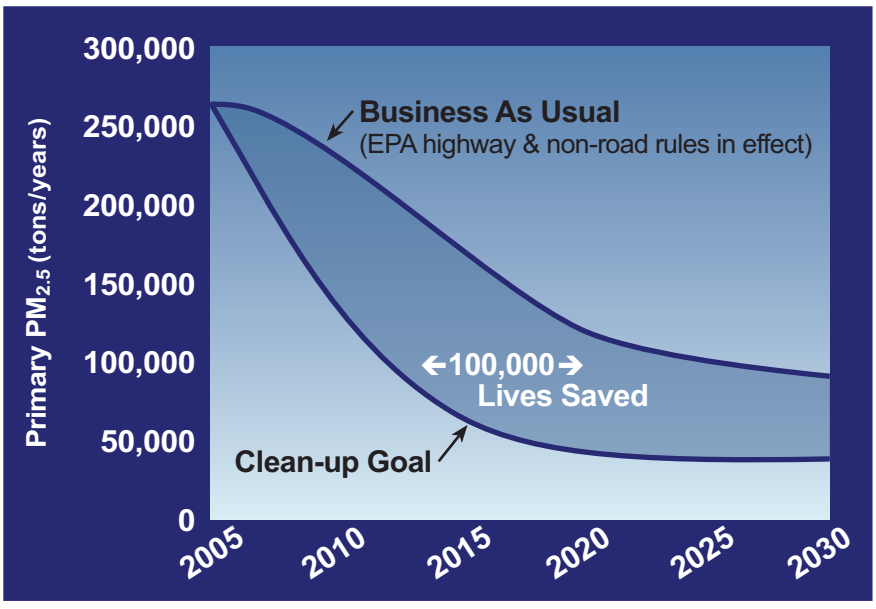
Everyone has experienced it: getting hit right in the face by a cloud of acrid diesel smoke. Perhaps you were standing on a street corner when a bus or truck whizzed by. Or maybe you were standing at a bus stop or stuck behind a dump truck grinding up a hill. But breathing diesel exhaust isn't just unpleasant. It is hazardous to your health. In fact, health research indicates that the portion of the exhaust you can't see may be the most dangerous of all. Asthma attacks, respiratory disease, heart attacks, and even premature death – all of these are among the most serious public health problems linked to emissions from the nation's fleet of diesel vehicles. The good news is that the technology exists right now to clean up emissions from these engines, so that most of the adverse health impacts can be prevented.

Today in the U.S. more than 13 million diesel vehicles help to build our cities and towns, transport our food and goods, and take us to and from work. More than three quarters of all Americans live near intersections, bus stops, highways, bus and truck depots, or construction sites with heavy equipment – all of which are concentrated sources of diesel exhaust. In rural areas, those who live near heavy diesel agricultural equipment suffer their share of exposure to diesel as well.

The U.S. Environmental Protection Agency has issued important regulations that will require dramatic reductions in emissions from new diesel vehicles starting in 2007 – but only the new ones. These regulations, to be phased in over the next quarter century, apply only to ***new*** engines. What about the diesels on the road today? The lifespan of the

average diesel vehicle is nearly 30 years. Many diesels are driven over a million miles. Because of this longevity, we will be left with the legacy of pollution from dirty diesel vehicles for decades to come. That is, ***unless*** we take action to reduce emissions from vehicles currently on the road. We don't have to wait. Control technologies exist right now that can significantly reduce deadly fine particle emissions from diesel vehicles, in some cases by upwards of 90 percent.

American know-how, witnessed by the success of the manufacturers of engines, control devices, and fuel refiners in developing innovative solutions for reducing diesel exhaust, provides a lifesaving opportunity we can seize today. Pollution from dirty diesels on the road now can be dramatically reduced using a combination of cleaner fuels, retrofit emission controls, rebuilt engines, engine repowerings, and accelerated purchase of new, cleaner vehicles. Unlike so many other vexing environmental issues, these affordable solutions present a highly unusual opportunity to actually address a major risk to public health and the environment. In fact, we could virtually eliminate this problem if diesel manufacturers, fleet owners, environmentalists, concerned citizens, and government regulators make the commitment to work together.



An Aggressive Program to Reduce Diesel Emissions Could Save About 100,000 Lives between Now and the Year 2030.

What are the health impacts of these dirty diesel vehicles? What benefits will we realize if we act now to clean them up? The Clean Air Task Force commissioned Abt Associates, an highly-respected consulting firm that U.S. EPA and other agencies rely upon to assess the benefits of national air quality policies, to quantify for the first time the health impacts of fine particle air pollution from America's diesel fleet. Using this information, we were able to estimate the expected benefits – in lives saved – from an aggressive but feasible program to clean up dirty diesel buses, trucks, and heavy equipment across the U.S.

This report summarizes the findings of the Abt Associates study. It then reviews the degree to which diesel vehicles increase the level of fine particle pollution in the air we breathe, and recommends reduction measures that will save thousands of lives each year.

Key findings include:

- Reducing diesel fine particle emissions 50 percent by 2010, 75 percent by 2015, and 85 percent by 2020 would save nearly 100,000 lives between now and 2030. These are additional lives saved above and beyond the projected impact of EPA's new engine regulations.
- Fine particle pollution from diesels shortens the lives of nearly 21,000 people each year. This includes almost 3,000 early deaths from lung cancer.
- Tens of thousands of Americans suffer each year from asthma attacks (over 400,000), heart attacks (27,000), and respiratory problems associated with fine particles from diesel vehicles. These illnesses result in thousands of emergency room visits, hospitalizations, and lost work days. Together with the toll of premature deaths, the health damages from diesel fine particles will total $139 billion in 2010.
- Nationally, diesel exhaust poses a cancer risk that is 7.5 times higher than the ***combined*** total cancer risk from all other air toxics.
- In the U.S., the average lifetime nationwide cancer risk due to diesel exhaust is over 350 times greater than the level U.S. EPA considers to be "acceptable" (i.e., one cancer per million persons over 70 years).
- Residents from more than two-thirds of all U.S. counties face a cancer risk from diesel exhaust greater than 100 deaths per million population. People living in eleven urban counties face diesel cancer risks greater than 1,000 in a million – one thousand times the level EPA says is acceptable.
- People who live in metropolitan areas with a high concentration of diesel vehicles and traffic feel their impacts most acutely. The risk of lung cancer from diesel exhaust for people living in urban areas is three times that for those living in rural areas.

The vast majority of the deaths due to dirty diesels could be avoided by an aggressive program over the next 15 years to require cleanup of the nation's existing diesel fleet. Practical, affordable solutions are available that can achieve substantial reductions in diesel risk. The only thing that stands between us and dramatically healthier air is the political will to require these reductions and the funding to make it a reality.

What We Must Do to Protect Public Health from Today's Dirty Diesels.

Although the EPA has mandated the phase-in of cleaner new engines and fuels beginning in 2007 for highway vehicles and heavy equipment, EPA has limited authority to mandate emissions controls on the fleet of existing diesel vehicles. To date, EPA has adopted a "voluntary" approach. Nevertheless, in order to meet the new ambient air quality standards for fine particles, states and cities must require controls to reduce diesel emissions. Diesel cleanup is also an important next step in areas that are having difficulty meeting existing and new ambient air quality standards for ozone such as Houston and Dallas, Texas.

States can enact legislation requiring diesel cleanup as some, such as California and Texas, have already begun to do. States should also consider measures to require early engine retirement and speed fleet turnover. For vehicles like long-haul trucks, ships, and locomotives that are engaged in interstate transport, federal regulations, federal legislation, or both may be needed. Funding for such initiatives may pose a challenge for public fleets (school buses, transit vehicles, garbage trucks, etc.), so support for expanded state and federal funding to help the cleanup of fleets owned by cash-strapped states and cities will be necessary. Local and state budget writers will need a strong commitment to come up with the necessary appropriations or bonds to fund the local share.

Particle filters combined with the use of Ultra Low Sulfur Diesel (ULSD) fuel have been found to reduce diesel particles and particle-bound toxics from diesel exhaust by up to 90 percent. Under the new engine rules, ULSD will be available for highway vehicles nationwide starting in 2006. It is already available in cities in 21 states. Not all vehicles can be retrofitted with a particle filter, but there are a variety of options available for the cleanup of every vehicle regardless of make or model year.

Cities and states should:

- Establish ambitious goals for reducing risk to their citizens by cleaning up existing diesels;
- Identify priority geographic areas and diesel "hotspots" for immediate attention;
- Adopt a package of options for reducing diesel exhaust including:
  - Retrofits accomplished by replacing mufflers with an optimal mix of filters or oxidation catalysts depending on vehicle age and type;
  - Requiring Ultra Low Sulfur Diesel and cleaner alternative fuels;
  - Closed crankcase ventilation systems to eliminate engine exhaust from penetrating the cabin of vehicles such as school and transit buses;
  - Engine rebuild and replacement requirements;
  - Truck stop electrification programs to give long-haul truckers a way to power their rigs overnight without running their engines;
  - Contract specifications requiring cleanup of trucks and construction equipment used in public works projects.
- Adopt diesel cleanup measures as federally-enforceable requirements in State Implementation Plans (SIPs) for the attainment of the fine particle and ozone air quality standards;
- Create and fund programs, such as California's "Carl Moyer" and the Texas Emission Reduction Plan (TERP) program, which provide funding for diesel equipment owners to replace or rebuild high-polluting diesel engines;
- Adopt and enforce anti-idling ordinances and legislation.

The Federal government should:

- Pass legislation providing funding for the cleanup of municipal and state fleet vehicles;
- Explore regulatory options for reducing emissions from existing interstate fleets such as long-haul trucks, shipping, and locomotives;
- Retain and enforce the tighter new engine and cleaner fuel standards for highway and non-road diesels.

NESCAUM

Retrofits are effective in reducing particle emissions from heavy equipment. The tractor on the left is retrofitted with a particle emissions control device.

New Findings

While numerous medical studies have linked diesel exhaust to a host of serious adverse health outcomes, no single study has yet quantified the death and disease attributable to diesel across America – until now. Researchers estimate that as many as 60,000 people in the U.S. die prematurely each year because of exposure to fine particles from all sources.[1] And some researchers believe that this figure may even underestimate the total number of particle-related deaths.[2] A reanalysis of the major particle mortality study in over 150 cities suggests that particles from motor vehicles may be more toxic than average.[3]

We know that diesel exhaust is a hazardous mixture of gases and particles including carcinogens, mutagens, respiratory irritants or inflammatory agents and other toxins that cause a range of diverse health effects. Diesel particles act like magnets for toxic organic chemicals and metals. The smallest of these particles (ultrafine particles) can penetrate deep into the lung and enter the bloodstream, carrying with them an array of toxins.[4] Diesel exhaust can contain 40 hazardous air pollutants as listed by EPA, 15 of which are listed by the International Agency for Research on cancer (IARC) as known, probable or possible human carcinogens.[5] Thousands of studies also have documented that fine particles are associated with respiratory and cardiovascular diseases and death. Additional studies have documented effects in infants and children such as Sudden Infant Death syndrome (SIDS) and retarded lung development.[6]

Now, for the first time, this report reveals the staggering toll of death and disease from diesel exhaust in our air – and the dramatic benefits of requiring the cleanup of the nation's existing diesel fleet. Abt Associates, using peer-reviewed, state-of-the-art research methodology employed by U.S. EPA in assessing the national benefits of proposed

National Annual Diesel Fine Particle Health Impacts [7]

Annual Cases in the U.S., 2010	
Premature Deaths	21,000
Lung Cancer Deaths	3,000
Hospital Admissions	15,000
Emergency Room Visits for Asthma	15,000
Non-fatal Heart Attacks	27,000
Asthma Attacks	410,000
Chronic Bronchitis	12,000
Work Loss Days	2,400,000
Restricted Activity Days	14,000,000

rules and legislation, finds that nearly 21,000 people will die prematurely in 2010 in the U.S. as a result of exposure to fine particle emissions from mobile diesel sources (i.e., all on-and non-road engines such as highway, construction, rail, and marine engines). The average number of life-years lost by those who die prematurely from exposure to fine particles is 14 years.[8]

The deaths from diesel fine particle pollution equal or exceed the death toll from other causes commonly understood to be major public policy priorities. For instance, drunk driving causes more than 17,000 deaths per year.[9] There are more than 20,000 homicides in the U.S. each year.[10] Moreover, the approximately 15,000 premature deaths per year that could be avoided by achieving a 75 percent diesel-risk-reduction target exceed the 11,000 automobile fatalities avoided each year through the use of safety belts.[11]

The Abt Associates analysis further shows that hundreds of thousands of Americans suffer from asthma attacks, cardiac problems, and respiratory ailments associated with fine particles from diesels. These health damages result in thousands of respiratory and cardio-pulmonary related hospitalizations and emergency room visits annually as well as hundreds of thousands of lost work days each year. For instance, the study finds that diesel pollution leads to 27,000 heart attacks and 400,000 asthma attacks each year.[12]

You can find the adverse health impacts from diesel for your state, metropolitan area, and county on the web at: **www.catf.us/goto/dieselhealth**.

The risk from diesel exhaust can be virtually eliminated by the application of emissions control strategies available today. For example, an aggressive but feasible program to reduce diesel particle emissions nationwide 50 percent by 2010, 75 percent by 2015, and 85 percent by 2020 would save about 100,000 lives between now and 2030 – beyond those lives that will be saved under EPA's new engine regulations.[13] Indeed, in the year 2000, the State of California set a Diesel Risk Reduction goal of a 75 percent reduction in diesel risk by 2010 and 85 percent by 2020 and the California Air Resources Board over the past few years has begun to issue regulations to achieve it.[14]

Cancer Risk

CATF has calculated the national average lifetime excess cancer risk posed by diesel. We base these estimates on 1999 modeled directly-emitted diesel fine particle concentrations and by applying both the EPA range of individual risk estimates and the California Air Resources Board (CARB) diesel risk factor for lung cancer over the U.S. population.[15] Although EPA has found diesel exhaust to be a "likely" human carcinogen, EPA has not adopted a risk factor but has, instead, provided a range of lung cancer risk.[16] Based on the national average diesel particulate matter concentration, we find average lung cancer risk ranges from 12 to 1210 per million people over a 70-year lifetime using EPA's range of lung cancer risk.[17] Using the same methodology, CATF finds that, based on the single CARB risk factor, the nationwide average lifetime cancer risk posed by diesel exhaust is over 350 times greater than EPA's "acceptable" level of one cancer in a million.

For comparison, according to EPA's 1999 NATA assessment, the combined risk from all other air toxics is 48 per million.[18] Therefore, diesel exhaust presents a lung cancer risk that is 7.5 times higher than the cancer risk of all other air toxics – ***combined!***[19] In addition, CATF has calculated the cancer risk posed by diesel for residents of each U.S. county. Residents of over two-thirds of U.S. counties experience a cancer risk greater than 100 in a million from diesel exhaust. Moreover, residents of eleven urban U.S. counties face a diesel cancer risk equal to 1,000 new cases of cancer in a population of one million.

People who live in metropolitan areas with a high concentration of diesel vehicles and traffic feel their impacts

most acutely. For example, the estimated risk of lung cancer from diesel in metropolitan areas is much higher than in areas with fewer diesels. In the rural counties we estimate a risk of 142 cancers per million based on the CARB unit risk, but three times that rate, 415 cancer per million, in urban counties. Therefore, the risk of lung cancer for people living in urban areas is three times that for those living in rural areas.[20]

You can find the community cancer risk from diesel for your state, metropolitan area, and county on the web at: **www.catf.us/goto/dieselhealth**. Personal risk varies with location and lifestyle. For example, if you live near a bus, truck, or train terminal, highway, construction site, or warehouse, or commute to work on congested roadways, your exposure may be higher than indicated by the county-wide average estimated here.

The Economic Toll of Health Effects

Respiratory distress severe enough to require a trip to the emergency room can be a terrifying experience for patients and their families. Victims of asthma attacks say that during an attack they wonder if and when their next breath will come. In addition to its serious physical and emotional costs, air pollution also takes a large monetary toll. Emergency room and hospital treatment costs can cripple a family financially, with the average stay for a respiratory ailment lasting about a week.[21] Bouts of respiratory illness and asthma attacks mean lost workdays and lost productivity. Although life is priceless, the government often monetizes loss of life when setting policies related to health and environmental protection. Using accepted valuation methodology employed by EPA in recent regulatory impact analyses, Abt Associates finds that the total monetized cost of the U.S. diesel fleet's fine particle pollution is a staggering $139 billion in 2010.

Pollution from motor vehicles, including diesels, can obscure city vistas such as illustrated in this split view of Dallas, Texas.

State and Metropolitan Area Findings

Using modeled concentrations of directly-emitted diesel fine particles throughout the lower 48 states, Abt Associates developed health impact estimates for every state and major metropolitan area in 1999, the latest year for which EPA's best emissions inventory for diesel fine particles is available.[22] Not surprisingly, heavily populated states with concentrated urban areas and significant diesel traffic fared the worst. Conversely, rural areas with a lower concentration of diesel vehicles fared much better. Similarly, metropolitan areas with large populations and heavy concentrations of diesel vehicles feel the impacts of diesel pollution most acutely.[23] In such large metropolitan areas, many hundreds of lives are shortened every year. However, because these state and metropolitan-area health estimates include only fine particles that are ***directly emitted*** from diesels – excluding any secondarily-formed particles from diesel emissions of nitrogen or sulfur oxides – they significantly understate the total adverse impact of diesel-related particles on public health.[24] Moreover, these estimates exclude any health impacts due to diesel's contribution to ozone smog.

States: Health Impacts from Diesel Fine Particles (1999)

Rank	State	Deaths	Cancer Deaths	Heart Attacks	Asthma Attacks	Chronic Bronchitis	Work Loss Days	Restricted Activity Days
1	New York	2,332	169	3,692	51,251	1,499	318,532	1,827,525
2	California	1,784	144	2,263	49,499	1,356	292,622	1,683,642
3	Pennsylvania	1,170	103	1,660	19,021	575	110,404	643,926
4	New Jersey	880	77	1,382	17,926	535	107,364	620,975
5	Texas	879	83	1,070	25,348	664	148,394	854,045
6	Illinois	878	76	1,193	19,162	539	112,205	649,445
7	Florida	805	77	980	13,926	438	81,462	474,601
8	Ohio	769	72	1,002	14,464	422	83,963	489,355
9	Michigan	484	43	667	10,511	299	61,109	355,260
10	Massachusetts	475	43	727	9,925	289	61,842	355,473
11	Maryland	409	39	454	8,418	246	50,275	291,675
12	Indiana	369	36	483	7,372	209	42,730	249,056
13	Georgia	329	29	377	8,514	235	51,808	298,317
14	Louisiana	324	32	339	7,131	188	40,740	236,444
15	Missouri	305	28	377	5,435	157	31,476	183,033
16	North Carolina	301	29	347	6,518	189	39,589	229,591
17	Tennessee	269	26	283	5,169	150	30,870	179,656
18	Washington	248	23	308	6,201	181	37,787	218,889
19	Virginia	248	24	303	5,991	174	36,963	214,083
20	Wisconsin	226	18	320	4,789	137	27,923	162,404
21	Arizona	214	19	268	5,215	144	30,053	173,721
22	Connecticut	206	18	340	4,091	125	24,097	140,140
23	Kentucky	198	22	213	3,764	110	22,385	130,403
24	Minnesota	193	15	291	4,713	134	27,979	161,954
25	Alabama	175	16	184	3,200	92	18,646	108,961

Metro Areas: Health Impacts from Diesel Fine Particles (1999)

Metropolitan Area	Rank	Deaths	Cancer Deaths	Heart Attacks
New York, NY	1	2,729	202	4,342
Los Angeles, CA	2	918	72	1,193
Chicago, IL	3	755	65	1,021
Philadelphia, PA	4	727	69	990
Boston, MA	5	391	36	602
Houston, TX	6	356	35	444
San Francisco, CA	7	291	23	358
Miami, FL	8	288	23	358
Baltimore, MD	9	285	28	290
Detroit, MI	10	279	25	378
Pittsburgh, PA	11	237	21	340
Washington, DC	12	226	19	302
St. Louis, MO	13	217	20	263
Dallas, TX	14	205	19	258
Atlanta, GA	15	199	17	239
Tampa, FL	16	185	18	210
Phoenix, AZ	17	183	16	230
Cleveland, OH	18	180	15	232
Cincinnati, OH	19	171	18	219
Seattle, WA	20	165	15	208

Metropolitan Area	Rank	Deaths	Cancer Deaths	Heart Attacks
San Diego, CA	21	150	13	191
Portland, OR	22	140	13	157
Minneapolis, MN	23	133	11	205
New Orleans, LA	24	128	13	131
Riverside, CA	25	123	10	142
Baton Rouge, LA	26	102	10	109
Milwaukee, WI	27	95	8	130
Columbus, OH	28	84	9	113
Indianapolis, IN	29	82	8	107
Louisville, KY	30	82	9	91
Memphis, TN	31	81	7	79
Kansas City, MO	32	79	8	109
Providence, RI	33	76	7	119
Bridgeport, CT	34	69	6	121
Beaumont, TX	35	65	7	65
Orlando, FL	36	65	7	85
Allentown, PA	37	65	5	101
Hartford, CT	38	63	5	100
Las Vegas, NV	39	62	7	71
Virginia Beach, VA	40	62	6	65

Metro Areas: Per Capita Impacts from Diesel Fine Particles (1999)

Rank Based on Mortality Risk	MSA	Deaths per 100,000 Adults	Heart Attacks per 100,000 Adults	Cancer Risk per Million
1	Beaumont, TX	29	29	865
2	Baton Rouge, LA	27	29	992
3	New York, NY	25	40	959
4	Philadelphia, PA	22	29	658
5	Trenton, NJ	20	31	699
6	Baltimore, MD	19	19	584
7	Huntington, WV	18	18	477
8	New Orleans, LA	17	18	889
9	Pittsburgh, PA	15	22	415
10	Cincinnati, OH	15	19	504
11	Boston, MA	15	23	563
12	Chicago, IL	15	20	539
13	Mobile, AL	14	15	435
14	Longview, WA	14	15	441
15	Houston, TX	14	18	691
16	Allentown, PA	14	22	450
17	Cleveland, OH	14	18	416
18	Toledo, OH	14	17	423
19	Los Angeles, CA	14	18	633
20	Lancaster, PA	14	22	463
21	Scranton, PA	14	18	319
22	St. Louis, MO	14	17	405
23	Reading, PA	14	21	428
24	Lake Charles, LA	14	14	437
25	Springfield, OH	13	16	356
26	Portland, OR	13	14	488
27	Bridgeport, CT	13	22	494
28	Harrisburg, PA	12.	19	412
29	York, PA	12	21	460
30	Wheeling, WV	12	14	309
31	Lebanon, PA	12	19	373
32	Evansville, IN	12	15	368
33	Memphis, TN	12	12	397
34	Savannah, GA	12	13	376
35	Dayton, OH	12	16	389
36	Vineland, NJ	12	17	365
37	Tampa, FL	12	14	365
38	Louisville, KY	12	13	384
39	Sandusky, OH	12	15	345
40	Kankakee, IL	12	14	336
41	San Francisco, CA	12	14	480
42	Muncie, IN	11	14	327
43	Duluth, MN	11	14	308
44	Michigan City, IN	11	15	370
45	Salt Lake City, UT	11	14	533
46	New Haven, CT	11	18	365
47	Steubenville, OH	11	13	279
48	Milwaukee, WI	11	15	376
49	South Bend, IN	11	15	342
50	Detroit, MI	11	15	381

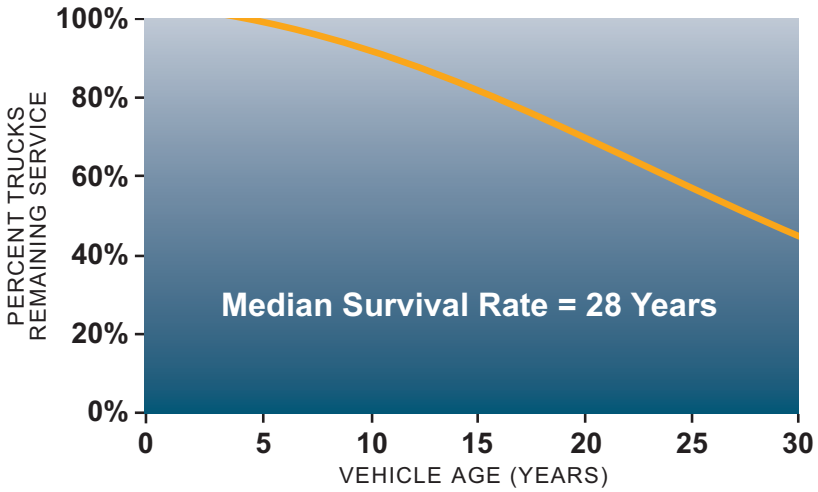
The Dirty Diesel Legacy

Since 1997, the U.S. EPA has promulgated major regulations that impose stringent emissions controls on new diesel vehicles, requiring tight emission standards and cleaner diesel fuel. These standards go into effect in 2007 and phase in over the next few decades. For example, the table below illustrates the progressively tighter standards for particulate matter and nitrogen oxides from trucks and buses over the next few years.

EPA Standards for New Trucks and Buses (g/bhphr)[25]

YEAR	NO_x	$PM_{2.5}$
1984	10.7	0.60
1991	5.0	0.25
1998	4.0	0.10
2004	2.0	0.10
2007	0.2	0.01

However, the emission rates of the diesel engines on the road and in use on construction sites and farms today are not affected by these rules. Considering that according to the U.S. Department of Energy the median lifetime for a heavy truck is nearly 30 years,[26] and a typical heavy duty diesel engine may power a truck for as long as one and a half million miles,[27] these vehicles will continue to pollute our air at unnecessarily high levels for years to come ***unless*** we act to clean them up now.



Median Heavy Truck Lifetime is Nearly 30 Years[28]

The Most Widespread Air Pollution Risk in the U.S.

There are few other sources of widespread pollution in our environment that rival diesel exhaust as an airborne toxin. America's 13 million diesel engines release a host of harmful substances including fine particles, ozone smog-forming nitrogen oxides, carbon monoxide, and a variety of toxic metals and organic gases such as formaldehyde, acrolein, and polycyclic aromatic hydrocarbons (PAH.)[29] In this report we focus on the respiratory, cardiovascular, and cancer effects of diesel fine particles only.[30]

Fine Particles are Linked to Heart Attacks, Asthma Attacks, and Stunted Lung Growth.

Fine particles have been linked to a wide variety of serious health impacts, from upper and lower respiratory ailments, such as asthma attacks and possible asthma onset, to heart attacks, stroke, and premature death, including crib death in children.[31] How risky is breathing air polluted with particles? A study published in the Journal of the American Medical Association found that living in the most polluted U.S. cities poses a risk similar to living with a smoker.[32] Based on thousands of studies compiled by EPA, federal health standards were established for fine particles in 1997.[34]

Health researchers have recently described serious health impacts of fine particles, including:

- Abnormal heart rhythms and heart attacks and atherosclerosis;[35]
- Increased incidence of stroke;[36]
- Permanent respiratory damage, characterized by fibrosis causing obstruction to airflow;[37]
- Chronic adverse effects on lung development resulting in deficits in lung function.[38]

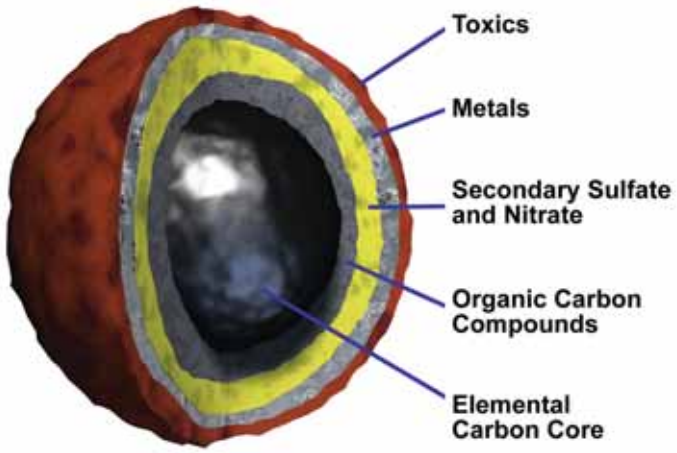
How Particulate Matter Kills

Fine particles, known as "$PM_{2.5}$", are particles less than 2.5 microns in diameter or 1/100th the width of a human hair, so small that they are often invisible. They can be deposited deep in the lung where they can affect both the respiratory and cardiovascular systems. Researchers believe that many deaths caused by particulate matter are related to cardiovascular illness. Fine particles aggravate cardiovascular disease and trigger heart attacks by invading the bloodstream and initiating an inflammatory response, disrupting heart rate and increasing blood clotting. In a recent experimental study, diesel particles caused blood clots providing "a plausible explanation for the increase in cardiovascular morbidity and mortality accompanying urban air pollution."[33]

Diesel Exhaust is a Likely Carcinogen that also Impairs Immune, Reproductive, and Nervous Systems.

In 1998, the Scientific Review Panel for the California Air Resources Board reviewed diesel exhaust as a toxic air contaminant and set a lifetime unit cancer risk from diesel particles at 3 in 10,000 persons for each microgram of annual average diesel exposure.[39] This is equivalent to 300 in a million excess lung cancers. In May 2002, EPA issued its Health Assessment for Diesel Exhaust which found diesel particulate matter to be a "likely" carcinogen. EPA did not settle on a unit risk factor but recommended a lifetime cancer risk range from 1 in 1,000 to 1 in 100,000.[40] The California unit risk falls within this range.[41]

> Diesel particles are carbon at their core with toxics and carcinogenic substances attached to their surfaces.



Applying California's cancer unit risk for diesel particulate matter to the national average concentration of directly-emitted diesel fine particles in 1999, results in a conservative estimate of 1,530 excess cases of lung cancer per year for 2005.[42] An American Cancer Society study of 150 metropolitan areas across the U.S published in 2002 supports the particulate matter cancer link.[43]

Other effects include:

- **Immune System Effects** – Diesel exposure is associated with numerous immune system responses in humans and animals culminating in increased allergic inflammatory responses and suppression of infection-fighting ability. These effects include disruption of chemical signals and production of antibodies, and an alteration in mobilization of infection-fighting cells.[44]
- **Reproductive, Developmental, and Endocrine Effects** – Diesel emissions have also been associated with reproductive, developmental and endocrine effects in animals. Specifically, diesel exposure has been associated in animals with decreased sperm production,[45] masculinization of rat fetuses,[46] changes in fetal development (thymus,[47] bone[48] and nervous system[49]) and endocrine disruption, i.e., production of adrenal and reproductive hormones.[50]
- **Nervous System Effects** – In addition to animal studies that have shown neurodevelopmental effects, a human study of railroad workers suggested that diesel exposure may have caused serious permanent impairment to the central nervous system.[51]

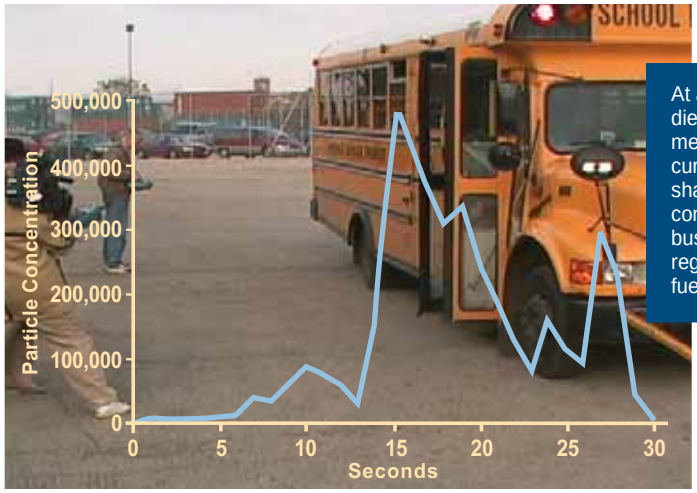
Cancer-causing Pollutants in Diesel Exhaust

Pollutant	Diesel Emissions % of all Mobile 1996[52]	EPA Carcinogen Status	Cancer Risk (per million/microgram in 70-yr life)
Formaldehyde	52%	probable	1 in a million
Acetaldehyde	59%	probable	1 in a million
Butadiene	8%	probable	2 in a million
Acrolein	50%	possible	n/a
Benzene	5%	known	2-8 in a million
Diesel Particulate Matter	77%	probable[53]	EPA: 12 to 1210 in a million; CARB: 300 in a million[54]

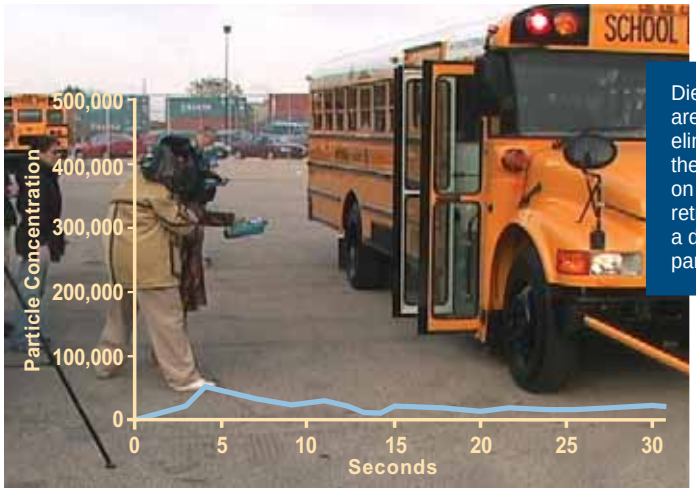
Children and Seniors are at Greatest Risk

Health researchers believe that children are more susceptible than adults to the adverse health effects of air pollution for a variety of reasons.[55] For example, children are more active than adults and therefore breathe more rapidly. Children also have more lung surface area compared to their body weight and therefore they inhale more air pound-for-pound than adults do. Compared to adults, children also have higher lung volume to body size, higher respiration rates, and spend more active time in the polluted outdoor environment. Fine particles have been linked in medical studies to serious health impacts in children such as slowed lung function growth, increased emergency room visits, increased incidences of asthma and bronchitis, and crib death. Furthermore, proximity to traffic has been linked to increased prevalence of asthma respiratory infections and allergic symptoms and asthma hospitalizations in children.[56]

Seniors are another important population at risk. Studies of the impacts of fine particles on seniors in Boston and Baltimore suggest that changes in their heart rhythms and control mechanisms occur when particle levels rise. In Phoenix, daily mortality increased in



At a bus stop, diesel particles measured at the curb spike sharply from a conventional bus running on regular diesel fuel.



Diesel particles are virtually eliminated when the bus is run on ULSD and retrofitted with a diesel particulate filter.

Children Exposed on School Buses

CATF Study: Cabin particulate matter eliminated with retrofit emissions controls.

Twenty four million students ride to school every day on yellow school buses that travel a total of four billion miles a year. While riding on a school bus is the safest way a student can travel to school,[57] children may be exposed to harmful pollutants, a concern since students spend an average of an hour and a half a day on school buses.[58] A recent study undertaken by Clean Air Task Force in cooperation with Purdue University investigated cabin air quality on school buses in three cities (Chicago, IL; Atlanta, GA; and Ann Arbor MI). The study found that particulate matter routinely entered the bus cabin from the tailpipe and the engine through the open front door. At some stops, particulate matter in the bus cabin exceeded levels in the outdoor air by as much as ten times. While idling or lined up in a schoolyard, rapid buildup of particulate matter in the buses also occurred. Most importantly, retrofit emissions controls worked: installation of a diesel particulate filter and the use of Ultra Low Sulfur Diesel (ULSD) fuel and a closed crankcase filtration device eliminated fine particles, ultrafine particles, black carbon and particle-bound PAH in the bus cabin. A closed crankcase filtration system by itself demonstrated major benefits and can provide immediate and low cost reductions in particulate matter levels on school buses. For a comprehensive report: **www.catf.us/goto/schoolbusreport**

seniors with increased levels of elemental and organic carbon (typical of diesels and other motor vehicles) and fine particles. Collectively, these studies demonstrate that elevated fine particle levels put the elderly at risk and suggest a possible mechanistic link between fine particles and cardiovascular disease mortality.[59]

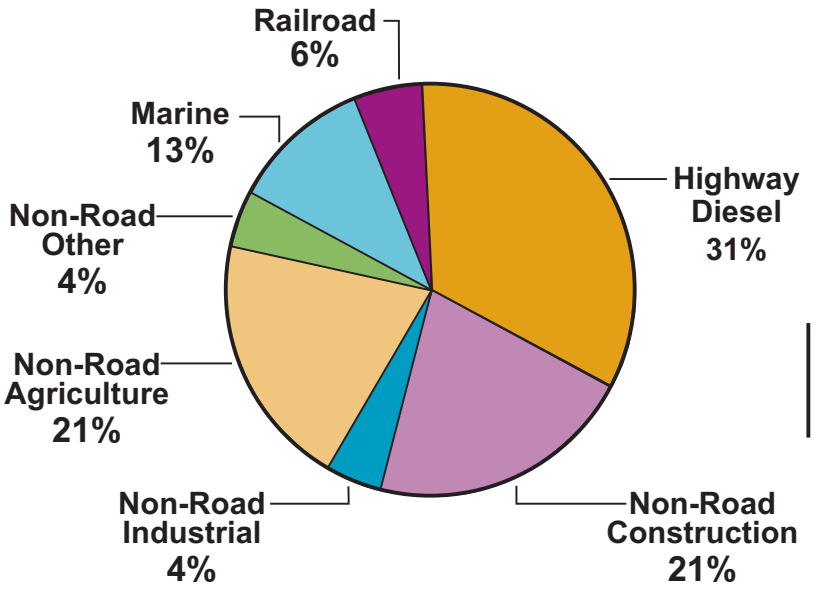
Today's Dirty Diesels

- **"On-road" or highway diesels** include many types of vehicles, such as municipal and commercial trucks and buses. Heavy duty highway diesels range from 8,500 lbs to those exceeding 60,000 lbs, such as 18-wheelers. Of the seven million diesels on the road today, 400,000 are school buses and 70,000 are transit buses. Highway diesels released 100,000 tons of directly-emitted fine particles in 2002, about one third of the total from diesels. Highway diesels also released 3.4 million tons of nitrogen oxides (NO_X) in 2002, which accounted for 16 percent of all NO_X emissions and half of all diesel NO_X emissions in the U.S. [60]

- **"Non-road" diesel engines and equipment** do not typically travel on roads or highways. There were approximately six million non-road diesel engines in service in 2003. Examples of these non-road diesels include construction equipment such as excavators, mining equipment and agricultural machinery. In 2002, 155,000 tons or half of all the fine particles directly emitted from diesels came from non-road engines. Non-road diesels also released 1.6 million tons of NO_X, 8 percent of all NO_X emissions and one quarter of all diesel NO_X emissions in the U.S. in 2002.[61]

- **Marine and river diesel** emissions are dominated by large commercial ships polluting our largest ocean and river port cities. Efforts to control pollution from shipping have focused on NO_X, although these engines also emit substantial quantities of fine particles. In 2002 marine diesel released 40,000 tons of directly-emitted fine particles, 13 percent of all diesel fine particles in the U.S. Marine diesels in the U.S. produced one million tons of diesel NO_X in 2002, 5 percent of all U.S. NO_X emissions and 14 percent of all diesel NO_X emissions.[62]

- **Locomotive diesels** account for a significant fraction of mobile source emissions in the U.S. today. In many areas, diesel trains travel through and pollute core urban and industrial areas. Diesel locomotives released 20,000 tons of directly-emitted diesel fine particles (six percent of all diesel fine particles) and 900,000 tons NO_X (13 percent of diesel NO_X). Diesel locomotives typically have a useful life of 40 years and are commonly rebuilt 5-10 times during their long service lives. For this reason, cleaning up today's locomotives is an important priority.[63]



Sources of Directly-Emitted Mobile Diesel Fine Particles

Source: EPA (2004)

Diesel "Hotspots"

Diesel Exhaust is Concentrated Near Roadways and Intersections.

Unlike industrial smokestack emissions, diesel typically is emitted at ground-level in places of concentrated population in our communities along busy streets and at our places of work. We often breathe diesel exhaust where it is fresh and most toxic. While air quality modeling, such as reported in our study, estimates average exposures in a community, your individual exposure may be much greater or smaller depending on a variety of factors. For example, the distance from where you live to major roadways and the nature of your commute to work may play a role.

Exposure to diesel exhaust is highest for those who:

- **Operate or work around diesel engines** – Occupational exposures to diesel are among the highest and have been associated with increased incidence of cancer. Furthermore, a study of diesel mechanics, train crewmen, and electricians working in a closed space near diesel generators suggests that diesel exposure may have caused both airway obstruction and serious impairment to the central nervous system. The report concludes that "impaired crews may be unable to operate trains safely."[64]
- **Live or work near areas where diesel emissions are concentrated** – Ambient diesel levels are highest near highways, busy roadways, bus depots, construction sites, railroad yards, ports and inland waterways with diesel boat traffic, major bridges, tunnels, or freight warehouses. People who live or work near these facilities face the greatest risk. Numerous recent medical studies have linked roadway proximity and traffic pollution to disease, asthma hospitalizations, and shortened life expectancy.[65] For example, a 2004 study in Ontario, Canada found increased risk of mortality from heart and lung disease in people living within 100 meters of a roadway.[66] New York City studies demonstrate that diesel trucks create air toxics hot spots at crossings, bus stops, and bus depots.[67] Rail yards can be diesel hotspots as well. For example, one study found elevated risk levels – up to 500 in a million – adjacent to a California rail yard.[68] Another study found elevated cancer risk for persons living near a ferry port.[69]

- **Regularly ride on school or transit buses, or commuter trains** – Children are exposed to elevated levels of diesel as a result of the buildup of diesel exhaust inside school buses – especially with windows closed.[70] Diesel exhaust levels on commuter trains and

People living and working near concentrated diesel emissions such as busy roadways have the greatest exposure to diesel exhaust.

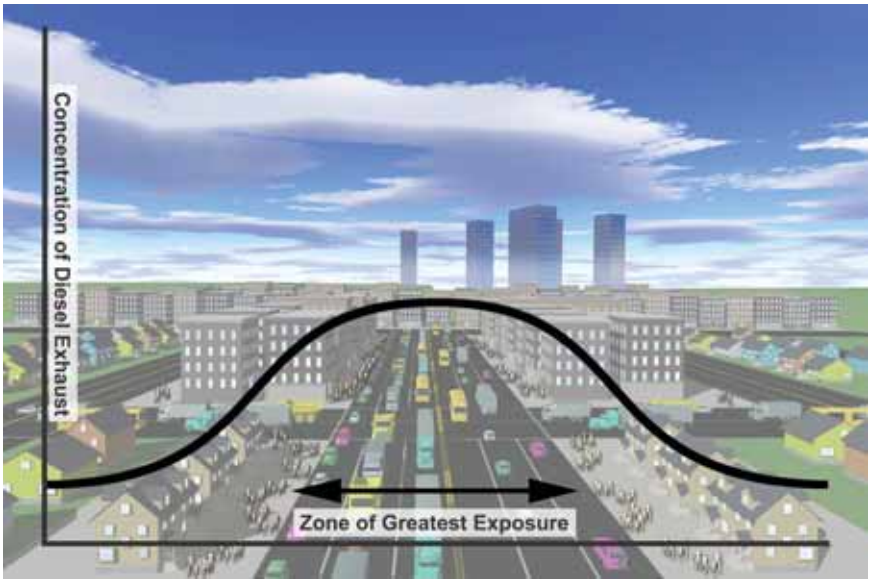


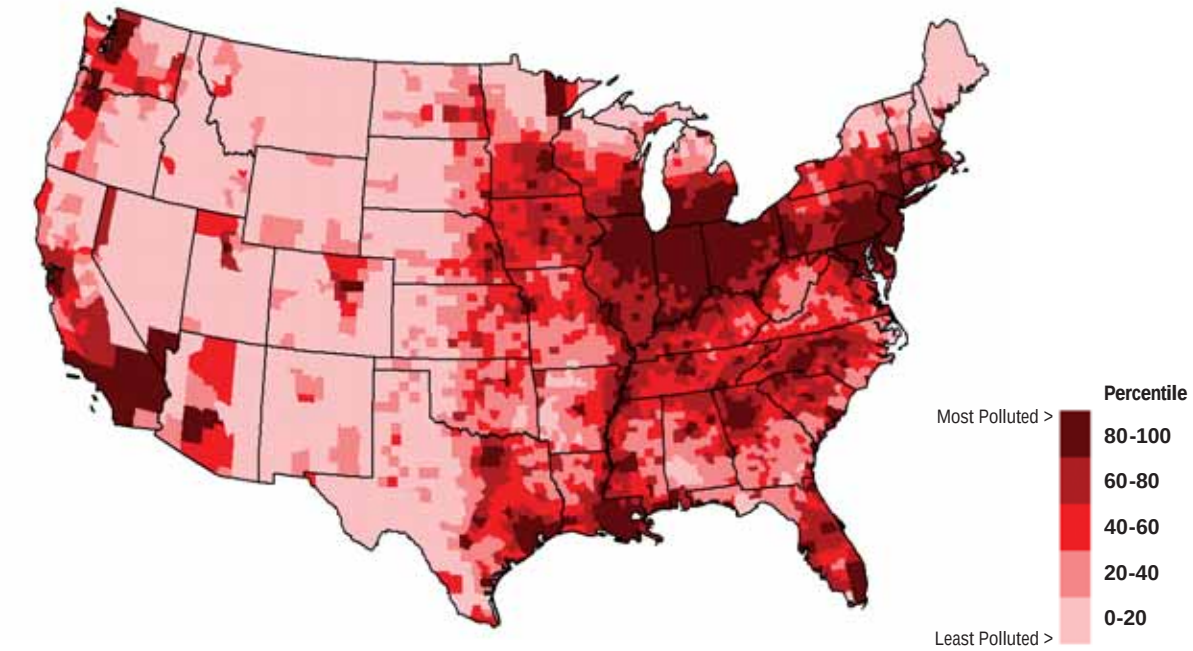
ILLUSTRATION BY ALAN MORIN

station platforms may also be high.[71]

- **Commute daily in heavy traffic** – Commuters are exposed to some of the highest diesel emissions in their cars due to pollutants released from trucks and buses on the road with them. Car occupants riding behind a diesel bus, for example, can experience extremely high levels of dangerous fine particles. Researchers in Los Angeles measured high fine particle levels (130 ug/m^3) behind an urban transit bus making numerous stops.[72] Exposures to drivers can have serious effects: a 2004 study suggests that young male state troopers experienced cardiac inflammation and heart rhythm changes from in-vehicle exposure to fine particles.[73]

Diesel exhaust from trucks and buses can be found in places we don't expect. For example it can be trapped in "urban canyons" and penetrate buildings through HVAC systems.

Exposure to diesel exhaust is also an Environmental Justice issue. Concentration of minority and low-income populations are more likely to be found in cities near diesel sources. Because these neighborhoods are exposed to some of the highest diesel exhaust levels, residents are certain to experience disproportionate health impacts.



Directly-Emitted Diesel Fine Particle Concentrations by County in the U.S. (1999)

A Solution Within Our Reach

Diesel Fine Particles Can Be Virtually Eliminated by Emission Controls Available Today.

Virtually all of the health risk posed by diesel exhaust can be eliminated through the application of emissions control strategies available today. For example, an aggressive but feasible program to reduce diesel particle emissions nationwide 50 percent by 2010, 75 percent by 2015, and 85 percent by 2020 would save about 100,000 lives between now and 2030 – beyond those lives that will be saved under EPA's new engine regulations.[74] Adopting this as a national goal would help states and municipalities set milestones for improvement and would be consistent with EPA's recently announced goal of retrofitting the entire U.S. fleet of diesel vehicles by 2015.[75] Indeed, California has already set a Diesel Risk Reduction goal of 75 percent 2010 and 85 percent by 2020. Over the last few years the California Air Resources Board has begun to issue regulations to achieve these goals.[76]

"Retrofit, Rebuild, Replace"

A variety of practical strategies exist to reduce diesel particle levels in America: tailpipe retrofits, clean fuels, closed crankcase filtration systems, engine rebuild and replacement requirements, emission specifications for vehicles used in public works contracts, anti-idling ordinances and legislation, truck stop electrification programs, aggressive fleet turnover policies, and more.

The most cost-effective approach to reducing diesel exhaust is likely in many cases to be the direct application of retrofit technology. Although the purchase of new, much cleaner vehicles will remain an important remedial strategy, the replacement of the entire diesel fleet is an expensive proposition that will have to be phased in over time. What's more, we can meet the challenge of reducing fine particles and related air toxics without replacing all vehicles right now. Current technology can easily remove particles from diesel exhaust. Retrofits that eliminate over 90 percent of fine particles from a heavy duty diesel bus engine typically cost $3,000-$7,500. This is a small expenditure when compared to the typical $60,000-75,000 price tag for a new school bus or $300,000 for a transit bus.[77]

Retrofits are available from many engine manufacturers. They generally are easy to install especially on highway vehicles. Nonetheless, it is important to point out that retrofits are not a "one size fits all" proposition. Retrofitting a fleet calls for careful planning and, often, a mix of strategies that will depend on the make and model year of the engines being retrofitted and funds available. For example, some heavy-duty engines lack modern electronic engine controls and are therefore are too old for some retrofit devices. Other diesel equipment simply does not have space for retrofit installation. Duty cycle is an important consideration too. Some engines do not run constantly which means that catalytic retrofit devices requiring consistent high engine temperatures do not operate as efficiently. Furthermore, some engines release pollution from crankcase ventilation in addition to the tailpipe. This calls for additional strategies. For some vehicles and model years, replacement may be the best option. As a result, fleets will need to develop individualized strategies that optimize emission reduction from their vehicles and equipment. Fortunately, this is not hard to do.

Installing a diesel particulate filter (DPF) in this Atlanta school bus simply required removal and replacement of the muffler and tailpipe.

Catalyzed diesel particulate matter filters (DPF) can reduce emissions of fine particles and adsorbed air toxics by over 90 percent. DPFs have been used in thousands of on- and non-road diesel applications. Diesel oxidation catalysts (DOCs) represent a less expensive albeit less effective option. They are smaller and therefore easier to install. EPA has verified that they can reduce total particulate matter emissions by 10-30 percent. Like the DPF, the DOC is also attached to the exhaust system. Installing one on a diesel truck or bus costs about $1,000. DOCs may be appropriate for vehicles built before 1995 that lack electronic controls and for construction equipment where there is inadequate space for a DPF to be installed. DOCs have been installed in more than 1.5 million trucks in the U.S.[78]

Low Sulfur Diesel Fuels Are Requisite for Effective Retrofit Controls.

Diesel particulate filters require low sulfur fuels because sulfur in the fuel can foul the emission control device. Unfortunately, low sulfur fuels are not available everywhere in the U.S. today (see http://www.epa.gov/otaq/retrofit/fuelsmap.htm for the current fuel availability map). Where ULSD is available, decision makers should consider requiring installation of filters where possible. Federal regulations have established diesel fuel and additive formulation requirements for on-road vehicles, limiting fuel sulfur content to 15 ppm nationwide beginning in 2006 for use with 2007 highway vehicles. Starting in 2010, non-road equipment will be required to use ULSD.

Biodiesel is another potential low-sulfur fuel choice that can achieve modest reductions in emissions when used as a blend, or higher reductions when used at 100 percent. Biodiesel is an alternative diesel fuel made from either animal fats or plants such as soybeans.

Ultra low sulfur diesel fuel will be available nationwide mid-2006.

Cleaning up All School Buses Within a Decade

With today's emissions controls, students need not be exposed to diesel exhaust while riding to school. EPA in the summer of 2004 announced the goal of retrofitting all existing school buses with pollution controls within a decade.[79] Funding retrofits and cleaner fuel presents the greatest obstacle facing school districts. To achieve this goal, adequate funds must be appropriated by states and the federal government.

Recommendations

Cities and States Must Act to Reduce Diesel.

The fine particle pollution problem is so widespread in the U.S. about one quarter of the U.S. population resides in areas that violate the standard. EPA recently formally designated over 200 counties in "nonattainment" with the annual fine particle standard.[80] Countless additional commuters may also spend significant time in areas exceeding the standard where they work. But the rest of the country is not safe from the risk posed by diesel particles – science tells us that particle-related health impacts don't stop once the standard is achieved. Health research has shown that there are adverse health impacts from particles even at very low concentrations.[81]

Cities and states that have been designated as "nonattainment" must act now to achieve meaningful reductions in fine particles. For those areas, state implementation plans must be developed and presented to EPA for approval within three years. Controls must then be implemented and air quality standards achieved by 2010. For this reason, states and cites must start now to determine how to achieve substantial emissions reductions. With rules to reduce particles from power plants pending at EPA and expected to be finalized in the near future, diesel emissions will become the largest remaining share of the problem and the most cost-effective solution, one that largely is within the control of states and municipalities.

MA TURNPIKE AUTHORITY

Cities should adopt and enforce anti-idling ordinances.

Cities and states should:

- Establish ambitious goals for reducing risk to their citizens by cleaning up existing diesels;
- Identify priority geographic areas and diesel "hotspots" for immediate attention;
- Adopt a package of options for reducing diesel exhaust including:
  - Retrofits accomplished by replacing mufflers with an optimal mix of filters or oxidation catalysts depending on vehicle age and type;
  - Requiring Ultra Low Sulfur Diesel and cleaner alternative fuels;
  - Closed crankcase ventilation systems to eliminate engine exhaust from penetrating the cabins of school and transit buses;
  - Engine rebuild and replacement requirements;
  - Truck stop electrification programs to give long-haul truckers a way to power their rigs overnight without running their engines;
  - Contract specifications requiring cleanup of trucks and construction equipment used in public works projects.
- Adopt diesel cleanup measures as federally-enforceable requirements in State Implementation Plans (SIPs) for the attainment of the fine particle and ozone air quality standards;
- Create and fund programs to provide money for diesel equipment owners to replace or rebuild high-polluting diesel engines;
- Adopt and enforce anti-idling ordinances and legislation.

To meet this challenge, several states and cities have begun to take action. California continues to lead the way in reducing diesel emissions: adopting stricter fine particle air quality standards, developing a statewide diesel risk reduction plan, and establishing a state program to clean up on- and non-road diesel engines ranging from garbage trucks to stationary generators.[82] When completed, the California program will regulate emissions from all existing diesels within its jurisdiction.

Trucks parked at New York Thruway rest area shut off their engines and plug into IdleAire facility for heat and electricity.

In New York, over 120,000 kids now ride a school bus that has had a retrofit kit installed to reduce diesel emissions. Under city and state law all New York City-sponsored construction projects are required to use ULSD and all heavy equipment engines at the sites must be retrofitted. Likewise, Seattle, King County, and the State of Washington have made a solid start on diesel cleanup from on- and non-road vehicles, and ships including a commitment to retrofit up to 8,000 school buses using local, state, federal, and SEP monies and buy up to 250 new diesel/electric hybrid buses. Other cities also have made a start.[83]

California and Texas have created funds – the "Carl Moyer" program in California and the Texas Emission Reduction Program (TERP) – to provide funding for diesel equipment owners to replace or rebuild high-polluting diesel engines.

NEW FLYER

Some cities are choosing Diesel Electric Hybrid buses as an alternative to conventional diesel buses.

Washington Must Support States

States and cities cannot meet the challenge of diesel pollution alone. U.S. EPA has recognized the dangers and societal costs of diesel exhaust and set tighter emission standards for new highway and non-road diesel engines and mandated the availability beginning in 2006 of Ultra Low Sulfur Diesel (ULSD) fuel nationwide. These requirements must be retained with no backsliding. In addition, EPA has set a national goal of cleaning up all of America's existing diesels by 2015 and has established a voluntary retrofit program to begin to meet it.[84] However, this challenge will only be met with an aggressive set of policies and adequate funding to ensure the goal can be accomplished.

Many states do not have the resources to clean up state and municipally-owned vehicles. They will need the support of the federal government to achieve EPA's goal.

Federal action may also be needed to clean up transient diesel vehicles, including long-haul trucks, marine diesel shipping in U.S. ports, and locomotives that typically travel from city to city dispersing their emissions along travel corridors. Because the Clean Air Act contains limited authority for EPA to establish national diesel retrofit rules, federal legislation will ultimately be needed to establish federal requirements and funding for a national retrofit program for all diesel engines as well as these interstate diesels.

The Federal government should:

- Pass legislation providing funding for the cleanup of municipal and state fleet vehicles;
- Explore regulatory options for reducing emissions from existing interstate fleets such as long-haul trucks, shipping, and locomotives;
- Retain and enforce the tighter new engine and cleaner fuel standards for highway and non-road diesels.

Endnotes

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2 Schwartz, J.,"Air Pollution Deadlier than Previously Thought," Harvard School of Public Health, Press Release, March 2, 2000.

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5 National Center for Environmental Assessment, Office of Research and Development, U.S. EPA. EPA/600/8-90/057F. May 2002. International Agency on Cancer, Monograph 46. See at: http://www-cie.iarc.fr/htdocs/monographs/vol46/46-01.htm; California Air Resources Board (1998) Proposed Identification of Diesel Exhaust as a Toxic Air Contaminant; See also, California Environmental Protection Agency, Air Resources Board, Office of Environmental Health Hazard Assessment, April 22, 1998; CalEPA (2002). Health Assessment for Diesel Engine Exhaust;

6 American Academy of Pediatrics, Committee on Environmental Health, *Ambient Air Pollution: Health Hazards to Children,* Pediatrics, Vol 114, No. 6, (December 2004) pp. 1699-1707. Available at www.pediat rics.org. For a complete summary of studies of particulate matter and health see: EPA Air Quality Criteria for Particulate Matter, October 2004 avaialble at: http://cfpub.epa.gov/ncea/cfm/partmatt.cfm

7 Modeled health impacts of less severe acute health impacts (e.g. other than mortality, heart attacks) likely understate the full magnitude of the impacts because many cases go unreported (e.g. asthma, bronchitis self-treatment, or treatment in small clinics or private offices.) Furthermore, the U.S. does not manage a central database of national health records.

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13 Estimate is based on EPA methodology described in EPA Memorandum, Bryan Hubbell to Sam Napolitano, July 2, 2001. Estimated NO_X, SO_2 and PM emissions health damages for heavy duty vehicle emissions.

14 Through only those diesel regulations promulgated to date, California will reduce diesel fine particles by 30 percent from year 2000 levels. California has announced plans to promulgate additional critical regulations in the next few years to address significant sources such as construction, agriculture, and inland shipping. California Air Resources Board (CARB) 2004a. Air Quality Almanac Emission Projections. Online at http://www.arb.ca.gov/emisinv/emsmain/emsmain.htm; California Air Resources Board (CARB). 2003a. Staff Report: Initial Statement of Reasons: Proposed Diesel Particulate Matter Control Measure for On Road Heavy-Duty Residential and Commercial Solid Waste Collection Vehicles. Sacramento, CA: California Environmental Protection Agency. California Air Resources Board (CARB) 2003b Staff Report: Initial Statement of Reasons for Proposed Rulemaking: Airborne Toxic Control Measure for Stationary Compression Ignition Engines. Sacramento, CA: California Environmental Protection Agency, Stationary Source Division Emissions Assessment Branch;. California Air Resources Board (CARB) 2003c. REVISED – Staff Report: Initial Statement of Reasons for Proposed Rulemaking: Airborne Toxic Control Measure for In-use Diesel Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets, and Facilities Where TRUs Operate. Sacramento, CA: California Environmental Protection Agency, Stationary Source Division Emissions Assessment Branch. The Union of Concerned Scientists recently estimated the costs and benefits of achieving the CARB Diesel Risk Reduction goal. See Union of Concerned Scientists, *Sick of Soot: Reducing the Health Impacts of Diesel Pollution in California* (June 2004) available online at: http://www.ucsusa.org/clean_vehicles/trucks_ and_buses/page.cfm?pageID=1429

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17 The number per million is the chance in a population of a million people who might be expected to get cancer over a 70-year lifetime. A potential cancer risk of 10 in a million means if one million people were exposed to a certain level of a pollutant or chemical there is a chance that 10 of them may develop cancer over their 70-year lifetime. This would be 10 new cases of cancer above the expected rate of cancer in the population. According to CARB the expected rate of cancer for all causes, including smoking, is about 200,000 to 250,000 chances in a million (one in four to five people).

18 For 1999 NATA national excess cancer risk from air toxics other than diesel see: Inside EPA, Inside Washington Publishers, (December 15, 2004) http://www.insideepa.com/

19 This finding is based on inhalation as the only exposure path and is limited to the thirty-three air toxics included in EPA's National Air Toxics Assessment (NATA). The relative cancer risk of diesel particulate matter is calculated as a ratio of the cancer risk of all air toxics tracked by EPA in the NATA divided by the risk of diesel particulate. We calculated the cancer risk for diesel PM in the U.S. based by applying the CARB cancer unit risk factor for diesel particulate matter to 1999 ASPEN model average national ambient concentration results for diesel PM. (Source for national toxic risk: Inside EPA, Inside Washington Publishers, December 15, 2004.)

20 According to the EPA's categorization of counties as urban or rural, the average ASPEN 1999 ambient diesel fine particle concentration is 1.3822 ug/m^3 for urban counties and 0.4730 ug/m^3 for rural counties. The overall national average is 1.2096 ug/m^3. These averages are population weighted. These averages convert (using the 0.0003 factor) to cancer risks of 415 per million urban, 142 per million rural, and 363 per million average.

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23 The new health findings provided in this report by Abt Associates are derived from average modeled estimates of ambient concentrations of diesel particulate matter for entire counties. Many people experience higher diesel exposure situations depending upon where they live and work, for example, such as working near diesel engines, living near diesel sources or commuting regularly on roadways with diesel traffic. The quantitative estimates of death and disease we provide in this report are based on average exposures only and do not represent the risks associated with high diesel exposures. Furthermore, these health findings do not include the impacts from all toxic constituents in diesel exhaust, only directly-emitted particulate matter.

24 The state and metropolitan area health effects reported here exclude those associated with secondarily-formed fine particles, i.e., particles formed from gaseous emissions through post-emission atmospheric chemical reactions. Typically, these include nitrate from nitrogen oxide emissions and sulfate from sulfur dioxide emissions. Secondarily-formed fine particles may make up as much as one-third of diesel-related particles. See Lloyd, A. C., and Cackette, T.A. (2001). Diesel engines: Environmental Impact and Control. Journal of Air and Waste Management Association, v. 51, p. 809-847, June 2001.

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76 California Air Resources Board (CARB) 2004a. Air Quality Almanac Emission Projections. Online at *http://www.arb.ca.gov/emisinv/emsmain/emsmain.htm;* California Air Resources Board (CARB). 2003a. Staff Report: "Initial Statement of Reasons: Proposed Diesel Particulate Matter Control Measure for On-Road Heavy-Duty Residential and Commercial Solid Waste Collection Vehicles," California Environmental Protection Agency, Sacramento, CA; California Air Resources Board (CARB) 2003b Staff Report: "Initial Statement of Reasons for Proposed Rulemaking: Airborne Toxic Control Measure for Stationary Compression Ignition Engines," Sacramento, CA: California Environmental Protection Agency, Stationary Source Division Emissions Assessment Branch; California Air Resources Board (CARB) 2003c. REVISED – Staff Report: Initial Statement of Reasons for Proposed Rulemaking: Airborne Toxic Control Measure for In-use Diesel Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets, and Facilities Where TRUs Operate, Sacramento, CA: California Environmental Protection Agency, Stationary Source Division Emissions Assessment Branch.

77 MECA: http://www.epa.gov/otaq/retrofit/documents/meca1.pdf; CARB cost-effectiveness analysis: http://www.arb.ca.gov/regact/bus02/appf.pdf

78 MECA: http://www.meca.org/jahia/Jahia/engineName/filemanager/pid/229/dieselfact.PDF?actionreq=actionFileDownload&fileItem=213. A newly verified Diesel Oxidation Catalyst technology, called "a torturous path filter" achieves a 50 percent reduction in diesel particulate at about half the cost of a diesel particulate filter.

79 Motor Age, "EPA to Retrofit 11 Million Diesels," Advanstar Communications (August 2004). Available online at: http://www.motorage.com/motorage/article/articleDetail.jsp?id=141102. See also, http://www.epa.gov/cleanschoolbus/

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81 Vedal, S., Brauer, M., White, R., and Petkau, R., (2003). Air Pollution and Daily Mortality in a City With Low Levels of Air Pollution, Environmental Health Perspectives Vol.111, No.1, (2003), pp. 45-51.

82 See: California Risk Reduction Plan at: http://www.arb.ca.gov/diesel/documents/rrpfinal.pdf

83 For more information about retrofit programs in your area see: http://www.epa.gov/otaq/retrofit/projectmap.htm

84 For more information on EPA's Voluntary Retrofit Program see: http://www.epa.gov/otaq/retrofit

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CAPCOA

CALIFORNIA AIR POLLUTION CONTROL OFFICERS ASSOCIATION

CEQA & Climate Change

Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act

January 2008

Disclaimer

The California Air Pollution Control Officers Association (CAPCOA) has prepared this white paper consideration of evaluating and addressing greenhouse gas emissions under the California Environmental Quality Act (CEQA) to provide a common platform of information and tools to support local governments.

This paper is intended as a resource, not a guidance document. It is not intended, and should not be interpreted, to dictate the manner in which an air district or lead agency chooses to address greenhouse gas emissions in the context of its review of projects under CEQA.

This paper has been prepared at a time when California law has been recently amended by the Global Warming Solutions Act of 2006 (AB 32), and the full programmatic implications of this new law are not yet fully understood. There is also pending litigation in various state and federal courts pertaining to the issue of greenhouse gas emissions. Further, there is active federal legislation on the subject of climate change, and international agreements are being negotiated. Many legal and policy questions remain unsettled, including the requirements of CEQA in the context of greenhouse gas emissions. This paper is provided as a resource for local policy and decision makers to enable them to make the best decisions they can in the face of incomplete information during a period of change.

Finally, this white paper reviews requirements and discusses policy options, but it is not intended to provide legal advice and should not be construed as such. Questions of legal interpretation, particularly in the context of CEQA and other laws, or requests for advice should be directed to the agency's legal counsel.

Acknowledgements

This white paper benefited from the hard work and creative insights of many people. CAPCOA appreciates the efforts of all who contributed their time and energy to the project. In particular, the Association thanks the following individuals:

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Contract Support

Jones & Stokes, Sacramento, CA *(analysis of non-zero threshold approaches)*
EDAW, Inc., Sacramento, CA *(review of analytical methods and mitigation strategies)*.

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List of Acronyms and Abbreviations

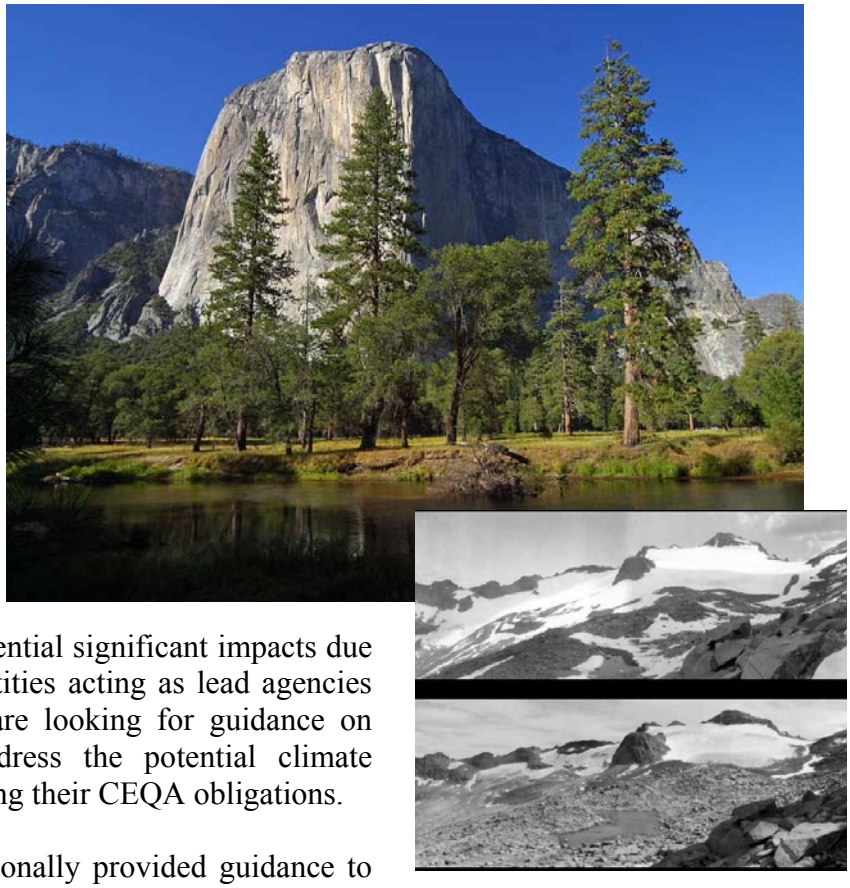
Acronym/ Abbreviation	Meaning
AB 32	Assembly Bill 32 Global Warming Solutions Act of 2006
AG	Attorney General
ARB	Air Resources Board
ASTM	American Society of Testing and Material
BAAQMD	Bay Area Air Quality Management District
BAU	Business as Usual
BEES	Building for Environmental and Economic Sustainability
Calfire	California Fire
Caltrans	California Department of Transportation
CAP	Criteria Air Pollutants
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resource Board
CAT	Climate Action Team
CCAP	Center for Clean Air Policy
CCAR	California Climate Action Registry
CDFA	California Department of Food and Agriculture
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CF	Connectivity Factor
CH_4	Methane
CIWMB	California Integrated Waste Management Board
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CNG	Compressed Natural Gas
CPUC	California Public Utilities Commission
CUFR	California Urban Forestry
DGS	Department of General Services
DOE	U.S. Department of Energy
DOF	Department of Finance
DPF	Diesel Particulate Filter
DWR	Department of Water Resources
E85	85% Ethanol
EEA	Massachusetts Executive Office of Energy and Environmental Affairs
EERE	Energy Efficiency and Renewable Energy
EIR	Environmental Impact Report
EOE	Encyclopedia of Earth
EPA	U.S. Environmental Protection Agency
ETC	Edmonton Trolley Coalition
EV	Electric Vehicles
FAR	Floor Area Ratio

GHG	Greenhouse Gas
GGEP	Greenhouse Gas Emissions Policy
GGRP	Greenhouse Gas Reduction Plan
GP	General Plan
GWP	Global Warming Potential
IGCC	Integrated Gasification Combined Cycle
IOU	Investor Owned Utility
IPCC	International Panel on Climate Change
IT	Information Technology
ITE	Institute of Transportation Engineers
J&S	Jones & Stokes
km	Kilometer
LandGem	Landfill Gas Emissions Model
LEED	Leadership in Energy and Environmental Design
LNG	Liquefied Natural Gas
MBUAPCD	Monterey Bay Unified Air Pollution Control District
MEPA	Massachusetts Environmental Policy Act
MND	Mitigated Negative Declaration
MMT CO_2e	Million Metric Tons Carbon Dioxide Equivalent
MW	Megawatts
N_2O	Nitrous Oxide
NACAA	National Association Clean Air Agencies
ND	Negative Declaration
NEV	Neighborhood Electric Vehicle
NIST	National Institute of Standards and Technology
NO_X	Oxides of Nitrogen
NREL	National Renewable Energy Laboratory
NSCAPCD	Northern Sonoma County Air Pollution Control District
NSR	New Source Review
OPR	State Office of Planning and Research
PFC	Perfluorocarbon
PG&E	Pacific Gas & Electric
POU	Publicly Owned Utility
PM	Particulate Mater
RoadMod	Road Construction Emissions Model
ROG	Reactive Organic Gas
RPS	Renewable Portfolio Standards
RTP	Regional Transportation Plan
S-3-05	Executive Order S-3-05
SB	Senate Bill
SBCAPCD	Santa Barbara County Air Pollution Control District
SCAQMD	South Coast Air Quality Management District
SCM	Sustainable Communities Model
SIP	State Implementation Plan
SJVAPCD	San Joaquin Valley Unified Air Pollution Control District
SLOCAPCD	San Luis Obispo County Air Pollution Control District

SMAQMD	Sacramento Metropolitan Air Quality Management District
SMUD	Sacramento Municipal Utilities District
SO_X	Sulfur Oxides
SP	Service Population
SRI	Solar Reflectance Index
SWP	State Water Project
TAC	Toxic Air Contaminants
TBD	To Be Determined
TDM	Transportation Demand Management
TMA	Transportation Management Association
THC	Total Hydrocarbon
UC	University of California
ULEV	Ultra Low Emission Vehicle
UNFCCC	United Nations Framework Convention on Climate Change
URBEMIS	Urban Emissions Model
USGBC	U.S. Green Building Council
VMT	Vehicle Miles Traveled
VTPI	Victoria Transit Policy
YSAQMD	Yolo-Solano Air Quality Management District

Introduction

The California Environmental Quality Act (CEQA) requires that public agencies refrain from approving projects with significant adverse environmental impacts if there are feasible alternatives or mitigation measures that can substantially reduce or avoid those impacts. There is growing concern about greenhouse gas emissions[1] (GHG) and recognition of their significant adverse impacts on the world's climate and on our environment. In its most recent reports, the International Panel on Climate Change (IPCC) has called the evidence for this "unequivocal." In California, the passage of the Global Warming Solutions Act of 2006 (AB 32) recognizes the serious threat to the "economic well-being, public health, natural resources, and the environment of California" resulting from global warming. In light of our current understanding of these impacts, public agencies approving projects subject to the CEQA are facing increasing pressure to identify and address potential significant impacts due to GHG emissions. Entities acting as lead agencies in the CEQA process are looking for guidance on how to adequately address the potential climate change impacts in meeting their CEQA obligations.



Air districts have traditionally provided guidance to local lead agencies on evaluating and addressing air pollution impacts from projects subject to CEQA. Recognizing the need for a common platform of information and tools to support decision makers as they establish policies and programs for GHG and CEQA, the California Air Pollution Control Officers Association has prepared a white paper reviewing policy choices, analytical tools, and mitigation strategies.

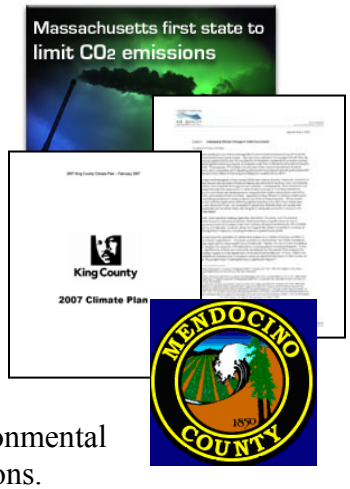
This paper is intended to serve as a resource for public agencies as they establish agency procedures for reviewing GHG emissions from projects under CEQA. It considers the application of thresholds and offers three alternative programmatic approaches toward

[1] Throughout this paper GHG, CO_2, CO_2e, are used interchangeably and refer generally to greenhouse gases but do not necessarily include all greenhouse gases unless otherwise specified.

determining whether GHG emissions are significant. The paper also evaluates tools and methodologies for estimating impacts, and summarizes mitigation measures. It has been prepared with the understanding that the programs, regulations, policies, and procedures established by the California Air Resources Board (CARB) and other agencies to reduce GHG emissions may ultimately result in a different approach under CEQA than the strategies considered here. The paper is intended to provide a common platform for public agencies to ensure that GHG emissions are appropriately considered and addressed under CEQA while those programs are being developed.

Examples of Other Approaches

Many states, counties, and cities have developed policies and regulations concerning greenhouse gas emissions that seek to require or promote reductions in GHG emissions through standards for vehicle emissions, fuels, electricity production/renewables, building efficiency, and other means. A few have developed guidance and are currently considering formally requiring or recommending the analysis of greenhouse gas emissions for development projects during their associated environmental processes. Key work in this area includes:



- Massachusetts Office of Energy and Environmental Affairs Greenhouse Gas Emissions Policy;
- King County, Washington, Executive Order on the Evaluation of Climate Change Impacts through the State Environmental Policy Act;
- Sacramento AQMD interim policy on addressing climate change in CEQA documents; and
- Mendocino AQMD updated guidelines for use during preparation of air quality impacts in Environmental Impact Reports (EIRs) or mitigated negative declarations.

The following paper evaluates options for lead agencies to ensure that GHG emissions are appropriately addressed as part of analyses under CEQA. It considers the use of significance thresholds, tools and methodologies for analyzing GHG emissions, and measures and strategies to avoid, reduce, or mitigate impacts.

Greenhouse Gas Significance Criteria

This white paper discusses three basic options air districts and lead agencies can pursue when contemplating the issues of CEQA thresholds for greenhouse gas emissions. This paper explores each path and discusses the benefits and disbenefits of each. The three basic paths are:

- No significance threshold for GHG emissions;

- GHG emissions threshold set at zero; or
- GHG threshold set at a non-zero level.

Each has inherent advantages and disadvantages. Air districts and lead agencies may believe the state or national government should take the lead in identifying significance thresholds to address this global impact. Alternatively, the agency may believe it is premature or speculative to determine a clear level at which a threshold should be set. On the other hand, air districts or lead agencies may believe that every GHG emission should be scrutinized and mitigated or offset due to the cumulative nature of this impact. Setting the threshold at zero will place all discretionary projects under the CEQA microscope. Finally, an air district or lead agency may believe that some projects will not benefit from a full environmental impact report (EIR), and may believe a threshold at some level above zero is needed.

This paper explores the basis and implications of setting no threshold, setting a threshold at zero and two primary approaches for those who may choose to consider a non-zero threshold. The first approach is grounded in statute (AB 32) and executive order (EO S-3-05) and explores four possible options under this scenario. The options under this approach are variations of ways to achieve the 2020 goals of AB 32 from new development, which is estimated to be about a 30 percent reduction from business as usual.

The second approach explores a tiered threshold option. Within this option, seven variations are discussed. The concepts explored here offer both quantitative and qualitative approaches to setting a threshold as well as different metrics by which tier cut-points can be set. Variations range from setting the first tier cut-point at zero to second-tier cut-points set at defined emission levels or based on the size of a project. It should be noted that some applications of the tiered threshold approach may require inclusion in a General Plan or adoption of enabling regulations or ordinances to render them fully effective and enforceable.

Greenhouse Gas Analytical Methodologies

The white paper evaluates various analytical methods and modeling tools that can be applied to estimate the greenhouse gas emissions from different project types subject to CEQA. In addition, the suitability of the methods and tools to characterize accurately a project's emissions is discussed and the paper provides recommendations for the most appropriate methodologies and tools currently available.

The suggested methodologies are applied to residential, commercial, specific plan and general plan scenarios where GHG emissions are estimated for each example. This chapter also discusses estimating emissions from solid waste facilities, a wastewater treatment plant, construction, and air district rules and plans.

Another methodology, a service population metric, that would measure a project's overall GHG efficiency to determine if a project is more efficient than the existing statewide average for per capita GHG emissions is explored. This methodology may be more directly correlated to a project's ability to help achieve objectives outlined in AB 32, although it relies on establishment of an efficiency-based significance threshold. The subcommittee believes this methodology may eventually be appropriate to evaluate the long-term GHG emissions from a project in the context of meeting AB 32 goals. However, this methodology will need further work and is not considered viable for the interim guidance presented in this white paper.

Greenhouse Gas Mitigation Measures

Common practice in environmental protection is first to avoid, then to minimize, and finally to compensate for impacts. When an impact cannot be mitigated on-site, off-site mitigation can be effectively implemented in several resource areas, either in the form of offsetting the same impact or preserving the resource elsewhere in the region.

This white paper describes and evaluates currently available mitigation measures based on their economic, technological and logistical feasibility, and emission reduction effectiveness. The potential for secondary impacts to air quality are also identified for each measure. A summary of current rules and regulations affecting greenhouse gas emissions and climate change is also provided.

Reductions from transportation related measures (e.g., bicycle, pedestrian, transit, and parking) are explored as a single comprehensive approach to land use. Design measures that focus on enhancing alternative transportation are discussed. Mitigation measures are identified for transportation, land use/building design, mixed-use development, energy efficiency, education/social awareness and construction.

Purpose

CEQA requires the avoidance or mitigation of significant adverse environmental impacts where there are feasible alternatives available. The contribution of GHG to climate change has been documented in the scientific community. The California Global Warming Solutions Act of 2006 (AB 32) mandates significant reductions in greenhouse gases (GHG); passage of that law has highlighted the need to consider the impacts of GHG emissions from projects that fall under the jurisdiction of the California Environmental Quality Act (CEQA). Because we have only recently come to fully recognize the potential for significant environmental impacts from GHG, most public agencies have not yet established policies and procedures to consider them under CEQA. As a result, there is great need for information and other resources to assist public agencies as they develop their programs.

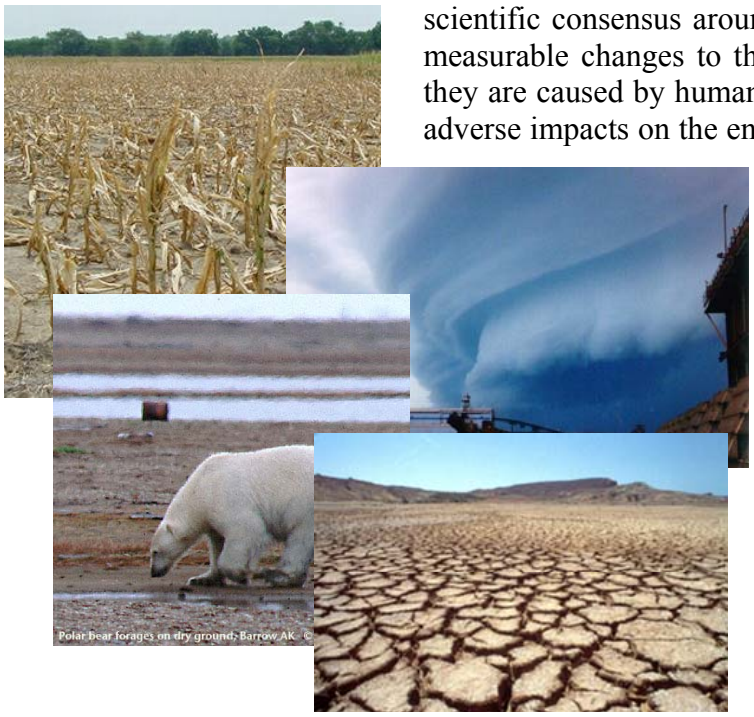
Air districts have historically provided guidance to local governments on the evaluation of air pollutants under CEQA. As local concern about climate change and GHG has increased, local governments have requested guidance on incorporating analysis of these impacts into local CEQA review. The California Air Pollution Control Officers Association (CAPCOA), in coordination with the CARB, the Governor's Office of Planning and Research (OPR) and two environmental consulting firms, has harnessed the collective expertise to evaluate approaches to analyzing GHG in CEQA. The purpose of this white paper is to provide a common platform of information and tools to address climate change in CEQA analyses, including the evaluation and mitigation of GHG emissions from proposed projects and identifying significance threshold options.

CEQA requires public agencies to ensure that potentially significant adverse environmental effects of discretionary projects are fully characterized, and avoided or mitigated where there are feasible alternatives to do so. Lead agencies have struggled with how best to identify and characterize the magnitude of the adverse effects that individual projects have on the global-scale phenomenon of climate change, even more so since Governor Schwarzenegger signed Executive Order S-3-05 and the state Legislature enacted The Global Warming Solutions Act of 2006 (AB 32). There is now a resounding call to establish procedures to analyze and mitigate greenhouse gas (GHG) emissions. The lack of established thresholds does not relieve lead agencies of their responsibility to analyze and mitigate significant impacts, so many of these agencies are seeking guidance from state and local air quality agencies. This white paper addresses issues inherent in establishing CEQA thresholds, evaluates tools, catalogues mitigation measures and provides air districts and lead agencies with options for incorporating climate change into their programs.

Background

National and International Efforts

International and Federal legislation have been enacted to deal with climate change issues. The Montreal Protocol was originally signed in 1987 and substantially amended in 1990 and 1992. In 1988, the United Nations and the World Meteorological Organization established the IPCC to assess the scientific, technical and socioeconomic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation. The most recent reports of the IPCC have emphasized the scientific consensus around the evidence that real and measurable changes to the climate are occurring, that they are caused by human activity, and that significant adverse impacts on the environment, the economy, and human health and welfare are unavoidable.



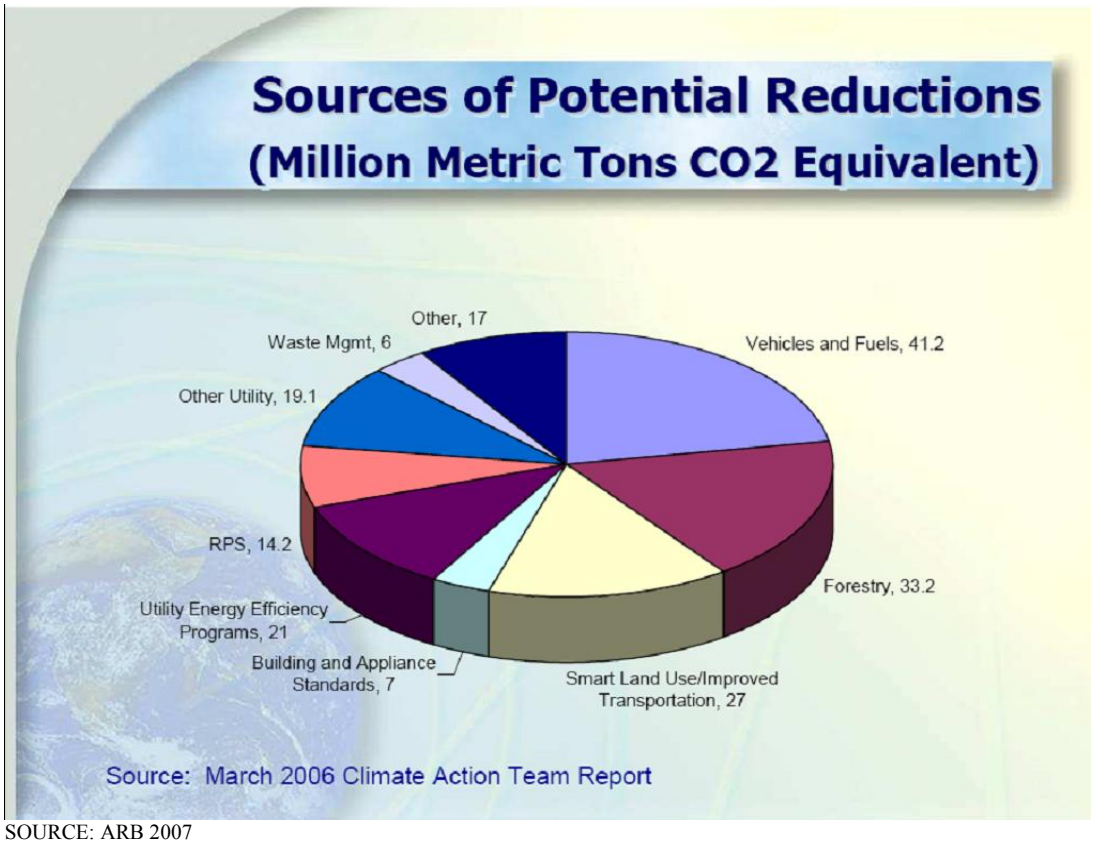
In October 1993, President Clinton announced his Climate Change Action Plan, which had a goal to return greenhouse gas emissions to 1990 levels by the year 2000. This was to be accomplished through 50 initiatives that relied on innovative voluntary partnerships between the private sector and government aimed at producing cost-effective reductions in greenhouse gas emissions. On March 21, 1994, the United States joined a number of countries around the world in signing the United Nations Framework Convention on Climate Change (UNFCCC). Under the Convention, governments agreed to gather and share information on greenhouse gas emissions, national policies, and best practices; launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change.

These efforts have been largely policy oriented. In addition to the national and international efforts described above, many local jurisdictions have adopted climate change policies and programs. However, thus far little has been done to assess the significance of the affects new development projects may have on climate change.

Executive Order S-3-05

On June 1, 2005, Governor Schwarzenegger issued Executive Order S-3-05 (S-3-05). It included the following GHG emission reduction targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; by 2050, reduce GHG emissions to 80 percent below 1990 levels. To meet the targets, the Governor directed the Secretary of the California Environmental Protection Agency to coordinate with the Secretary of the Business, Transportation and Housing Agency, Secretary of the Department of Food and Agriculture, Secretary of the Resources Agency, Chairperson of the CARB, Chairperson of the Energy Commission and President of the Public Utilities Commission on development of a Climate Action Plan.

The Secretary of CalEPA leads a Climate Action Team (CAT) made up of representatives from the agencies listed above to implement global warming emission reduction programs identified in the Climate Action Plan and report on the progress made toward meeting the statewide greenhouse gas targets that were established in the Executive Order.



SOURCE: ARB 2007

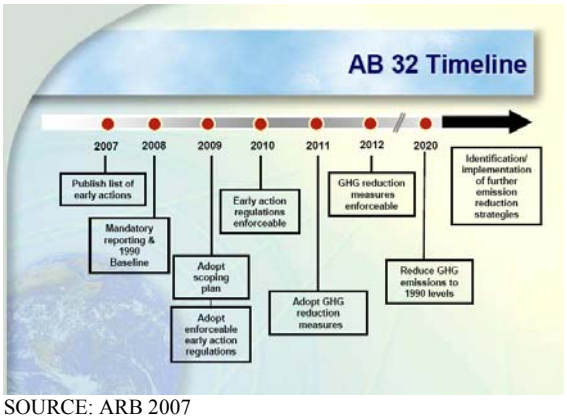
In accord with the requirements of the Executive Order, the first report to the Governor and the Legislature was released in March 2006 and will be issued bi-annually thereafter. The CAT Report to the Governor contains recommendations and strategies to help ensure the targets in Executive Order S-3-05 are met.

California Global Warming Solutions Act of 2006 (AB 32)

In 2006, the California State Legislature adopted the California Global Warming Solutions Act of 2006. AB 32 establishes a cap on statewide greenhouse gas emissions and sets forth the regulatory framework to achieve the corresponding reduction in statewide emissions levels. AB 32 charges the California Air Resources Board (CARB), the state agency charged with regulating statewide air quality, with implementation of the act. Under AB 32, greenhouse gases are defined as: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

The regulatory steps laid out in AB 32 require CARB to: adopt early action measures to reduce GHGs; to establish a statewide greenhouse gas emissions cap for 2020 based on 1990 emissions; to adopt mandatory reporting rules for significant source of greenhouse gases; and to adopt a scoping plan indicating how emission reductions will be achieved via regulations, market mechanisms and other actions; and to adopt the regulations needed to achieve the maximum technologically feasible and cost-effective reductions in greenhouse gases.

AB 32 requires that by January 1, 2008, the State Board shall determine what the statewide greenhouse gas emissions inventory was in 1990, and approve a statewide greenhouse gas emissions limit that is equivalent to that level, to be achieved by 2020. While the level of 1990 GHG emissions has not yet been approved, CARB's most recent emission inventory indicates that California had annual emissions of 436 million metric tons of carbon dioxide equivalent (MMT CO_2e) in 1990 and 497 MMT CO_2e in 2004.



SOURCE: ARB 2007

The regulatory timeline laid out in AB 32 requires that by July 1, 2007, CARB adopt a list of discrete early action measures, or regulations, to be adopted and implemented by January 1, 2010. These actions will form part of the State's comprehensive plan for achieving greenhouse gas emission reductions. In June 2007, CARB adopted three discrete early action measures. These three new proposed regulations meet the definition of "discrete early action greenhouse gas reduction measures," which include the following: a low carbon fuel standard; reduction of HFC-134a emissions from non-professional servicing of motor vehicle air conditioning systems; and improved landfill methane capture. CARB estimates that by 2020, the reductions from those three discrete early action measures would be approximately 13-26 MMT CO_2e.

CARB evaluated over 100 possible measures identified by the CAT for inclusion in the list of discrete early action measures. On October 25, 2007 CARB gave final approval to the list of Early Action Measures, which includes nine discrete measures and 35

additional measures, all of which are to be enforceable by January 1, 2010. AB 32 requires that by January 1, 2009, CARB adopt a scoping plan indicating how emission reductions will be achieved via regulations, market mechanisms and other actions.

Senate Bill 97

Senate Bill (SB) 97, signed in August 2007, acknowledges that climate change is an important environmental issue that requires analysis under CEQA. This bill directs the OPR to prepare, develop, and transmit to the Resources Agency guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, by July 1, 2009. The Resources Agency is required to certify or adopt those guidelines by January 1, 2010. This bill also protects projects funded by the Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006, or the Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1B or 1E) from claims of inadequate analysis of GHG as a legitimate cause of action. This latter provision will be repealed on January 1, 2010. Thus, this "protection" is highly limited to a handful of projects and for a short time period.

The Role of Air Districts in the CEQA Process

Air districts assume one of three roles in the CEQA process. They may be lead agencies when they are adopting regulations and air quality plans. In some instances, they can also be a lead agency when approving permits to construct or operate for applicants subject to district rules. However, in many cases where an air district permit is involved, another agency has broader permitting authority over the project and assumes the role of lead agency. In these situations, the air district becomes what is referred to as a responsible agency under CEQA. When CEQA documents are prepared for projects that do not involve discretionary approval of a district regulation, plan or permit, the air district may assume the role of a concerned or commenting agency. In this role, it is typical for air districts to comment on CEQA documents where there may be air quality-related adverse impacts, such as projects that may create significant contributions to existing violations of ambient standards, cause a violation of an ambient standard or create an exposure to toxic air contaminants or odors. In some cases, the air district may also act in an "advisory" capacity to a lead agency early on in its review of an application for a proposed development project.

A few air districts in California began developing significance thresholds for use in CEQA analyses in the late 1980's and early 1990's. By the mid-1990's most air districts had developed CEQA thresholds for air quality analyses. Many of the districts have included in their guidance the analysis of rule development and permits that may be subject to CEQA.

What is Not Addressed in this Paper

Impacts of Climate Change to a Project

The focus of this paper is addressing adverse impacts to climate change and the ability to meet statewide GHG reduction goals caused by proposed new land development projects. CEQA also requires an assessment of significant adverse impacts a project might cause by bringing development and people into an area affected by climate change (CEQA Guidelines §15126.2). For example, an area that experiences higher average temperatures due to climate change may expose new development to more frequent exceedances and higher levels of ozone concentrations. Alternatively, a rise in sea level brought on by climate change may inundate new development locating in a low-lying area. The methodologies, mitigation and threshold approaches discussed in this paper do not specifically address the potential adverse impacts resulting from climate change that may affect a project.

Impacts from Construction Activity

Although construction activity has been addressed in the analytical methodologies and mitigation chapters, this paper does not discuss whether any of the threshold approaches adequately addresses impacts from construction activity. More study is needed to make this assessment or to develop separate thresholds for construction activity. The focus of this paper is the long-term adverse operational impacts of land use development.

Introduction

Any analysis of environmental impacts under CEQA includes an assessment of the nature and extent of each impact expected to result from the project to determine whether the impact will be treated as significant or less than significant. CEQA gives lead agencies discretion whether to classify a particular environmental impact as significant. "The determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved," ref: CEQA Guidelines §15064(b) ("Guidelines"). Ultimately, formulation of a standard of significance requires the lead agency to make a policy judgment about where the line should be drawn distinguishing adverse impacts it considers significant from those that are not deemed significant. This judgment must, however, be based on scientific information and other factual data to the extent possible (Guidelines §15064(b)).

CEQA does not require that agencies establish thresholds of significance. Guidelines §15064.7(a) encourages each public agency "…to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects. A threshold of significance is an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which normally means the effect will be determined to be less than significant."

Once such thresholds are established, an impact that complies with the applicable threshold will "normally" be found insignificant and an impact that does not comply with the applicable threshold will "normally" be found significant.

Additionally, Guidelines §15064.7(b) requires that if thresholds of significance are adopted for general use as part of the lead agency's environmental review process they must be adopted by ordinance, resolution, rule or regulation, and developed through a public review process and be supported by substantial evidence.

While many public agencies adopt regulatory standards as thresholds, the standards do not substitute for a public agency's use of careful judgment in determining significance. They also do not replace the legal standard for significance (i.e., if there is a fair argument, based on substantial evidence in light of the whole record that the project may have a significant effect, the effect should be considered significant) (Guidelines §15064(f)(1). Also see *Communities for a Better Environment v. California Resource Agency* 103 Cal. App. 4th 98 (2002)). In other words, the adoption of a regulatory standard does not create an irrebuttable presumption that impacts below the regulatory standard are less than significant.

Summary of CEQA Thresholds at Air Districts

This section briefly summarizes the evolution of air district CEQA significance thresholds. Ventura County APCD, in 1980, was the first air district in California that formally adopted CEQA significance thresholds. Their first CEQA assessment document contained impact thresholds based on project type: residential, nonresidential, and government. Then, as now, the District's primary CEQA thresholds applied only to ROG and NO_x. The 1980 Guidelines did not address other air pollutants.

Santa Barbara County APCD and the Bay Area AQMD adopted thresholds in 1985. The South Coast AQMD recommended regional air quality thresholds in 1987 for CO, SO_2, NO_2, particulates, ROG, and lead. Most of the other California air districts adopted CEQA guidance and thresholds during the 1990's. Air districts have updated their thresholds and guidelines several times since they were first published.

Originally, most districts that established CEQA thresholds focused on criteria pollutants for which the district was nonattainment and the thresholds only addressed project level impacts. Updates during the 1990's began to add additional air quality impacts such as odors, toxic air contaminants and construction. Several air districts also developed thresholds for General Plans that relied on an assessment of the plan consistency with the district's air quality plans. A consistency analysis involves comparing the project's land use to that of the general plan and the population and employment increase to the forecasts underlying the assumptions used to develop the air quality plan.

Most air district thresholds for CEQA are based on the threshold for review under the New Source Review (NSR). The NSR threshold level is set by district rule and is different depending on the nonattainment classification of the air district. Areas with a less severe classification have a higher NSR trigger level while the most polluted areas have the lowest NSR trigger level. Some districts, such as Ventura County APCD, have significantly lower CEQA thresholds that are not tied to the NSR requirements. In Ventura, one set of CEQA thresholds is 25 pounds per day for all regions of Ventura County, except the Ojai Valley. The second set of CEQA thresholds was set at 5 pounds per day for the Ojai Valley.

The Sacramento Metropolitan AQMD bases its thresholds for ozone precursors on the projected land use share of emission reductions needed for attainment. The emission reductions needed to reach attainment are based on commitments made in the state implementation plan (SIP) prepared for the federal clean air act.

CEQA Considerations in Setting Thresholds

Public agencies use significance thresholds to disclose to their constituents how they plan on evaluating and characterizing the severity of various environmental impacts that could be associated with discretionary projects that they review. Significance thresholds are also used to help identify the level of mitigation needed to reduce a potentially significant impact to a less than significant level and to determine what type of an environmental document should be prepared for a project; primarily a negative declaration, mitigated negative declaration or an environmental impact report.

While public agencies are not required to develop significance thresholds, if they decide to develop them, they are required to adopt them by ordinance, resolution, rule or regulation through a public process. A lead agency is not restrained from adopting any significance threshold it sees as appropriate, as long as it is based on substantial evidence. CEQA Guidelines §15064.7 encourages public agencies to develop and publish significance thresholds that are identifiable, quantitative, qualitative or performance level that the agency uses in the determination of the significance of environmental effects. The courts have ruled that a "threshold of significance" for a given environmental effect is simply that level at which the lead agency finds the effects of the project to be significant.

Before an agency determines its course with regard to climate change and CEQA, it must be made clear that a threshold, or the absence of one, will not relieve a lead agency from having to prepare an EIR or legal challenges to the adequacy of an analysis leading to a conclusion, or lack of a conclusion, of significance under CEQA. CEQA has generally favored the preparation of an EIR where there is any substantial evidence to support a fair argument that a significant adverse environmental impact may occur due to a proposed project. This paper explores three alternative approaches to thresholds, including a no threshold option, a zero threshold option and a non-zero threshold option.

Fair Argument Considerations

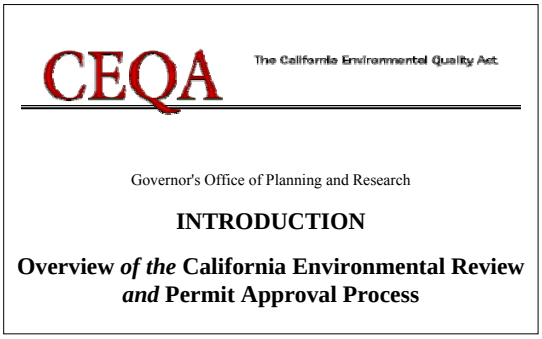
Under the CEQA fair argument standard, an EIR must be prepared whenever it can be fairly argued, based on substantial evidence in the administrative record, that a project may have a significant adverse effect on the environment. "Substantial evidence" comprises "enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached." (Guidelines §15384) This means that if factual information is presented to the public agency that there is a reasonable possibility the project could have

a significant effect on the environment, an EIR is required even if the public agency has information to the contrary (Guidelines §15064 (f)).

The courts have held that the fair argument standard "establishes a low threshold for initial preparation of an EIR, which reflects a preference for resolving doubts in favor of environmental review." (*Santa Teresa Citizen Action Group v. City of San Jose* [2003] 114 Cal.App.4th 689) Although the determination of whether a fair argument exists is made by the public agency, that determination is subject to judicial scrutiny when challenged in litigation. When the question is whether an EIR should have been prepared, the court will review the administrative record for factual evidence supporting a fair argument.

The fair argument standard essentially empowers project opponents to force preparation of an EIR by introducing factual evidence into the record that asserts that the project may have a significant effect on the environment. This evidence does not need to be conclusive regarding the potential significant effect.

In 1998, the Resources Agency amended the State CEQA Guidelines to encourage the use of thresholds of significance. Guidelines §15064 (h) provided that when a project's impacts did not exceed adopted standards, the impacts were to be considered less than significant. The section went on to describe the types of adopted standards that were to be considered thresholds. Guidelines § 15064.7 provided that agencies may adopt thresholds of significance to guide their determinations of significance. Both of these sections were challenged when environmental groups sued the Resources Agency in 2000 over the amendments. The trial court concluded that §15064.7 was proper, if it was applied in the context of the fair argument standard.


CEQA The California Environmental Quality Act

Governor's Office of Planning and Research

INTRODUCTION

Overview *of the* California Environmental Review *and* Permit Approval Process

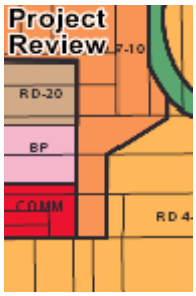
At the appellate court level, §15064(h) was invalidated. [2] Establishing a presumption that meeting an adopted standard would avoid significant impacts was "inconsistent with controlling CEQA law governing the fair argument approach." The Court of Appeal explained that requiring agencies to comply with a regulatory standard "relieves the agency of a duty it would have under the fair argument approach to look at evidence beyond the regulatory standard, or in contravention of the standard, in deciding whether an EIR must be prepared. Under the fair argument approach, any substantial evidence supporting a fair argument that a project may have a significant environmental effect would trigger the preparation of an EIR." (*Communities for a Better Environment v. California Resources Agency* [2002] 103 Cal.App.4th 98)

[2] Prior §15064(h) has been removed from the State CEQA Guidelines. Current §15064(h) discusses cumulative impacts.

In summary, CEQA law does not require a lead agency to establish significance thresholds for GHG. CEQA guidelines encourage the development of thresholds, but the absence of an adopted threshold does not relieve the agency from the obligation to determine significance.

Defensibility of CEQA Analyses

The basic purposes of CEQA, as set out in the State CEQA Guidelines, include: (1) informing decision makers and the public about the significant environmental effects of proposed projects; (2) identifying ways to reduce or avoid those impacts; (3) requiring the implementation of feasible mitigation measures or alternatives that would reduce or avoid those impacts; and (4) requiring public agencies to disclose their reasons for approving any project that would have significant and unavoidable impacts (Guidelines §15002). CEQA is enforced through civil litigation over procedure (i.e., did the public agency follow the correct CEQA procedures?) and adequacy (i.e., has the potential for impacts been disclosed, analyzed, and mitigated to the extent feasible?).



The California Supreme Court has held that CEQA is "to be interpreted in such manner as to afford the fullest possible protection to the environment within the reasonable scope of the statutory language." (*Friends of Mammoth v. Board of Supervisors* [1972] 8 Cal.3d 247, 259) Within that context, the role of the courts is to weigh the facts in each case and apply their judgment. Although the court may rule on the adequacy of the CEQA work, the court is not empowered to act in the place of the public agency to approve or deny the project for which the CEQA document was prepared. Further, the court's review is limited to the evidence contained in the administrative record that was before the public agency when it acted on the project.

Putting aside the issue of CEQA procedure, the defensibility of a CEQA analysis rests on the following concerns:

- whether the public agency has sufficiently analyzed the environmental consequences to enable decision makers to make an intelligent decision;
- whether the conclusions of the public agency are supported by substantial evidence in the administrative record; and
- whether the agency has made a good faith effort at the full disclosure of significant effects.

CEQA analyses need not be perfect or exhaustive -- the depth and breadth of the analysis is limited to what is "reasonably feasible." (Guidelines §15151) At the same time, the analysis "must include detail sufficient to enable those who did not participate in its preparation to understand and to consider meaningfully the issues raised by the proposed

project." (Laurel Heights Improvement Assn. v. Regents of University of California (1988) 47 Cal.3d 376)

By itself, establishment of a GHG threshold will not insulate individual CEQA analyses from challenge. Defensibility depends upon the adequacy of the analysis prepared by the lead agency and the process followed. However, the threshold can help to define the boundaries of what is a reasonable analysis by establishing when an analysis will be required and the basic scope of that analysis. The threshold would attempt to define the point at which an analysis will be required and when a level of impact becomes significant, requiring preparation of an EIR. If the threshold includes recommendations for the method or methods of analysis, it can establish the minimum level of analysis to address this issue.

Considerations in Setting Thresholds for Stationary Source Projects

In many respects, the analysis of GHG emissions from stationary sources is much more straightforward than the analysis of land use patterns, forecasted energy consumption, and emissions from mobile sources. The reason is that, for the most part, the latter analyses depend largely on predictive models with myriad inputs and have a wider range of error. Emissions from stationary sources involve a greater reliance on mass and energy balance calculations and direct measurements of emissions from the same or similar sources. Energy demand is more directly tied to production, and even associated mobile source emissions will likely fall within narrower predictive windows.

Implementing CEQA Without a Threshold

A lead agency is not required to establish significance thresholds for GHG emissions from stationary sources. The lead agency may find that it needs more information or experience evaluating GHG from these types of projects to determine an appropriate significance threshold. As with other project types, the lead agency could conduct a project specific analysis to determine whether an environmental impact report is needed and to determine the level of mitigation that is appropriate. The agency might also rely on thresholds established for criteria pollutants as a screening method, and analyze GHG emissions (and require mitigation) from projects with emissions above the criteria pollutant thresholds. Over time, the agency could amass information and experience with specific project categories that would support establishing explicit thresholds. The lead agency may also choose to base local CEQA thresholds on state guidelines or on the category-specific reduction targets established by ARB in its scoping plan for implementing AB32. Resource constraints and other considerations associated with implementing CEQA without GHG thresholds for stationary sources would be similar to those outlined for other types of projects (see Chapter 5 – No Threshold Option).

Implementing CEQA with Threshold of Zero

A lead agency may find that any increase in GHG emissions is potentially significant under CEQA. The resources and other considerations for implementing a threshold of zero for stationary sources are the same as those outlined for other types of projects (see Chapter 6 – Zero Threshold Option).

Implementing CEQA with a Non-Zero Threshold

A lead agency may identify one or more non-zero thresholds for significance of emissions of GHG from stationary sources. The agency could elect to rely on existing thresholds for reviewing new or modified stationary sources of GHG, if the state or local air district has established any. The agency could also apply the threshold(s) established for non-stationary sources to GHG emissions from stationary sources. Significance thresholds could also be established by ordinance, rule, or policy for a given category of stationary sources; this approach is especially conducive to a tiered threshold approach. For example, the agency could establish significance and mitigation tiers for stationary compression-ignition diesel-fueled generators. Under such an approach, the project proponent could be first required to use a lower GHG-emitting power source if feasible, and if not, to apply mitigation based on the size of the generator and other defined considerations, such as hours of operation. Certain classes of generators could be found to be insignificant under CEQA (e.g., those used for emergency stand-by power only, with a limit on the annual hours of use). As with non-stationary projects, the goal of establishing non-zero thresholds is to maximize environmental protection, while minimizing resources used. Resource and other considerations outlined for non-stationary projects are applicable here (see Chapter 7 – Non-Zero Threshold Options).

Implementing CEQA with Different Thresholds for Stationary and Non-stationary Projects

Although a lead agency may apply the same thresholds to stationary and non-stationary projects, it is not required to do so. There are, in fact, some important distinctions between the two types of projects that could support applying different thresholds. The lead agency should consider the methods used to estimate emissions. Are the estimates a "best/worst reasonable scenario" or are they based on theoretical maximum operation? How accurate are the estimates (are they based on models, simulations, emission factors, source test data, manufacturer specifications, etc.)? To what extent could emissions be reduced through regulations after the project is constructed if they were found to be greater than originally expected (i.e., is it possible to retrofit emissions control technology onto the source(s) of GHG at a later date, how long is the expected project life, etc.)? Are there emission limits or emissions control regulations (such as New Source Review) that provide certainty that emissions will be mitigated? Generally, stationary source emissions are based on maximum emissions (theoretical or allowed under law or regulation), are more accurate, and are more amenable to retrofit at a later time than non-stationary source emissions. It is also more likely that category specific

rules or some form of NSR will apply to stationary sources than non-stationary projects. Notwithstanding, it is almost always more effective and cost-efficient to apply emission reduction technology at the design phase of a project. There are, therefore, a number of considerations that need to be evaluated and weighed before establishing thresholds – and which may support different thresholds for stationary and non-stationary projects. Furthermore, the considerations may change over time as new regulations are established and as emissions estimation techniques and control technology evolves.

Direct GHG Emissions from Stationary Sources

The main focus of this paper has been the consideration of projects that do not, in the main, involve stationary sources of air pollution, because stationary source projects are generally a smaller percentage of the projects seen by most local land use agencies. That said, some discussion of stationary sources is warranted. As the broader program for regulating GHG from these sources is developed, the strategies for addressing them under CEQA will likely become more refined.

The primary focus of analysis of stationary source emissions has traditionally been those pollutants that are directly emitted by the source, whether through a stack or as fugitive releases (such as leaks). CAPCOA conducted a simplified analysis of permitting activity to estimate the number of stationary source projects with potentially significant emissions of greenhouse gases that might be seen over the course of a year. This analysis looked only at stationary combustion sources (such as boilers and generators), and only considered direct emissions. A lead agency under CEQA may see a different profile of projects than the data provided here suggest, depending on what other resources are affected by projects. In addition, air districts review like-kind replacements of equipment to ensure the new equipment meets current standards, but such actions might not constitute a project for many land use agencies or other media regulators. The data does provide a useful benchmark, however, for lead agencies to assess the order of magnitude of potential stationary source projects. A similar analysis is included for non-stationary projects in Chapter 7.

Table 1: Analysis of GHG Emissions from Stationary Combustion Equipment Permits[3]

	BAAQMD	SMAQMD	SJVUAPCD	SCAQMD
Total Applications for Year	1499	778	1535	1179
Affected at threshold of:				
900 metric tons/year	26	43	63	108
10,000 metric tons/year	7	5	26	8
25,000 metric tons/year	3	1	11	4

[3] District data varies based on specific local regulations and methodologies.

Emissions from Energy Use

In addition to the direct emissions of GHG from stationary projects, CEQA will likely need to consider the project's projected energy use. This could include an analysis of opportunities for energy efficiency, onsite clean power generation (e.g., heat/energy recovery, co-generation, geothermal, solar, or wind), and the use of dedicated power contracts as compared to the portfolio of generally available power. In some industries, water use and conservation may provide substantial GHG emissions reductions, so the CEQA analysis should consider alternatives that reduce water consumption and wastewater discharge. The stationary project may also have the opportunity to use raw or feedstock materials that have a smaller GHG footprint; material substitution should be evaluated where information is available to do so.

Emissions from Associated Mobile Sources

The stationary project will also include emissions from associated mobile sources. These will include three basic components: emissions from employee trips, emissions from delivery of raw or feedstock materials, and emissions from product transport. Employee trips can be evaluated using trip estimation as is done for non-stationary projects, and mitigations would include such measures as providing access to and incentives for use of public transportation, accessibility for bicycle and pedestrian modes of transport, employer supported car or vanpools (including policies such as guaranteed rides home, etc). Upstream and downstream emissions related to goods movement can also be estimated with available models. The evaluation will need to determine the extent of the transport chain that should be included (to ensure that all emissions in the chain have been evaluated and mitigated, but to avoid double counting). Mitigations could include direct actions by operators who own their own fleet, or could be implemented through contractual arrangements with independent carriers; again, the evaluation will need to consider how far up and down the chain mitigation is feasible and can be reasonably required.

Comparing Emissions Changes Across Pollutant Categories

The potential exists for certain GHG reduction measures to increase emissions of criteria and toxic pollutants known to cause or aggravate respiratory, cardiovascular, and other health problems. For instance, GHG reduction efforts such as alternative fuels and methane digesters may create significant levels of increased pollutants that are detrimental to the health of the nearby population (e.g.; particulate matter, ozone precursors, toxic air contaminants). Such considerations should be included in any CEQA analysis of a project's environmental impacts. While there are many win-win

strategies that can reduce both GHG and criteria/toxic pollutant emissions, when faced with situations that involve tradeoffs between the two, the more immediate public health concerns that may arise from an increase in criteria or toxic pollutant emissions should take precedence. GHG emission reductions could be achieved offsite through other mitigation programs.

Introduction

Under state law, it is the purview of each lead agency to determine what, if any, significance thresholds will be established to guide its review of projects under CEQA. While the state does provide guidelines for implementing CEQA, the guidelines have left the decision of whether to establish thresholds (and if so, at what level) to individual lead agencies. Frequently, lead agencies consult with resource-specific agencies (such as air districts) for assistance in determining what constitutes a significant impact on that specific resource.

With the passage of AB 32, the ARB has broad authority to regulate GHG emissions as necessary to meet the emission reduction goals of the statute. This may include authority to establish emission reduction requirements for new land use projects, and may also enable them to recommend statewide thresholds for GHG under CEQA.

In developing this white paper, CAPCOA recognizes that, as the GHG reduction program evolves over time, GHG thresholds and other policies and procedures for CEQA may undergo significant revision, and that uniform statewide thresholds and procedures may be established. This paper is intended to serve as a resource for public agencies until such time that statewide guidance is established, recognizing that decisions will need to be made about GHG emissions from projects before such guidance is available. This paper is not, however, uniform statewide guidance. As stated before, it outlines several possible approaches without endorsing any one over the others.

Some air districts may choose to use this paper to support their establishment of guidance for GHG under CEQA, including thresholds. This paper does not, nor should it be construed to require a district to implement any of the approaches evaluated here. Decisions about whether to provide formal local guidance on CEQA for projects with GHG emissions, including the question of thresholds, will be made by individual district boards.

Each of the 35 air districts operates independently and has its own set of regulations and programs to address the emissions from stationary, area and mobile sources, consistent with state and federal laws, regulations, and guidelines. The independence of the districts allows specific air quality problems to be addressed on a local level. In addition, districts have also established local CEQA thresholds of significance for criteria pollutants – also to address the specific air quality problems relative to that particular district.

The overall goal of air district thresholds is to achieve and maintain health based air quality standards within their respective air basins and to reduce transport of emissions to other air basins. In establishing recommended thresholds, air districts consider the existing emission inventory of criteria pollutants and the amount of emission reductions needed to attain and maintain ambient air quality standards.

However, unlike criteria pollutants where individual districts are characterized by varying levels of pollutant concentrations and source types, greenhouse gases (GHG) and their attendant climate change ramifications are a global problem and, therefore, may suggest a uniform approach to solutions that ensure both progress and equity.

Under SB97, the Office of Planning and Research is directed to prepare, develop, and transmit to the Resources Agency guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions through CEQA by July 1, 2009. Those guidelines may recommend thresholds. As stated, this paper is intended to provide a common platform of information and tools to support local decision makers until such time that statewide guidance or requirements are promulgated.

Local Ability to Promulgate District-Specific GHG Thresholds

One of the primary reasons behind the creation of air districts in California is the recognition that some regions within the state face more critical air pollution problems than others and, as has often been pointed out – one size does not fit all. For example, a "Serious" federal nonattainment district would need greater emission reductions than a district already in attainment – and, therefore, the more "serious" district would set its criteria pollutant CEQA thresholds of significance much lower than the air district already in attainment.

The action of GHGs is global in nature, rather than local or regional (or even statewide or national). Ultimately there may be a program that is global, or at least national in scope. That said, actions taken by a state, region, or local government can contribute to the solution of the global problem. Local governments are not barred from developing and implementing programs to address GHGs. In the context of California and CEQA, lead agencies have the primary responsibility and authority to determine the significance of a project's impacts.

Further, air districts have primary authority under state law for "control of air pollution from all sources, other than emissions from motor vehicles." (H&SC §40000) The term air contaminant or "air pollutant" is defined extremely broadly, to mean "any discharge, release, or other propagation into the atmosphere" and includes, but is not limited to, soot, carbon, fumes, gases, particulate matter, etc. Greenhouse gases and other global warming pollutants such as black carbon would certainly be included in this definition, just as the U.S. Supreme Court held in Massachusetts v. EPA that greenhouse gases were air pollutants under the federal Clean Air Act. Therefore, air districts have the primary authority to regulate global warming pollutants from nonvehicular sources. AB 32 does not change this result. Although it gives wide responsibility to CARB to regulate greenhouse gases from all sources, including nonvehicular sources, it does not preempt the districts. AB 32 specifically states That "nothing in this division shall limit or expand the existing authority of any district..."(H&SC § 38594). Thus, districts and CARB retain concurrent authority over nonvehicular source greenhouse gas emissions.

Introduction

The CEQA statutes do not require an air district or any lead agency to establish significance thresholds under CEQA for any pollutant. While there are considerations that support the establishment of thresholds (which are discussed in other sections of this document), there is no obligation to do so.

An air district or other lead agency may elect not to establish significance thresholds for a number of reasons. The agency may believe that the global nature of the climate change problem necessitates a statewide or national framework for consideration of environmental impacts. SB 97 directs OPR to develop "guidelines for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions by July 1, 2009," and directs the California Resources Agency to certify and adopt the guidelines by June 30, 2010.

An agency may also believe there is insufficient information to support selecting one specific threshold over another. As described earlier, air districts have historically set CEQA thresholds for air pollutants in the context of the local clean air plan, or (in the case of toxic air pollutants) within the framework of a rule or policy that manages risks and exposures due to toxic pollutants. There is no current framework that would similarly manage impacts of greenhouse gas pollutants, although the CARB is directed to establish one by June 30, 2009, pursuant to AB 32. A local agency may decide to defer any consideration of thresholds until this framework is in place.

Finally, an agency may believe that the significance of a given project should be assessed on a case-by-case basis in the context of the project at the time it comes forward.

Implementing CEQA Without Significance Thresholds for GHG

The absence of a threshold does not in any way relieve agencies of their obligations to address GHG emissions from projects under CEQA. The implications of not having a threshold are different depending on the role the agency has under CEQA – whether it is acting in an advisory capacity, as a responsible agency, or as a lead agency.

Implications of No Thresholds for an Agency Acting in an Advisory Capacity

Air districts typically act in an advisory capacity to local governments in establishing the framework for environmental review of air pollution impacts under CEQA. This may include recommendations regarding significance thresholds, analytical tools to assess emissions and impacts, and mitigations for potentially significant impacts. Although districts will also address some of these issues on a project-specific basis as responsible agencies, they may provide general guidance to local governments on these issues that

are program wide, and these are advisory (unless they have been established by regulation).

An air district that has not established significance thresholds for GHG will not provide guidance to local governments on this issue. This does not prevent the local government from establishing thresholds under its own authority. One possible result of this would be the establishment of different thresholds by cities and counties within the air district. Alternatively, the air district could advise local governments not to set thresholds and those jurisdictions may follow the air district's guidance.

It is important to note here (as has been clearly stated by the Attorney General in comments and filings) that lack of a threshold does *not* mean lack of significance. An agency may argue lack of significance for any project, but that argument would have to be carried forth on a case-by-case, project specific basis. By extension then, a decision not to establish thresholds for GHG is likely to result in a greater workload for responsible and lead agencies as they consider individual projects under CEQA.

Implications of No Thresholds for a Responsible Agency

If there are no established thresholds of significance, the significance of each project will have to be determined during the course of review. The responsible agency (e.g., the air district) will review each project referred by the lead agency. The review may be qualitative or quantitative in nature. A qualitative review would discuss the nature of GHG emissions expected and their potential effect on climate change as the district understands it. It could also include a discussion of the relative merits of alternative scenarios. A quantitative analysis would evaluate, to the extent possible, the expected GHG emissions; it would also need to evaluate their potential effect on climate change and might include corresponding analysis of alternatives. The air district, as a responsible agency, may also identify mitigation measures for the project.

The lack of established thresholds will make the determination of significance more resource intensive for each project. The district may defer to the lead agency to make this determination, however the district may be obligated, as a responsible agency, to evaluate the analysis and determination.

Implications of No Thresholds for a Lead Agency

The main impact of not having significance thresholds will be on the primary evaluation of projects by the lead agency. Without significance thresholds, the agency will have to conduct some level of analysis of every project to determine whether an environmental impact report is needed. There are three fundamental approaches to the case-by-case analysis of significance, including presumptions of significance or insignificance, or no presumption:

1. The agency can begin with a presumption of significance and the analysis would be used to support a case-specific finding of no significance. This is similar to establishing a threshold of zero, except that here, the "threshold" is rebuttable. This approach may result in a large number of projects proceeding to preparation of an environmental impact report. Because of the attendant costs, project proponents may challenge the determination of significance, although formal challenge is less likely than attempts to influence the determination.

2. The agency can begin with a presumption of insignificance, and the analysis would be used to support a case-specific finding of significance. A presumption of insignificance could be based on the perspective that it would be speculative to attempt to identify the significance of GHG emissions from a project relative to climate change on a global scale. This approach might reduce the number of projects proceeding to preparation of environmental impact reports. It is likely to have greater success with smaller projects than larger ones, and a presumption of *insignificance* may be more likely to be challenged by project opponents.

3. It is not necessary for the lead agency to have any presumption either way. The agency could approach each project from a *tabula rasa* perspective, and have the determination of significance more broadly tied to the specific context of the project; this approach is likely to be resource intensive, and creates the greatest uncertainty for project proponents. To the extent that it results in a lead agency approving similar projects based on different determinations of significance for GHG emissions, it may be more vulnerable to challenge from either proponents or opponents of the project. Alternatively, in the absence of either thresholds or presumptions, the lead agency could use each determination of significance to build its approach in the same way that subsequent judgments define the law.

Relevant Citations

The full text of relevant citations is in Appendix A.

Public Resources Code – §21082.2, Significant Effect on Environment; Determination; Environmental Impact Report Preparation.

State CEQA Guidelines – §15064, Determining the Significance of the Environmental Effects Caused by a Project.

Introduction

If an air district or lead agency determines that any degree of project-related increase in GHG emissions would contribute considerably to climate change and therefore would be a significant impact, it could adopt a zero-emission threshold to identify projects that would need to reduce their emissions. A lead agency may determine that a zero-emission threshold is justified even if other experts may disagree. A lead agency is not prevented from adopting any significance threshold it sees as appropriate, as long as it is based on substantial evidence.

If the zero threshold option is chosen, all projects subject to CEQA would be required to quantify and mitigate their GHG emissions, regardless of the size of the project or the availability of GHG reduction measures available to reduce the project's emissions. Projects that could not meet the zero-emission threshold would be required to prepare environmental impact reports to disclose the unmitigable significant impact, and develop the justification for a statement of overriding consideration to be adopted by the lead agency.

Implementing CEQA With a Zero Threshold for GHG

The scientific community overwhelmingly agrees that the earth's climate is becoming warmer, and that human activity is playing a role in climate change. Unlike other environmental impacts, climate change is a global phenomenon in that all GHG emissions generated throughout the earth contribute to it. Consequently, both large and small GHG generators cause the impact. While it may be true that many GHG sources are individually too small to make any noticeable difference to climate change, it is also true that the countless small sources around the globe combine to produce a very substantial portion of total GHG emissions.

A zero threshold approach is based on a belief that, 1) all GHG emissions contribute to global climate change and could be considered significant, and 2) not controlling emissions from smaller sources would be neglecting a major portion of the GHG inventory.

CEQA explicitly gives lead agencies the authority to choose thresholds of significance. CEQA defers to lead agency discretion when choosing thresholds. Consequently, a zero-emission threshold has merits.

The CEQA review process for evaluating a project's impact on global climate change under the zero threshold option would involve several components. Air quality sections would be written by lead agencies to include discussions on climate change in CEQA documents, GHG emissions would be calculated, and a determination of significance would be made. The local air districts would review and comment on the climate change discussions in environmental documents. Lead agencies may then revise final EIRs to accommodate air district comments. More than likely, mitigation measures will be specified for the project, and a mitigation monitoring program will need to be put in place to ensure that these measures are being implemented.

Since CEQA requires mitigation to a less than significant level, it is conceivable that many projects subjected to a zero threshold could only be deemed less than significant with offsite reductions or the opportunity to purchase greenhouse gas emission reduction credits. GHG emission reduction credits are becoming more readily available however the quality of the credits varies considerably. High quality credits are generated by actions or projects that have clearly demonstrated emission reductions that are real, permanent, verifiable, enforceable, and not otherwise required by law or regulation. When the pre- or post-project emissions are not well quantified or cannot be independently confirmed, they are considered to be of lesser quality. Similarly, if the reductions are temporary in nature, they are also considered to be poor quality. Adoption of a zero threshold should consider the near-term availability and the quality of potential offsets.

There are also environmental justice concerns about the effects of using offsite mitigations or emission reduction credits to offset, or mitigate, the impacts of a new project. Although GHGs are global pollutants, some of them are emitted with co-pollutants that have significant near-source or regional impacts. Any time that increases in emissions at a specific site will be mitigated at a remote location or using emission reduction credits, the agency evaluating the project should ensure that it does not create disproportionate impacts.

Administrative Considerations

If electing to pursue a zero threshold, an air district or lead agency should consider the administrative costs and the environmental review system capacity. Some projects that previously would have qualified for an exemption could require further substantial analysis, including preparation of a Negative Declaration (ND), a Mitigated Negative Declaration (MND) or an EIR. Moreover, the trade-offs between the volume of projects requiring review and the quality of consideration given to reviews should be considered. It may also be useful to consider whether meaningful mitigation can be achieved from smaller projects.

Consideration of Exemptions from CEQA

A practical concern about identifying GHG emissions as a broad cumulative impact is whether the zero threshold option will preclude a lead agency from approving a large set of otherwise qualified projects utilizing a Categorical Exemption, ND, or MND. The results could be a substantial increase in the number of EIR's. This is a valid and challenging concern, particularly for any threshold approach that is based on a zero threshold for net GHG emission increases.

CEQA has specified exceptions to the use of a categorical exception. Specifically, CEQA Guidelines §15300.2 includes the following exceptions:

"(b) Cumulative Impact. All exemptions for these classes are inapplicable when the cumulative impact of successive projects of the same type in the same place, over time is significant."

(c) Significant Effect. A categorical exemption shall not be used for an activity where there is a reasonable possibility that the activity will have a significant effect on the environment due to unusual circumstances."

These CEQA Guidelines sections could be argued to mean that any net increase in GHG emissions would preclude the use of a categorical exemption. However, as described below, if the following can be shown, then the exceptions above could be argued not to apply:

(1) Cumulative local, regional and/or state GHG emissions are being reduced or will be reduced by adopted, funded, and feasible measures in order to meet broader state targets.

(2) Mandatory state or local GHG reduction measures would apply to the project's emissions such that broader GHG reduction goals would still be met and the project contributions would not be cumulatively considerable.

(3) Project GHG emissions are below an adopted significance threshold designed to take into account the cumulative nature of GHG emissions.

A similar argument could be made relative to the use of a ND (provided no additional mitigation (beyond existing mandates) is required to control GHG emissions) and to the use of a MND instead of an EIR. However, due to the "fair argument" standard, which is discussed in Chapter 3, caution is recommended in use of a ND or MND unless all three elements above can be fully supported through substantial evidence and there is no substantial evidence to the contrary. Establishing a significance threshold of zero is likely to preclude the use of a categorical exemption.

Relevant Citations

The full text of relevant citations is in Appendix A.

Public Resources Code – §21004, Mitigating or Avoiding a Significant Effect; Powers of Public Agency.

State CEQA Guidelines – §15064, Determining the Significance of the Environmental Effects Caused by a Project.

State CEQA Guidelines – §15130, Discussion of Cumulative Impacts.

State CEQA Guidelines – §15064.7, Thresholds of Significance.

Introduction

A non-zero threshold could minimize the resources spent reviewing environmental analyses that do not result in real GHG reductions or to prevent the environmental review system from being overwhelmed. The practical advantages of considering non-zero thresholds for GHG significance determinations can fit into the concept regarding whether the project's GHG emissions represent a "considerable contribution to the cumulative impact" and therefore warrant analysis.

Specifying a non-zero threshold could be construed as setting a *de minimis* value for a cumulative impact. In effect, this would be indicating that there are certain GHG emission sources that are so small that they would not contribute substantially to the global GHG budget. This could be interpreted as allowing public agencies to approve certain projects without requiring any mitigation of their GHG. Any threshold framework should include a proper context to address the *de minimis* issue. However, the CEQA Guidelines recognize that there may be a point where a project's contribution, although above zero, would not be a *considerable contribution* to the cumulative impact and, therefore, not trigger the need for a significance determination.

GHG emissions from all sources are under the purview of CARB and as such may eventually be "regulated" no matter how small. Virtually all projects will result in some direct or indirect release of GHG. However, a decision by CARB to regulate a class of sources does not necessarily mean that an individual source in that class would constitute a project with significant GHG impacts under CEQA. For example, CARB has established criteria pollutant emission standards for automobiles, but the purchase and use of a single new car is not considered a project with significant impacts under CEQA. At the same time, it is important to note that it is likely that all meaningful sources of emissions, no matter how small are likely to be considered for regulation under AB 32. It is expected that projects will have to achieve some level of GHG reduction to comply with CARB's regulations meant to implement AB 32. As such all projects will have to play a part in reducing our GHG emissions budget and no project, however small, is truly being considered *de minimis* under CARB's regulations.

This chapter evaluates a range of conceptual approaches toward developing GHG significance criteria. The air districts retained the services of J&S an environmental consulting, firm to assist with the development of a Statute and Executive Order-based threshold (Approach 1) and a tiered threshold (Approach 2) based on a prescribed list of tasks and deliverables. Time and financial constraints limited the scope and depth of this analysis, however, the work presented here may be useful in developing interim guidance while AB 32 is being implemented. J&S recognized that approaches other than those described here could be used.

As directed, J&S explored some overarching issues, such as:

- what constitutes "new" emissions?

- how should "baseline emissions" be established?
- what is cumulatively "considerable" under CEQA?
- what is "business as usual" ? and
- should an analysis include "life-cycle" emissions?

The answers to these issues were key to evaluating each of the threshold concepts.

Approach 1 – Statute and Executive Order Approach

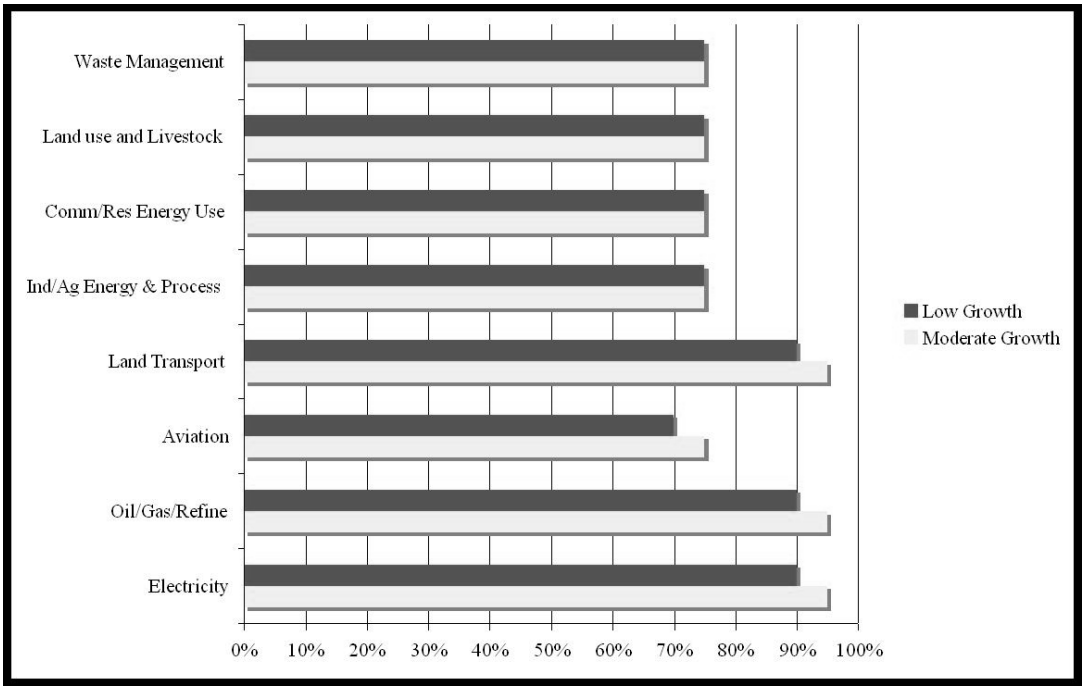
Thresholds could be grounded in existing mandates and their associated GHG emission reduction targets. A project would be required to meet the targets, or reduce GHG emissions to the targets, to be considered less than significant.

AB 32 and S-3-05 target the reduction of statewide emissions. It should be made clear that AB 32 and S-3-05 do not specify that the emissions reductions should be achieved through uniform reduction by geographic location or by emission source characteristics. For example, it is conceivable, although unlikely, that AB 32 goals could be achieved by new regulations that only apply to urban areas or that only apply to the transportation and/or energy sector. However, this approach to evaluating GHG under CEQA is based on the presumption that a new project must at least be consistent with AB 32 GHG emission reduction mandates.

The goal of AB 32 and S-3-05 is the significant reduction of future GHG emissions in a state that is expected to rapidly grow in both population and economic output. As such, there will have to be a significant reduction in the per capita GHG output for these goals to be met. CEQA is generally used to slow or zero the impact of new emissions, leaving the reduction of existing emission sources to be addressed by other regulatory means. With these concepts in mind, four options were identified for statute/executive order-based GHG significance thresholds and are described below.

Threshold 1.1: AB 32/S-3-05 Derived Uniform Percentage-Based Reduction. AB 32 requires the state to reduce California-wide GHG emissions to 1990 levels by 2020. Reducing greenhouse gas emission levels from 2020 to 1990 levels could require a 28 to 33 percent reduction of business-as-usual GHG emissions depending on the methodology used to determine the future emission inventories. The exact percent reduction may change slightly once CARB finalizes its 1990 and 2020 inventory estimates. In this context, business-as-usual means the emissions that would have occurred in the absence of the mandated reductions. The details of the business-as-usual scenario are established by CARB in the assumptions it uses to project what the state's GHG emissions would have been in 2020, and the difference between that level and the level that existed in 1990 constitutes the reductions that must be achieved if the mandated goals are to be met.

This threshold approach would require a project to meet a percent reduction target based on the average reductions needed from the business-as-usual emission from all GHG sources. Using the 2020 target, this approach would require all discretionary projects to achieve a 33 percent reduction from projected business-as-usual emissions in order to be considered less than significant. A more restrictive approach would use the 2050 targets. S-3-05 seeks to reduce GHG emissions to 80 percent below 1990 levels by 2050. To reach the 2050 milestone would require an estimated 90 percent reduction (effective immediately) of business-as-usual emissions. Using this goal as the basis for a significance threshold may be more appropriate to address the long-term adverse impacts associated with global climate change. Note that AB 32 and S-3-05 set emission inventory goals at milestone years; it is unclear how California will progress to these goals in non-milestone years.



SOURCE: ARB 2007

Threshold 1.2: Uniform Percentage-Based (e.g.50%) Reduction for New Development. This threshold is based on a presumption that new development should contribute a greater percent reduction from business-as-usual because greater reductions can be achieved at lower cost from new projects than can be achieved from existing sources. This approach would establish that new development emit 50 percent less GHG emissions than business-as-usual development. This reduction rate is greater than the recommended reduction rate for meeting the Threshold 1.1 2020 target (33 percent) but is significantly less restrictive than the Threshold 1.1 2050 target reduction rate (90 percent). If a 50 percent GHG reduction were achieved from new development, existing emissions would have to be reduced by 25 to 30 percent in order to meet the 2020 emissions goal depending on the year used to determine the baseline inventory. Although this reduction goal is reasonable for achieving the 2020 goal, it would not be possible to

reach the 2050 emissions target with this approach even if existing emissions were 100 percent controlled.

Threshold 1.3: Uniform Percentage-Based Reduction by Economic Sector. This threshold would use a discrete GHG reduction goal specific to the economic sector associated with the project. There would be specific reduction goals for each economic sector, such as residential, commercial, and industrial development. Specifying different reduction thresholds for each market sector allows selection of the best regulatory goal for each sector taking into account available control technology and costs. This approach would avoid over-regulating projects (i.e. requiring emissions to be controlled in excess of existing technology) or under-regulating projects (i.e. discouraging the use of available technology to control emissions in excess of regulations). This approach requires extensive information on the emission inventories and best available control technology for each economic sector. This data will be compiled as CARB develops its scoping plan under AB 32 and its implementing regulations; as a result, this approach will be more viable in the long term.

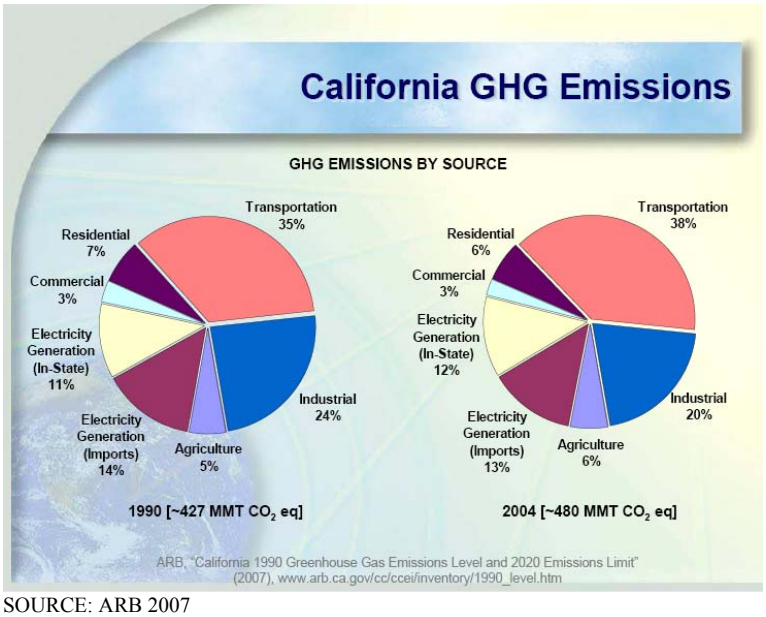
Threshold 1.4: Uniform Percentage-Based Reduction by Region. AB 32 and S-3-05 are written such that they apply to a geographic region (i.e. the entire state of California) rather than on a project or sector level. One could specify regions of the state such as the South Coast Air Basin, Sacramento Valley, or Bay Area which are required to plan (plans could be developed by regional governments, such as councils of governments) and demonstrate compliance with AB 32 and S-3-05 reduction goals at a regional level. To demonstrate that a project has less than significant emissions, one would have to show compliance with the appropriate regional GHG plan. Effectively this approach allows for analysis of GHG emissions at a landscape scale smaller than the state as a whole. Specifying regions in rough correlation to existing air basins or jurisdictional control allows for regional control of emissions and integration with regional emission reduction strategies for criteria and toxic air pollutants. Although differing GHG reduction controls for each region are possible, it is likely that all regions would be

required to achieve 1990 emission inventories by the year 2020 and 80 percent less emissions by 2050. Threshold 1.4 is considered viable long-term significance criteria that is unlikely to be used in the short term.

Implementing CEQA Thresholds Based on Emission Reduction Targets

Characterizing Baseline and Project Emissions

While the population and economy of California is expanding, all new projects can be considered to contribute new emissions. Furthermore, GHG impacts are exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective. "Business-as-usual" is the projection of GHG emissions at a future date based on current technologies and regulatory requirements in absence of other reductions. For example to determine the future emissions from a power plant for "business-as-usual" one would multiply the projected energy throughput by the current emission factor for that throughput. If adopted regulations (such as those that may be promulgated by CARB for AB 32) dictate that power plant emissions must be reduced at some time in the future, it is appropriate to consider these regulation standards as the new business-as-usual for a future date. In effect, business-as-usual will continue to evolve as regulations manifest. Note that "business-as-usual" defines the CEQA No Project conditions, but does not necessarily form the baseline under CEQA. For instance, it is common to subtract the future traffic with and without a project to determine the future cumulative contribution of a project on traffic conditions. However, existing conditions at the time of issuance of the notice of preparation is normally the baseline.



SOURCE: ARB 2007

Establishing Emission Reduction Targets

One of the obvious drawbacks to using a uniform percent reduction approach to GHG control is that it is difficult to allow for changes in the 1990 and future emission inventories estimates. To determine what emission reductions are required for new projects one would have to know accurately the 1990 budget and efficacy of other GHG promulgated regulations as a function of time. Since CARB will not outline its

regulation strategy for several more years, it is difficult to determine accurately what the new project reductions should be in the short term. Future updates to the 1990 inventory could necessitate changes in thresholds that are based on that inventory. It is important to note that it is difficult to create near term guidance for a uniform reduction threshold strategy since it would require considerable speculation regarding the implementation and effectiveness of forthcoming CARB regulations.

Of greater importance are the assumptions used to make the projected 2020 emission inventories. Projecting future inventories over the next 15-50 years involves substantial uncertainty. Furthermore, there are likely to be federal climate change regulations and possibly additional international GHG emission treaties in the near future. To avoid such speculation, this paper defines all future emission inventories as hypothetical business-as-usual projections.

This white paper is intended to support local decisions about CEQA and GHG in the near term. During this period, it is unlikely that a threshold based on emission reduction targets would need to be changed. However, it is possible that future inventory updates will show that targets developed on the current inventory were not stringent enough, or were more stringent than was actually needed.

Approach 2 – Tiered Approach

The goal of a tiered threshold is to maximize reduction predictability while minimizing administrative burden and costs. This would be accomplished by prescribing feasible mitigation measures based on project size and type, and reserving the detailed review of an EIR for those projects of greater size and complexity. This approach may require inclusion in a General Plan, or adoption of specific rules or ordinances in order to fully and effectively implement it.

A tiered CEQA significance threshold could establish different levels at which to determine if a project would have a significant impact. The tiers could be established based on the gross GHG emission estimates for a project or could be based on the physical size and characteristics of the project. This approach would then prescribe a set of GHG mitigation strategies that would have to be incorporated into the project in order for the project to be considered less than significant.

The framework for a tiered threshold would include the following:

- disclosure of GHG emissions for all projects;
- support for city/county/regional GHG emissions reduction planning;
- creation and use of a “green list” to promote the construction of projects that have desirable GHG emission characteristics;
- a list of mitigation measures;

- a decision tree approach to tiering; and
- quantitative or qualitative thresholds.

Decision-Tree Approach to Tiering

CEQA guidance that allows multiple methodologies to demonstrate GHG significance will facilitate the determination of significance for a broad range of projects/plans that would otherwise be difficult to address with a single non-compound methodology. Even though there could be multiple ways that a project can determine GHG significance using a decision-tree approach, only one methodology need be included in any single CEQA document prepared by the applicant. The presence of multiple methodologies to determine significance is designed to promote flexibility rather than create additional analysis overhead. Figure 1 shows a conceptual approach to significance determination using a tiered approach that shows the multiple routes to significance determination.

Figure 1 Detail Description

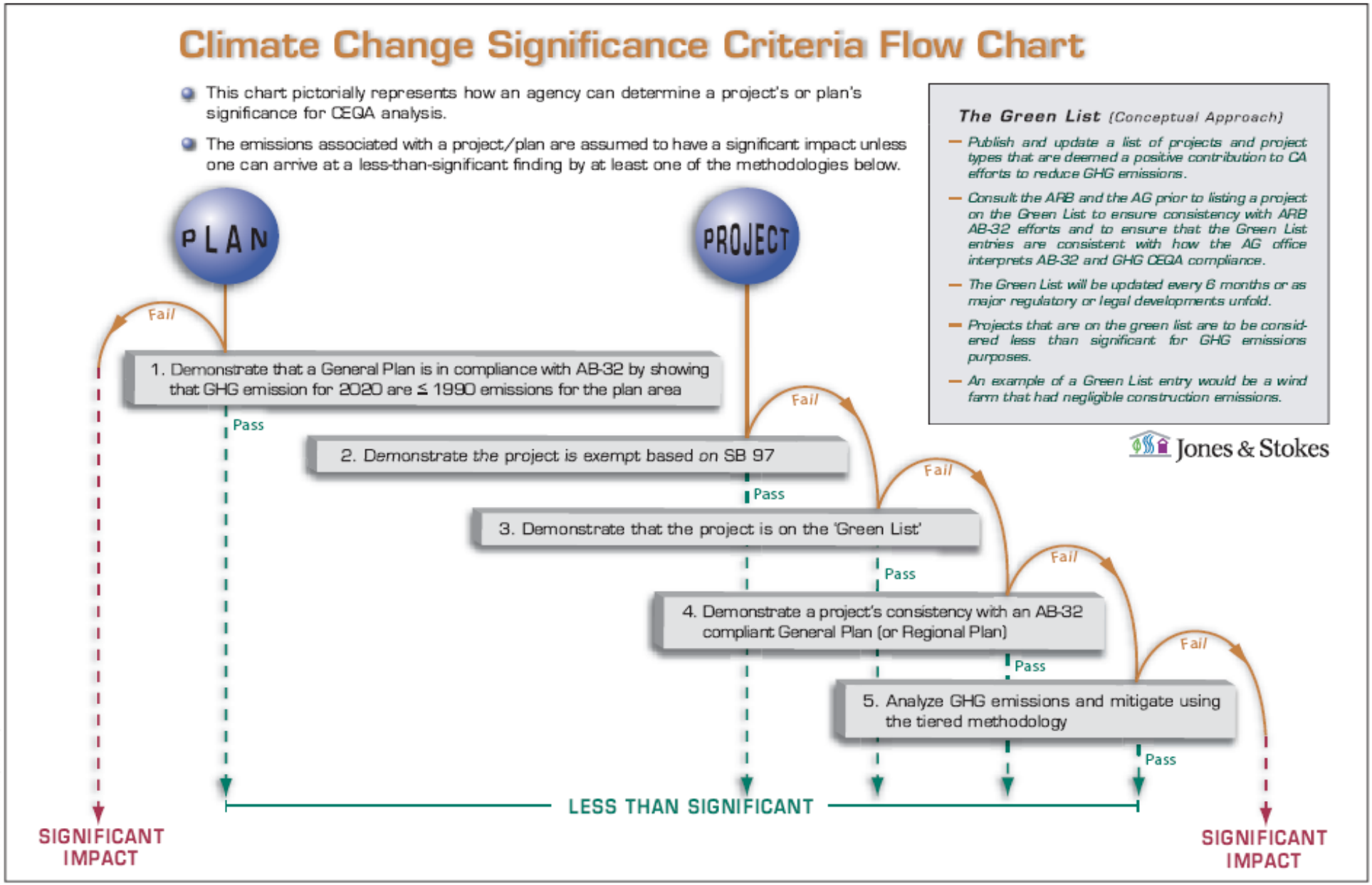
Figure 1 pictorially represents how an agency can determine a project's or plan's significance for CEQA analysis using the non-zero threshold methodology. The emissions associated with a project/plan are assumed to have a significant impact unless one can arrive at a less-than-significant finding by at least one of the methodologies below.

1. Demonstrate that a General Plan (GP) or Regional Plan is in Compliance with AB32

   - For most GPs or RPs this will require demonstration that projected 2020 emissions will be equal to or less than 1990 emissions.
   - GPs or RPs are expected to fully document 1990 and 2020 GHG emission inventories.
   - Projection of 2020 emissions is complicated by the fact that CARB is expected to promulgate emission reductions in the short term. Until explicit CARB regulations are in place, unmitigated GP 2020 emission inventories represent business-as-usual scenarios.
   - EIRs for GPs or RPs which demonstrate 2020 mitigated emissions are less than or equal to 1990 emissions are considered less than significant.

2. Demonstrate the Project is Exempt Based on SB 97

   - As specified in SB 97, projects that are funded under November 2006 Proposition 1B (Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act) and 1C (Disaster Preparedness and Flood Prevention Bond Act) may be exempt from analysis until January 1, 2010.



Jones & Stokes

Figure 1
Climate Change Significance Criteria Flow Chart

- An exemption can be used in an ND, MND, or EIR to support a less than significant finding for GHG impacts.

3. Demonstrate that the Project is on the 'Green List'

- This list would include projects that are deemed a positive contribution to California efforts to reduce GHG emissions. If the project is of the type described on the Green List it is considered less than significant.
- If the Green List entry description requires mitigation for impacts other than GHG, this methodology can be used in MNDs or EIRs; if the Green List entry does not require mitigation this methodology can be used in NDs, MNDs, or EIRs.

4. Demonstrate a Project's Compliance with a General Plan

- If a project is consistent with an appropriate General Plan's Greenhouse Gas Reduction Plan (GGRP), a project can be declared less than significant.
- Note that at this time there are no known jurisdictions that have a GGRP that has been fully subject to CEQA review. While Marin County has adopted a forward-thinking GGRP and it is described in the most recent GP update, the associated EIR does not analyze the secondary environmental impacts of some of the GGRP measures such as tidal energy. While one can reference GGRPs that have not been reviewed fully in CEQA, to attempt to show a project's compliance with such a plan as evidence that the project's GHG emission contributions are less than significant may not be supported by substantial evidence that cumulative emissions are being fully addressed in the particular jurisdiction.
- Compliance with a CEQA-vetted GGRP can be cited as evidence for all CEQA documents (Categorical Exemption, ND, MND, and EIR).

5. Analyze GHG Emissions and Mitigate using the Tiered Methodology

- Guidance and mitigation methodology for various development projects (residential, commercial, industrial) are listed in the form of tiered thresholds. If a project incorporates the mitigation measures specified in the tiered threshold tables the project is considered less than significant.
- All project emissions are considered less than significant if they are less than the threshold(s).
- If the tiered approach requires mitigation, this methodology can be used in MNDs or EIRs; if the tiered approach does not require mitigation this methodology can be used in NDs, MNDs, or EIRs.

The Green List

- The Green List would be a list of projects and project types that are deemed a positive contribution to California's efforts to reduce GHG emissions.
- If this approach is followed, it is suggested that CARB and the Attorney General (AG) are consulted prior to listing a project on the Green List to ensure consistency with CARB AB 32 efforts and to ensure that the Green List entries are consistent with how the AG office interprets AB 32 and GHG CEQA compliance.
- The Green List should be updated every 6 months or as major regulatory or legal developments unfold.
- Projects that are on the Green List are to be considered less than significant for GHG emissions purposes.
- A tentative list of potential Green List entries is presented below. Actual Green List entries should be far more specific and cover a broad range of project types and mitigation approaches. The list below is merely a proof-of-concept for the actual Green List.

  1. Wind farm for the generation of wind-powered electricity
  2. Extension of transit lines to currently developed but underserved communities
  3. Development of high-density infill projects with easily accessible mass transit
  4. Small hydroelectric power plants at existing facilities that generate 5 mw or less (as defined in Class 28 Categorical Exemption)
  5. Cogeneration plants with a capacity of 50 mw or less at existing facilities (as defined in Class 29 Cat Exemption)
  6. Increase in bus service or conversion to bus rapid transit service along an existing bus line
  7. Projects with LEED "Platinum" rating
  8. Expansion of recycling facilities within existing urban areas
  9. Recycled water projects that reduce energy consumption related to water supplies that services existing development
  10. Development of bicycle, pedestrian, or zero emission transportation infrastructure to serve existing regions

There are also several options for tiering and thresholds, as shown in Table 2 below. One could establish strictly numeric emissions thresholds and require mitigation to below the specific threshold to make a finding of less than significant. One could establish narrative emissions threshold that are based on a broader context of multiple approaches to GHG reductions and a presumption that projects of sufficiently low GHG intensity are less than significant.

In Concept 2A, a zero threshold would be applied to projects and thus only projects that result in a reduction of GHG emissions compared to baseline emissions would be less than significant absent mitigation. All projects would require quantified inventories. All projects that result in a net increase of GHG emissions would be required to mitigate their emissions to zero through direct mitigation or through fees or offsets or the impacts

Table 2: Approach 2 Tiering Options

	Concept 2A Zero	Concept 2B Quantitative	Concept 2C Qualitative
Tier 1	Project results in a net reduction of GHG emissions *Less than Significant*	Project in compliance with an AB 32-compliant General/Regional Plan, on the Green List, or below Tier 2 threshold. Level 1 Reductions (Could include such measures as: bike parking, transit stops for planned route, Energy Star roofs, Energy Star appliances, Title 24, water use efficiency, etc.) *Less than Significant*	Project in compliance with an AB 32-compliant General/Regional Plan, on the Green List, or below Tier 2 threshold. Level 1 Reductions (See measures under 2B) *Less than Significant*
Tier 2	Project results in net increase of GHG emissions Mitigation to zero (including offsets) *Mitigated to Less than Significant*	Above Tier 2 threshold Level 2 Mitigation (Could include such measures as: Parking reduction beyond code, solar roofs, LEED Silver or Gold Certification, exceed Title 24 by 20%, TDM measures, etc.) *Mitigated to Less than Significant*	Above Tier 2 threshold Level 2 Mitigation (See measures under 2B) *Mitigated to Less than Significant*
Tier 3	Mitigation infeasible to reduce emissions to zero (e.g., cost of offsets infeasible for project or offsets not available) *Significant and Unavoidable*	Above Tier 2 threshold With Level 1, 2 Mitigation Level 3 Mitigation: (Could include such measures as: On-site renewable energy systems, LEED Platinum certification, Exceed Title 24 by 40%, required recycled water use for irrigation, zero waste/high recycling requirements, mandatory transit passes, offsets/carbon impact fees) *Mitigated to Less than Significant*	Above Tier 3 thresholds Quantify Emissions, Level 3 Mitigation (see measures under 2B), and Offsets for 90% of remainder *Significance and Unavoidable*

would be identified as significant and unavoidable. This could be highly problematic and could eliminate the ability to use categorical exemptions and negative declarations for a wide range of projects.

In Concepts 2B and 2C, the first tier of a tiered threshold includes projects that are within a jurisdiction with an adopted greenhouse gas reduction plan (GGRP) and General Plan/Regional Plan that is consistent with AB 32 (and in line with S-3-05), or are on the Green List, or are below the Tier 2 threshold. All Tier 1 projects would be required to implement mandatory reductions required due to other legal authority (Level 1 reductions) such as AB 32, Title 24, or local policies and ordinances. With Level 1

reduction measures, qualifying Tier 1 projects would be considered less than significant without being required to demonstrate mitigation to zero.

In Concept 2B, the Tier 2 threshold would be quantitative, and quantified inventories would be required. Several quantitative threshold options are discussed below. A more comprehensive set of Level 2 mitigation would be required. If the project's emissions still exceed the Tier 2 threshold, an even more aggressive set of Level 3 mitigation measures would be required including offsets (when feasible) to reduce emissions below the Tier 2 threshold.

In Concept 2C, there would be two thresholds, a lower Tier 2 threshold (the "low bar") and a higher Tier 3 threshold (the "high bar"). The Tier 2 threshold would be the significance threshold for the purposes of CEQA and would be qualitative in terms of units (number of dwelling units, square feet of commercial space, etc.) or a per capita ratio. Projects above the Tier 2 threshold would be required to implement the comprehensive set of Level 2 mitigation. Projects below the Tier 2 threshold would not be required to quantify emissions or reductions. The Tier 3 threshold would be a threshold to distinguish the larger set of projects for which quantification of emissions would be required. Level 3 mitigation would be required and the project would be required to purchase offsets (when feasible) in the amount of 90 percent of the net emissions after application of Level 1 reductions and Level 2 and 3 mitigation. A variant on Concept 2C would be to require mandatory Level 3 mitigation without quantification and offsets.

Approach 2 Threshold Options

Seven threshold options were developed for this approach. The set of options are framed to capture different levels of new development in the CEQA process and thus allow different levels of mitigation. Options range from a zero first-tier threshold (Threshold 2.1) up to a threshold for GHG that would be equivalent to the capture level (i.e., number of units) of the current criteria pollutant thresholds used by some air districts (Threshold 2.4). The decision-based implementation approach discussed above could be used for any of these options. Table 3 below compares the results of each of the approaches discussed here.

Threshold 2.1: Zero First Tier Tiered Threshold.

This option would employ the decision tree concept and set the first tier cut-point at zero. The second tier cut-point could be one of the qualitative or quantitative thresholds discussed below. First-tier projects would be required to implement a list of very feasible and readily available mitigation measures.

Threshold 2.2: Quantitative Threshold Based on Market Capture

A single quantitative threshold was developed in order to ensure capture of 90 percent or more of likely future discretionary developments. The objective was to set the emission

threshold low enough to capture a substantial fraction of future residential and non-residential development that will be constructed to accommodate future statewide population and job growth, while setting the emission threshold high enough to exclude small development projects that will contribute a relatively small fraction of the cumulative statewide GHG emissions.

The quantitative threshold was created by using the following steps:

- Reviewing data from four diverse cities (Los Angeles in southern California and Pleasanton, Dublin, and Livermore in northern California) on pending applications for development.

- Determining the unit (dwelling unit or square feet) threshold that would capture approximately 90 percent of the residential units or office space in the pending application lists.

- Based on the data from the four cities, the thresholds selected were 50 residential units and 30,000 square feet of commercial space.

- The GHG emissions associated with 50 single-family residential units and 30,000 square feet of office were estimated and were found to be 900 metric tons and 800 metric tons, respectively. Given the variance on individual projects, a single threshold of 900 metric tons was selected for residential and office projects.

- A 900 metric ton threshold was also selected for non-office commercial projects and industrial projects to provide equivalency for different projects in other economic sectors.

- If this threshold is preferred, it is suggested that a more robust data set be examined to increase the representativeness of the selected thresholds. At a minimum, a diverse set of at least 20 cities and/or counties from throughout the state should be examined in order to support the market capture goals of this threshold. Further, an investigation of market capture may need to be conducted for different commercial project types and for industrial projects in order to examine whether multiple quantitative emissions thresholds or different thresholds should be developed.

The 900-ton threshold corresponds to 50 residential units, which corresponds to the 84th percentile of projects in the City of Los Angeles, the 79th percentile in the City of Pleasanton, the 50th percentile in the City of Livermore and the 4th percentile in the City of Dublin. This is suggestive that the GHG reduction burden will fall on larger projects that will be a relatively small portion of overall projects within more developed central cities (Los Angeles) and suburban areas of slow growth (Pleasanton) but would be the higher portion of projects within moderately (Livermore) or more rapidly developing areas (Dublin). These conclusions are suggestive but not conclusive due to the small sample size. The proposed threshold would exclude the smallest proposed developments

from potentially burdensome requirements to quantify and mitigate GHG emissions under CEQA. While this would exclude perhaps 10 percent of new residential development, the capture of 90 percent of new residential development would establish a strong basis for demonstrating that cumulative reductions are being achieved across the state. It can certainly serve as an interim measure and could be revised if subsequent regulatory action by CARB shows that a different level or different approach altogether is called for.

The 900-ton threshold would correspond to office projects of approximately 35,000 square feet, retail projects of approximately 11,000 square feet, or supermarket space of approximately 6,300 square feet. 35,000 square feet would correspond to the 46th percentile of commercial projects in the City of Los Angeles, the 54th percentile in the City of Livermore, and the 35th percentile in the City of Dublin. However, the commercial data was not separated into office, retail, supermarket or other types, and thus the amount of capture for different commercial project types is not known. The proposed threshold would exclude smaller offices, small retail (like auto-parts stores), and small supermarkets (like convenience stores) from potentially burdensome requirements to quantify and mitigate GHG emissions under CEQA but would include many medium-scale retail and supermarket projects.

The industrial sector is less amenable to a unit-based approach given the diversity of projects within this sector. One option would be to adopt a quantitative GHG emissions threshold (900 tons) for industrial projects equivalent to that for the residential/commercial thresholds described above. Industrial emissions can result from both stationary and mobile sources. CARB estimates that their suggested reporting threshold for stationary sources of 25,000 metric tons accounts for more than 90 percent of the industrial sector GHG emissions (see Threshold 2.3 for 25,000 metric ton discussion). If the CARB rationale holds, then a 900 metric ton threshold would likely capture at least 90 percent (and likely more) of new industrial and manufacturing sources. If this approach is advanced, we suggest further examination of industrial project data to determine market capture.

This threshold would require the vast majority of new development emission sources to quantify their GHG emissions, apportion the forecast emissions to relevant source categories, and develop GHG mitigation measures to reduce their emissions.

Threshold 2.3: CARB Reporting Threshold

CARB has recently proposed to require mandatory reporting from cement plants, oil refineries, hydrogen plants, electric generating facilities and electric retail providers, cogeneration facilities, and stationary combustion sources emitting $\geq$ 25,000 MT CO_2e/yr. AB 32 requires CARB to adopt a regulation to require the mandatory reporting and verification of emissions. CARB issued a preliminary draft version of its proposed reporting requirements in August 2007 and estimates that it would capture 94 percent of the GHG emissions associated with stationary sources.

This threshold would use 25,000 metric tons per year of GHG as the CEQA significance level. CARB proposed to use the 25,000 metric tons/year value as a reporting threshold, not as a CEQA significance threshold that would be used to define mitigation requirements. CARB is proposing the reporting threshold to begin to compile a statewide emission inventory, applicable only for a limited category of sources (large industrial facilities using fossil fuel combustion).

A 25,000 metric ton significance threshold would correspond to the GHG emissions of approximately 1,400 residential units, 1 million square feet of office space, 300,000 square feet of retail, and 175,000 square feet of supermarket space. This threshold would capture far less than half of new residential or commercial development.

As noted above, CARB estimates the industrial-based criteria would account for greater than 90 percent of GHG emissions emanating from stationary sources. However, industrial and manufacturing projects can also include substantial GHG emissions from mobile sources that are associated with the transportation of materials and delivery of products. When all transportation-related emissions are included, it is unknown what portion of new industrial or manufacturing projects a 25,000-ton threshold would actually capture.

An alternative would be to use a potential threshold of 10,000 metric tons considered by the Market Advisory Committee for inclusion in a Greenhouse Gas Cap and Trade System in California. A 10,000 metric ton significance threshold would correspond to the GHG emissions of approximately 550 residential units, 400,000 square feet of office space, 120,000 square feet of retail, and 70,000 square feet of supermarket space. This threshold would capture roughly half of new residential or commercial development.

Threshold 2.4: Regulated Emissions Inventory Capture

Most California air districts have developed CEQA significance thresholds for NOx and ROG emissions to try to reduce emissions of ozone precursors from proposed sources that are not subject to NSR pre-construction air quality permitting. The historical management of ozone nonattainment issues in urbanized air districts is somewhat analogous to today's concerns with greenhouse gas emissions in that regional ozone concentrations are a cumulative air quality problem caused by relatively small amounts of NOx and ROG emissions from thousands of individual sources, none of which emits enough by themselves to cause elevated ozone concentrations. Those same conditions apply to global climate change where the environmental problem is caused by emissions from a countless number of individual sources, none of which is large enough by itself to cause the problem. Because establishment of NOx/ROG emissions CEQA significance thresholds has been a well-tested mechanism to ensure that individual projects address cumulative impacts and to force individual projects to reduce emissions under CEQA, this threshold presumes the analogy of NOx/ROG emission thresholds could be used to develop similar GHG thresholds.

The steps to develop a GHG emission threshold based on the NOx/ROG analogy were as follows:

- For each agency, define its NOx/ROG CEQA thresholds.
- For each agency, define the regional NOx/ROG emission inventory the agency is trying to regulate with its NOx/ROG thresholds.
- For each agency, calculate the percentage of the total emission inventory for NOx represented by that agency's CEQA emission threshold. That value represents the "minimum percentage of regulated inventory" for NOx.
- The current (2004) California-wide GHG emission inventory is 499 million metric tons per year of CO_2 equivalent (MMT CO_2e). Apply the typical "minimum percentage of regulated inventory" value to the statewide GHG inventory, to develop a range of analogous GHG CEQA thresholds.

The preceding methodology was applied to two different air quality districts: the Bay Area Air Quality Management District (BAAQMD), a mostly-urbanized agency within which most emissions are generated from urban areas; and the San Joaquin Valley Air Pollution Control District (SJVAPCD), which oversees emissions emanating in part from rural areas that are generated at dispersed agricultural sources and area sources. For example, in the Bay Area the NOx threshold is 15 tons/year. The total NOx inventory for 2006 was 192,000 tons/year (525 tons/day). The threshold represents 0.008 percent of the total NOx inventory. Applying that ratio to the total statewide GHG emissions inventory of 499 MMT CO_2e (2004) yields an equivalent GHG threshold of 39,000 MMT CO_2e.

The range of analogous CEQA GHG thresholds derived from those two agencies is tightly clustered, ranging from 39,000 to 46,000 tons/year. A 39,000 to 46,000 metric ton threshold would correspond to the GHG emissions of approximately 2,200 to 2,600 residential units, 1.5 to 1.8 million square feet of office space, 470,000 to 560,000 square feet of retail, and 275,000 to 320,000 square feet of supermarket space. This threshold would capture far less than half of new residential or commercial development. Similarly, this threshold would capture less of new industrial/manufacturing GHG emissions inventory than Thresholds 2.2 or 2.3.

Threshold 2.5: Unit-Based Thresholds Based on Market Capture

Unit thresholds were developed for residential and commercial developments in order to capture approximately 90 percent of future development. The objective was to set the unit thresholds low enough to capture a substantial fraction of future housing and commercial developments that will be constructed to accommodate future statewide population and job growth, while setting the unit thresholds high enough to exclude small development projects that will contribute a relatively small fraction of the cumulative statewide GHG emissions. Sector-based thresholds were created by using the same steps

and data used to create Threshold 2.2- Quantitative Threshold Based on Market Capture above.

The distribution of pending application data suggests that the GHG reduction burden will fall on larger projects that will be a relatively small portion of overall projects within more developed central cities and suburban areas of slow growth but would be the higher portion of projects within moderately or rapidly developing areas. The proposed threshold would exclude the smallest proposed developments from potentially burdensome requirements to quantify and mitigate GHG emissions under CEQA. While this would exclude perhaps 10 percent of new residential development, the capture of 90 percent of new residential development would establish a strong basis for demonstrating that cumulative reductions are being achieved across the state. It can certainly serve as an interim measure and could be revised if subsequent regulatory action by CARB shows that a different level or different approach altogether is called for.

A similar rationale can be applied to the development of a commercial threshold. Threshold 2.5 would exclude many smaller businesses from potentially burdensome requirements to quantify and mitigate GHG emissions under CEQA. It should be noted that the GHG emissions of commercial projects vary substantially. For example, the carbon dioxide emissions associated with different commercial types were estimated as follows:

- 30,000 square-foot (SF) office = 800 metric tons/year CO_2
- 30,000 SF retail = 2,500 metric tons/year CO_2
- 30,000 SF supermarket = 4,300 metric tons/year CO_2

Thus, in order to assure appropriate market capture on an emissions inventory basis, it will be important to examine commercial project size by type, instead of in the aggregate (which has been done in this paper).

The industrial sector is less amenable to a unit-based approach given the diversity of projects within this sector. One option would be to use a quantitative threshold of 900 tons for industrial projects in order to provide for rough equivalency between different sectors. Industrial emissions can result from both stationary and mobile sources. However, if the CARB rationale for > 90 percent stationary source capture with a threshold of 25,000 metric tons holds, then a 900 metric ton threshold would likely capture at least 90 percent (and likely more) of new industrial sources. Further examination of unit-based industrial thresholds, such as the number of employees or manufacturing floor space or facility size, may provide support for a unit-based threshold based on market capture.

This threshold would require the vast majority of new development emission sources to quantify their GHG emissions, apportion the forecast emissions to relevant source categories, and develop GHG mitigation measures to reduce their emissions.

Threshold 2.6. Projects of Statewide, Regional, or Areawide Significance

For this threshold, a set of qualitative, tiered CEQA thresholds would be adopted based on the definitions of "projects with statewide, regional or areawide significance" under the Guidelines for California Environmental Quality Act, CCR Title 14, Division 6, Section 15206(b).

Project sizes defined under this guideline include the following:

- Proposed residential development of more than 500 dwelling units.
- Proposed shopping center or business establishment employing more than 1,000 persons or encompassing more than 500,000 square feet of floor space.
- Proposed commercial office building employing more than 1,000 persons or encompassing more than 250,000 square feet of floor space.
- Proposed hotel/motel development of more than 500 rooms.
- Proposed industrial, manufacturing or processing plant or industrial park planned to house more than 1,000 persons, or encompassing more than 600,000 square feet of floor space.

These thresholds would correspond to the GHG emissions of approximately 9,000 metric tons for residential projects, 13,000 metric tons for office projects, and 41,000 metric tons for retail projects. These thresholds would capture approximately half of new residential development and substantially less than half of new commercial development. It is unknown what portion of the new industrial or manufacturing GHG inventory would be captured by this approach.

Threshold 2.7 Efficiency-Based Thresholds

For this approach, thresholds would be based on measurements of efficiency. For planning efforts, the metric could be GHG emissions per capita or per job or some combination thereof. For projects, the metric could be GHG emission per housing unit or per square foot of commercial space. In theory, one could also develop metrics for GHG emissions per dollar of gross product to measure the efficiency of the economy.

This approach is attractive because it seeks to benchmark project GHG intensity against target levels of efficiency. The thresholds would need to be set such that there is reasonably foreseeable and sufficient reductions compared to business as usual to support meeting AB 32 and S-3-05 goals in time (in combination with command and control regulations). Because this approach would require substantial data and modeling to fully develop, this is a concept considered as a potential future threshold and not appropriate

for interim guidance in the short term. Thus, it is not evaluated in the screening evaluation in the next section.

Table 3 compares the results for each of the approaches.

Table 3: Comparison of Approach 2 Tiered Threshold Options

Threshold	GHG Emission Threshold (metric tons/year)	Future Development Captured by GHG Threshold
2.1: Zero Threshold	0 tons/year	All
2.2: Quantitative Threshold Based on Market Capture	~900 tons/year	Residential development > 50 dwelling units Office space > 36,000 ft^2 Retail space >11,000 ft^2 Supermarkets >6.300 ft^2 small, medium, large industrial
2.3: CARB GHG Mandatory Reporting Threshold OR Potential Cap and Trade Entry Level	25,000 metric tons/year OR 10,000 metric tons/year	Residential development >1,400 dwelling units OR 550 dwelling units Office space >1 million ft^2 OR 400,000 ft^2 Retail space >300,000 ft^2 OR 120,000 ft^2 Supermarkets >175,000 ft^2 OR 70,000 ft^2 medium/larger industrial
2.4: Regulated Inventory Capture	40,000 – 50,000 metric tons/year	Residential development >2,200 to 2,600 dwelling units Office space >1.5 to 1.8 million ft^2 Retail space >470,000 to 560,000 ft^2 Supermarkets >270,000 to 320,000 ft^2 medium/larger industrial
2.5: Unit-Based Threshold Based on Market Capture	Not applicable.	Residential development >50 dwelling units Commercial space >50,000 ft^2 > small, medium, large industrial (with GHG emissions > 900 tonsCO2e)
2.6: Projects of Statewide, Regional, or Areawide Significance	Not applicable.	Residential development >500 dwelling units Office space >250,000 ft^2 Retail space >500,000 ft^2 Hotels >500 units Industrial project >1,000 employees Industrial project >40 acre or 650,000 ft^2
2.7: Efficiency-Based Thresholds	TBD tons/year/person TBD tons/year/unit	Depends on the efficiency measure selected.

Implementing CEQA With Tiered Thresholds

Several issues related to Approach 2 are addressed below:

1. *Some applications of this approach may need to be embodied in a duly approved General Plan, or in some other formal regulation or ordinance to be fully enforceable.* Because CEQA does not expressly provide that projects may be deemed insignificant based on implementation of a set of mitigations, this approach may need to be supported with specific and enforceable mechanisms adopted with due public process.

2. *How would this concept affect adoption of air district rules and regulations?* Proposed air district rules and regulations may be subject to CEQA like other projects and plans. Thus, if significance thresholds were adopted by an APCD or AQMD, then they could also apply to air district discretionary actions. If GHG emissions would be increased by a rule or regulation for another regulated pollutant, that would be a potential issue for review under CEQA.

3. *Mitigation measures may not be all-inclusive; better measures now or new future technology would make these measures obsolete.* The mandatory mitigation measures could be periodically updated to reflect current technology, feasibility, and efficiency.

4. *Total reduction may not be quantified or difficult to quantify.* CEQA only requires the adoption of feasible mitigation and thus the reduction effectiveness of required mitigation should not be in question. However, the precise reduction effectiveness may indeed be difficult to identify. As described above, if a quantitative threshold is selected as the measure of how much mitigation is mandated, then best available evidence will need to be used to estimate resultant GHG emissions with mitigation adoption. If a qualitative threshold is selected, then it may not be necessary to quantify reductions.

5. *Difficult to measure progress toward legislative program goals.* One could require reporting of project inventories to the Climate Action Registry, air district, or regional council of governments, or other suitable body. Collection of such data would allow estimates of the GHG intensity of new development over time, which could be used by CARB to monitor progress toward AB 32 goals.

6. *Measures may have adverse impacts on other programs.* The identification of mandatory mitigation will need to consider secondary environmental impacts, including those to air quality.

7. *Consideration of life-cycle emissions.* In many cases, only direct and indirect emissions may be addressed, rather than life-cycle emissions. A project applicant has traditionally been expected to only address emissions that are closely related and within the capacity of the project to control and/or influence. The long chain

8. of economic production resulting in materials manufacture, for example, involves numerous parties, each of which in turn is responsible for the GHG emissions associated with their particular activity. However, there are situations where a lead agency could reasonably determine that a larger set of upstream and downstream emissions should be considered because they are being caused by the project and feasible alternatives and mitigation measures may exist to lessen this impact.

Approach 2 Tiered Threshold with Mandatory Mitigation

As shown in Table 2, due to the cumulative nature of GHG emissions and climate change impacts, there could be a level of mandatory reductions and/or mitigation for all projects integrated into a tiered threshold approach. In order to meet AB 32 mandates by 2020 and S-3-05 goals, there will need to be adoption of GHG reduction measures across a large portion of the existing economy and new development. As such, in an effort to support a determination under CEQA that a project has a less than considerable contribution to significant cumulative GHG emissions, mitigation could be required on a progressively more comprehensive basis depending on the level of emissions.

- Level 1 Reductions – These reduction measures would apply to all projects and would only consist of AB 32 and other local/state mandates. They would be applied to a project from other legal authority (not CEQA). Level 1 reductions could include such measures as bike parking, transit stops for planned routes, Energy Star roofs, Energy Star appliances, Title 24 compliance, water use efficiency, and other measures. All measures would have to be mandated by CARB or local regulations and ordinances.

- Level 2 Mitigation – Projects that exceed the determined threshold would be required to first implement readily available technologies and methodologies with widespread availability. Level 2 Mitigation could include such measures as: parking reduction below code minimum levels, solar roofs, LEED Silver or Gold Certification, exceed Title 24 building standards by 20 percent, Traffic Demand Management (TDM) measures, and other requirements.

- Level 3 Mitigation - If necessary to reduce emissions to the thresholds, more extensive mitigation measures that represent the top tier of feasible efficiency design would also be required. Level 3 Mitigation could include such measures as: on-site renewable energy systems, LEED Platinum certification, exceed Title 24 building requirements by 40 percent, required recycled water use for irrigation, zero waste/high recycling requirements, mandatory transit pass provision, and other measures.

- Offset Mitigation – If, after adoption of all feasible on-site mitigation, the project is still found to exceed a Tier 2 quantitative threshold, or exceed a Tier 3 qualitative threshold, or if a project cannot feasibly implement the mandatory on-site mitigation, then purchases of offsets could be used for mitigation. In the case

of a quantitative threshold, the amount of purchase would be to offset below the Tier 2 significance threshold. In the case of a qualitative threshold, the amount of purchase could be to offset GHG emissions overall to below the lowest equivalent GHG emissions among the Tier 2 qualitative thresholds. With Threshold 2.5, this would be approximately 900 tons of GHG emissions (corresponding to 50 residential units). With Threshold 2.6, this would be approximately 9,000 tons (corresponding to 500 residential units). Alternatively, one could require purchase of offsets in the amount of a set percentage (such as 90% or 50% for example) of the residual GHG emissions (after other mitigation). As discussed earlier, any decision to include or require the use of emission reduction credits (or offsets) must consider issues of availability, quality, and environmental justice.

Substantial Evidence Supporting Different Thresholds

If a project can be shown by substantial evidence not to increase GHG emissions relative to baseline emissions, then no fair argument will be available that the project contributes considerably to a significant cumulative climate change impact.

It is more challenging to show that a project that increases GHG emissions above baseline emissions does not contribute considerably to a significant cumulative climate change impact. It is critical therefore, to establish an appropriate cumulative context, in which, although an individual project may increase GHG emissions, broader efforts will result in net GHG reductions.

Approach 1-based thresholds that by default will require an equal level of GHG reductions from the existing economy (Thresholds 1.1, 1.3, and 1.4) may be less supportable in the short run (especially before 2012) than Approach 1.2 (which requires new development to be relatively more efficient than a retrofitted existing economy). This is because, prior to 2012, there will only be limited mandatory regulations implementing AB 32 that could address the existing economy in a truly systematic way that can be relied upon to demonstrate that overall GHG reduction goals can be achieved by 2020. Approach 1.2 will still rely on substantial reductions in the existing economy but to a lesser degree.

Approach 1-based thresholds that would spread the mitigation burden across a sector (Threshold 1.3) or across a region (Threshold 1.4) will allow for tradeoffs between projects or even between municipalities. In order to demonstrate that a sector or a region is achieving net reductions overall, there would need to be feasible, funded, and mandatory requirements in place promoting an overall reduction scheme, in order for a project to result in nominal net increased GHG emissions.

Approach 2-based thresholds that capture larger portions of the new development GHG inventory (Thresholds 2.2 and 2.5) would promote growth that results in a smaller increase in GHG emissions; they may therefore be more supportable than thresholds that do not and that have a greater reliance on reductions in the existing economy (Thresholds

2.3, 2.4, and 2.6), especially in the next three to five years. With an established cumulative context that demonstrates overall net reductions, all threshold approaches could be effective in ensuring growth and development that significantly mitigates GHG emissions growth in a manner that will allow the CARB to achieve the emission reductions necessary to meet AB 32 targets. In that respect, all of these thresholds are supported by substantial evidence.

Evaluation of Non-Zero Threshold Options

Overarching issues concerning threshold development are reviewed below. Where appropriate, different features or application of the two conceptual approaches and the various options for thresholds under each conceptual approach described above are analyzed. The screening evaluation is summarized in Tables 4 (Approach 1) and 5 (Approach 2). The summary tables rate each threshold for the issues discussed below based on the level of confidence (low, medium or high) ascribed by J&S. The confidence levels relate to whether a threshold could achieve a particular attribute, such as emission reduction effectiveness. For example, a low emission reduction effectiveness rating means the threshold is not expected to capture a relatively large portion of the new development inventory.

As described above, Threshold 2.7 is not included in this evaluation because the data to develop an efficiency-based threshold has not been reviewed at this time and because this threshold is not considered feasible as an interim approach until more detailed inventory information is available across the California economy.

What is the GHG Emissions Effectiveness of Different Thresholds?

Effectiveness was evaluated in terms of whether a threshold would capture a large portion of the GHG emissions inventory and thus require mitigation under CEQA to control such emissions within the larger framework of AB 32. In addition, effectiveness was also evaluated in terms of whether a threshold would require relatively more or less GHG emissions reductions from the existing economy verses new development. This is presumptive that gains from the existing economy (through retrofits, etc.) will be more difficult and inefficient relative to requirements for new development.

Approach 1-based thresholds that require equivalent reductions relative to business-as-usual (Thresholds 1.1, 1.3, and 1.4) for both the existing and new economy will be less effective than thresholds that support lower-GHG intensity new development (Approach 1.2). However, since Approach 1-based thresholds do not establish a quantitative threshold below which projects do not have to mitigate, the market capture for new development is complete.

Approach 2-based thresholds can be more or less effective at capturing substantial portions of the GHG inventory associated with new development depending on where the quantitative or qualitative thresholds are set. Lower thresholds will capture a broader range of projects and result in greater mitigation. Based on the review of project data for

the select municipalities described in the Approach 2 section above, thresholds based on the CARB Reporting Threshold/Cap and Trade Entry Level (Threshold 2.4) or CEQA definitions of "Statewide, Regional or Areawide" projects (Threshold 2.6) will result in a limited capture of the GHG inventory. Lower quantitative or qualitative thresholds (Thresholds 2.1, 2.2 and 2.5) could result in capture of greater than 90 percent of new development.

Are the Different Thresholds Consistent with AB 32 and S-3-05?

Thresholds that require reductions compared to business-as-usual for all projects or for a large portion of new development would be consistent with regulatory mandates. In time, the required reductions will need to be adjusted from 2020 (AB 32) to 2050 (S-3-05) horizons, but conceptually broad identification of significance for projects would be consistent with both of these mandates. Thresholds that exclude a substantial portion of new development would likely not be consistent, unless it could be shown that other more effective means of GHG reductions have already been, or will be adopted, within a defined timeframe.

All Approach 1-based thresholds would be consistent with AB 32 and S-3-05 if it can be demonstrated that other regulations and programs are effective in achieving the necessary GHG reduction from the existing economy to meet the overall state goals.

Approach 2-based thresholds that include substantive parts of the new development GHG inventory (Thresholds 2.1, 2.2 and 2.5) will be more consistent with AB 32 and S-3-05 than those that do not (Thresholds 2.3, 2.4, and 2.6) unless it can be demonstrated that other regulations and programs are effective in achieving the necessary GHG reduction from the existing economy to meet the overall state goals.

What are the Uncertainties Associated with Different Thresholds?

All thresholds have medium to high uncertainties associated with them due to the uncertainty associated with the effectiveness of AB 32 implementation overall, the new character of GHG reduction strategies on a project basis, the immaturity of GHG reduction technologies or infrastructure (such as widespread biodiesel availability), and the uncertainty of GHG reduction effectiveness of certain technologies (such as scientific debate concerning the relative lifecycle GHG emissions of certain biofuels, for example).

In general, Approach 1-based thresholds have higher uncertainties than Approach 2 thresholds because they rely on a constantly changing definition of business-as-usual. Threshold 1.2, with its relatively smaller reliance on the existing economy for GHG reductions has relatively less uncertainty than other Approach 1 thresholds. Thresholds that spread mitigation more broadly (Thresholds 1.3 and 1.4) have less uncertainty by avoiding the need for every project to mitigate equally.

Approach 2 thresholds with lower quantitative (2.1 and 2.2) or qualitative (2.5) thresholds will have uncertainties associated with the ability to achieve GHG reductions

from small to medium projects. Approach 2 thresholds with higher quantitative (2.3, 2.4) or qualitative (2.6) thresholds will have uncertainties associated with the ability to achieve relatively larger GHG reductions from the existing economy.

What are Other Advantages/Disadvantages of the Different Thresholds?

Thresholds with a single project metric (Thresholds 1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.5, and 2.6) will be easier to apply to individual projects and more easily understood by project applicants and lead agencies broadly. Thresholds that spread mitigation across sectors (1.3) or regions (1.4), while simple in concept, will require adoption of more complicated cross-jurisdictional reduction plans or evaluation of broad sector-based trends in GHG intensity reduction over time. Approach 1 options would require all projects to quantify emissions in order to determine needed reductions relative to business-as-usual (which will change over time as described above). Concepts that are unit-based (Threshold 2.5 and 2.6) will not result in thresholds that have equal amount of GHG emissions, and thus equity issues may arise.

Table 4: Non-Zero Threshold Evaluation Matrix – Approach 1

Approach 1	1.1	1.2	1.3	1.4
	28% - 33% Reduction from BAU by 2020 by Project	**50% Reduction from BAU by 2020 by Project**	**28% - 33% Reduction by 2020 by Sector**	**28% - 33% Reduction by 2020 by Region**
GHG Emissions Reduction Effectiveness	**Low** - Captures all new projects but relies on a high level of reductions from the existing economy.	**Medium** - Captures all new projects and has a more realistic level of reductions from the existing economy.	**Low** - Captures all new projects but relies on a high level of reductions from the existing economy.	**Low** - Captures all new projects but relies on a high level of reductions from the existing economy.
Economic Feasibility	**Low** - Some projects will not be able to afford this level of reduction without effective market-based mechanisms like offsets.	**Low** - Some projects will not be able to afford this level of reduction without effective market-based mechanisms like offsets.	**Medium** - Sectors as a whole will be better able to achieve reductions than individual projects.	**Low** - Some regions and newly developed areas may not be able to afford this level of reduction without effective market-based mechanisms like offsets.
Technical Feasibility	**Medium** - Some projects will not be able to achieve this level of reduction without effective market-based mechanisms like offsets	**Low** - Relatively larger set of projects will not be able to achieve this level of reduction without effective market-based mechanisms like offsets	**High** - Some projects will not be able to achieve this level of reduction without effective market-based mechanisms like offsets	**Medium** - Some regions and newly developed areas may not be able to afford this level of reduction without effective market-based mechanisms like offsets.
Logistical Feasibility	**Low** - Absent broader reductions strategies, each project may reinvent the wheel each time to achieve mandated reductions.	**Low** - Absent broader reductions strategies, each project may reinvent the wheel each time to achieve mandated reductions.	**Low** - Absent broader reductions strategies, each project may reinvent the wheel each time to achieve mandated reductions.	**Low** - Absent broader reductions strategies, each project may reinvent the wheel each time to achieve mandated reductions.
Consistency with AB-32 and S-03-05	**Medium** - Would require heavy reliance on command and control gains.	**High**	**Medium-High** - Would rely on command and control gains, but would allow sectoral flexibility.	**Medium-High** - Would rely on command and control gains, but would allow regional flexibility.
Cost Effectiveness	**Low** - Will require all types of projects to reduce the same regardless of the cost/ton of GHG reductions.	**Low** - Will require all types of projects to reduce the same regardless of the cost/ton of GHG reductions.	**Low/Medium** - Allows tradeoffs within sector between high and low cost reduction possibilities but not between sectors.	**Low/Medium** - Allows tradeoffs within region between high and low cost reduction possibilities, but not between regions.
Uncertainties	**High** - BAU changes over time. Ability to reduce GHG emissions from existing economy will take years to demonstrate. Ability to limit GHG emissions from other new development will take years to demonstrate.	**Medium/High** - BAU changes over time. Ability to limit GHG emissions from other new development will take years to demonstrate.	**High** - BAU changes over time. Ability to reduce GHG emissions from existing economy will take years to demonstrate. Ability to limit GHG emissions from other new development will take years to demonstrate.	**High** - BAU changes over time. Ability to reduce GHG emissions from existing economy will take years to demonstrate. Ability to limit GHG emissions from other new development will take years to demonstrate.
Other Advantages	Simple/easy to explain.	Simple/easy to explain.	Spreads mitigation broadly	Spreads mitigation broadly
Other Disadvantages	Requires all projects to quantify emissions.	Requires all projects to quantify emissions.	Requires all projects to quantify emissions.	Requires all projects to quantify emissions.

Table 5: Non-Zero Threshold Evaluation Matrix – Approach 2

Approach 2	2.1 **Zero Threshold**	2.2 **Quantitative (900 tons)**	2.3 **Quantitative CARB Reporting Threshold/Cap and Trade (25,000 tons/ 10,000 tons)**	2.4 **Quantitative Regulated Inventory Capture (~40,000 - 50,000 tons)**	2.5 **Qualitative Unit-Based Thresholds**	2.6 **Statewide, Regional or Areawide (CEQA Guidelines 15206(b)).**
GHG Emissions Reduction Effectiveness	**High** - Captures all sources.	**High** - Market capture at >90%. Captures diverse sources.	**Medium** - Moderate market capture.	**Low** - Low market capture.	**High** - Market capture at ~90%. Captures diverse sources; excl. smallest proj.	**Medium** - Moderate market capture. Excludes small and med. projects.
Economic Feasibility	**Low** - Early phases will be substantial change in BAU, esp. for smaller projects; may be infeasible to mitigate.	**Medium** - Early phases will be substantial change in BAU, esp. for smaller projects; may be infeasible to mitigate.	**High** - Large projects have greater ability to absorb cost.	**High** - Large projects have greater ability to absorb cost.	**Medium** - Early phases will be substantial change in BAU, esp. for smaller projects; may be infeasible to mitigate.	**High** - Large projects have greater ability to absorb cost.
Technical Feasibility	**Low** - Early phases will be substantial change in BAU, esp. for smaller projects; may be infeasible to mitigate.	**Medium** - Early phases will be substantial change in BAU, esp. for smaller projects; may be inefficient to mitigate.	**High** - Greater opportunities for multiple reduction approaches.	**High** - Greater opportunities for multiple reduction approaches.	**Medium** - Early phases will be substantial change in BAU, particularly for smaller projects may be inefficient to mitigate.	**High** - Greater opportunities for multiple reduction approaches.
Logistical Feasibility	**Low** - Unless fee or offset basis,very difficult to mitigate all projects.	**Medium** - BMPs broadly written to allow diversity; new req. will take time to integrate into new dev.	**High** - Less mitigation.	**High** - Less mitigation.	**Medium** - BMPs broadly written to allow diversity; new req. will take time to integrate into new dev.	**High** - Less mitigation.
Consistency with AB-32 and S-03-05	**High** - Market capture.	**High** - Market capture at >90%.	**Low** - Would rely on command and control success heavily.	**Low** - Would rely on command and control success heavily.	**Medium** - Need to demonstrate adequate market capture over time.	**Low** - Would rely on command and control success heavily.
Cost Effectiveness	**Low** - Will result in inefficient mitigation approaches. Efficiency will improve in time.	**Medium** - Emphasis is on new dev., req. for mitigation will result in inefficient mitigation approaches in early phases. Efficiency will improve in time.	**Medium** - Relies on command and control reductions for existing economy more heavily. With focus on larger projects, eff. of mitigation for new dev. high.	**Medium** - Relies on command and control reductions for existing economy more heavily. With focus on larger projects, eff. of mitigation for new dev. high.	**Medium** - Emphasis is on new dev.; req. for mitigation will result in inefficient mitigation approaches in early phases. Efficiency will improve in time.	**Medium** - Relies on command and control reductions for existing economy more heavily. With focus on larger projects, eff. of mitigation for new dev. high.
Uncertainties	**High** - Time to adapt for res. and comm.. sectors. Ability to mitigate without market-based mechanism for smaller projects unlikely.	**Medium/High** - Time to adapt for res. and comm.. sectors. Ability to mitigate without market-based mechanism for smaller projects uncertain.	**High** - Gains from command and control likely longer to be realized.	**High** - Gains from command and control likely longer to be realized.	**Medium/High** - Time to adapt for res. and comm.. sectors. Ability to mitigate without market-based mechanism for smaller projects uncertain.	**High** - Gains from command and control likely longer to be realized.
Other Advantages	Single threshold.	Single threshold. BMPs can be updated. Greenlist can be updated.	Single threshold. Does not change CEQA processing for most projects. CARB inventory = project inv.. All projects treated same.	Single threshold. Does not change CEQA processing for most projects. Follows established SIP practice.	BMPs can be updated. Greenlist can be updated. Unit-Based thresholds can be updated.	Existing guideline. Does not change CEQA processing for most projects. Endorsed by Cal. Chapter of the APA.
Other Disadvantages	Requires all projects to quantify emissions.	Requires nearly all projects to quantify emissions.			Sectoral projects have different GHG emis. Only largest projects to quantify emis.	Sectoral projects have different GHG emissions.

Introduction

This chapter evaluates the availability of various analytical methods and modeling tools that can be applied to estimate the greenhouse gas emissions from different project types subject to CEQA. This chapter will also provide comments on the suitability of the methods and tools to accurately characterize a projects emissions and offer recommendations for the most favorable methodologies and tools available. Some sample projects will be run through the methodologies and modeling tools to demonstrate what a typical GHG analysis might look like for a lead agency to meet its CEQA obligations. The air districts retained the services of EDAW environmental consultants to assist with this effort.

Methodologies/Modeling Tools

There are wide varieties of discretionary projects that fall under the purview of CEQA. Projects can range from simple residential developments to complex expansions of petroleum refineries to land use or transportation planning documents. It is more probably than not, that a number of different methodologies would be required by any one project to estimate its direct and indirect GHG emissions. Table 10 contains a summary of numerous modeling tools that can be used to estimate GHG emissions associated with various emission sources for numerous types of project's subject to CEQA. The table also contains information about the models availability for public use, applicability, scope, data requirements and its advantages and disadvantages for estimating GHG emissions.

In general, there is currently not one model that is capable of estimating all of a project's direct and indirect GHG emissions. However, one of the models identified in Table 9 would probably be the most consistently used model to estimate a projects direct GHG emissions based on the majority of projects reviewed in the CEQA process. The Urban Emissions Model (URBEMIS) is designed to model emissions associated with development of urban land uses. URBEMIS attempts to summarize criteria air pollutants and CO_2 emissions that would occur during construction and operation of new development. URBEMIS is publicly available and already widely used by CEQA practitioners and air districts to evaluate criteria air pollutants emissions against air district-adopted significance thresholds. URBEMIS is developed and approved for statewide use by CARB. The administrative reasons for using URBEMIS are less important than the fact that this model would ensure consistency statewide in how CO_2 emissions are modeled and reported from various project types.

One of the shortfalls of URBEMIS is that the model does not contain emission factors for GHGs other than CO_2, except for methane (CH_4) from mobile-sources, which is converted to CO_2e. This may not be a major problem since CO_2 is the most important GHG from land development projects. Although the other GHGs have a higher global warming potential, a metric used to normalize other GHGs to CO_2e, they are emitted in far fewer quantities. URBEMIS does not calculate other GHG emissions associated with

off-site waste disposal, wastewater treatment, emissions associated with goods and services consumed by the residents and workers supported by a project. Nor does URBEMIS calculate GHGs associated with consumption of energy produced off-site. (For that matter, URBEMIS does not report criteria air pollutant emissions from these sources either).

Importantly, URBEMIS does not fully account for interaction between land uses in its estimation of mobile source operational emissions. Vehicle trip rates are defaults derived from the Institute of Transportation Engineers trip generation manuals. The trip rates are widely used and are generally considered worst-case or conservative. URBEMIS does not reflect "internalization" of trips between land uses, or in other words, the concept that a residential trip and a commercial trip are quite possibly the same trip, and, thus, URBEMIS counts the trips separately. There are some internal correction settings that the modeler can select in URBEMIS to correct for "double counting"; however, a project-specific "double-counting correction" is often not available. URBEMIS does allow the user to overwrite the default trip rates and characteristics with more project-specific data from a traffic study prepared for a project.

Residential, Commercial, Mixed-Use Type Projects/ Specific Plans

Direct Emissions

URBEMIS can be used to conduct a project-specific model run and obtain CO_2e emissions for area and mobile sources from the project, and convert to metric tons CO_2e. When a project-specific traffic study is not available, the user should consult with their local air district for guidance. Many air district staff are experienced practitioners of URBEMIS and can advise the lead agency or the modeler on how to best tailor URBEMIS default input parameters to conduct a project-specific model run. When a traffic study has been prepared for the project, the user must overwrite default trip length and trip rates in URBEMIS to match the total number of trips and vehicle miles traveled (VMT) contained in the traffic study to successfully conduct a project-specific model run. URBEMIS is recommended as a calculation tool to combine the transportation study (if available) and EMFAC emission factors for mobile-sources. Use of a project-specific traffic study gets around the main shortfall of URBEMIS: the lack of trip internalization. URBEMIS also provides the added feature of quantifying direct area-source GHG emissions.

Important steps for running URBEMIS

1. Without a traffic study prepared for the project, the user should consult with the local air district for direction on which default options should be used in the modeling exercise. Some air districts have recommendations in the CEQA guidelines.

2. If a traffic study was prepared specifically for the project, the following information must be provided:

a. Total number of average daily vehicle trips *or* trip-generation rates by land use type per number of units; and,

b. Average VMT per residential *and* nonresidential trip.

c. The user overwrites the "Trip Rate (per day)" fields for each land use in URBEMIS such that the resultant "Total Trips" and the "Total VMT" match the number of total trips and total VMT contained in the traffic study.

d. Overwrite "Trip Length" fields for residential and nonresidential trips in UBEMIS with the project-specific lengths obtained form the traffic study.

3. Calculate results and obtain the CO_2 emissions from the URBEMIS output file (units of tons per year [TPY]).

Indirect Emissions

URBEMIS does estimate indirect emissions from landscape maintenance equipment, hot water heaters, etc. URBEMIS does not however, provide modeled emissions from indirect sources of emissions, such as those emissions that would occur off-site at utility providers associated with the project's energy demands. The California Climate Action Registry (CCAR) Protocol v.2.2 includes methodology, which could be used to quantify and disclose a project's increase in indirect GHG emissions from energy use. Some assumptions must be made for electrical demand per household or per square foot of commercial space, and would vary based on size, orientation, and various attributes of a given structure. An average rate of electrical consumption for residential uses is 7,000 kilowatt hours per year per household and 16,750 kilowatt hours per thousand square feet of commercial floor space. Commercial floor space includes offices, retail uses, warehouses, and schools. These values have been increasing steadily over the last 20 years. Energy consumption from residential uses has increased due to factors such as construction and occupation of larger homes, prices of electricity and natural gas, and increased personal income allowing residents to purchase more electronic appliances. Commercial energy consumption is linked to factors such as vacancy rates, population, and sales.

The modeler will look up the estimated energy consumption for the project's proposed land uses under year of project buildout, or use the values given in the previous paragraph for a general estimate. The CCAR Protocol contains emission factors for CO_2, CH_4, and nitrous oxide. The "CALI" region grid serves most of the State of California. If a user has information about a specific utility provider's contribution from renewable sources, the protocol contains methodology to reflect that, rather than relying on the statewide average grid. The incremental increase in energy production associated with project operation should be accounted for in the project's total GHG emissions for inclusion in the environmental document.

The incremental increase in energy production associated with project operation should be accounted for in the project's total GHG emissions, but it should be noted that these emissions would be closely controlled by stationary-source control-based regulations and additional regulations are expected under AB 32. However, in the interest of disclosing project-generated GHG emissions and mitigating to the extent feasible, the indirect emissions from off-site electricity generation can be easily calculated for inclusion in the environmental document.

Example Project Estimates for GHG Emissions

Residential Project

Project Attributes:

- 68 detached dwelling units
- 15.9 acres
- 179 residents
- 0 jobs
- Located in unincorporated Placer County (PCAPCD jurisdiction)
- Analysis year 2009

As shown in Table 6, the project's direct GHG emissions per service population (SP) would be approximately 8 metric tons CO_2e/SP/year.

Table 6: Residential Project Example GHG Emissions Estimates

URBEMIS Output (Project Specific)	Metric Tons/Year CO_2e	Demographic Data	
Area-source emissions	251	Residents	179
Mobile-source emissions	1,044	Jobs	0
Indirect emissions (from CCAR Protocol)	174		
Total operational emissions	**1,469**	Service population	179
Operational emissions/SP	**8.2**		

Notes:
CO_2e = carbon dioxide equivalent; CCAR = California Climate Action Registry; SP = service population(see definition of service population below in discussion of Normalization/Service Population Metric).

Sources: EDAW 2007, ARB 2007b, CCAR 2007, CEC 2000

Commercial Project

Project Attributes:

- Free Standing Discount Superstore: 241 thousand square feet (ksf)
- 0 residents

- 400 jobs
- Located in the San Joaquin Valley Air Pollution Control District's (SJVAPCD) jurisdiction
- Analysis year 2009

Table 7: Commercial Project Example GHG Emissions Estimates

URBEMIS Output (Project Specific)	Metric Tons/Year CO_2e	Demographic Data	
Area-source emissions	464	Residents	0
Mobile-source emissions	13,889	Jobs	400
Indirect emissions (from CCAR Protocol)	1,477		
Total operational emissions	**15,830**	Service population	400
Operational emissions/SP	**39.6**		

Notes:
CO_2e = carbon dioxide equivalent; CCAR = California Climate Action Registry; SP = service population (see definition of service population below in discussion of Normalization/Service Population Metric).

Sources: EDAW 2007, ARB 2007b, CCAR 2007, CEC 2000

Specific Plan

If used traditionally with default trip rates and lengths, rather than project-specific (Traffic Analysis Zone-specific) trip rates and lengths, URBEMIS does not work well for specific plan or general plan-sized projects with multiple land use types proposed. However, in all instances, projects of these sizes (several hundred or thousand acres) would be accompanied by a traffic study. Thus, for large planning-level projects, URBEMIS can be used as a calculation tool to easily obtain project-specific mobile-source emissions. The user should follow the steps discussed above; wherein he/she overwrites the default ITE trip rates for each land use type with that needed to make total VMT match that contained in the traffic study. The URBEMIS interface is a simple calculator to combine the traffic study and EMFAC emissions factors for mobile-source CO_2.

Project Attributes:

- 985 acres
- Total dwelling units: 5,634
- Commercial/Mixed Use: 429 ksf
- Educational: 2,565 ksf
- 14,648 residents
- 3,743 jobs
- Located in Sacramento County (SMAQMD jurisdiction)
- Analysis year 2009

Table 8: Specific Plan Example GHG Emissions Estimates

URBEMIS Output (Project Specific)	Metric Tons/Year CO_2e	Demographic Data	
Area-source emissions	23,273	Residents	14,648
Mobile-source emissions	73,691	Jobs	3,743
Indirect emissions (from CCAR Protocol)	32,744	Service population	18,391
Total operational emissions	**129,708**		
Operational emissions/SP	**7.1**		

Notes:
CO_2e = carbon dioxide equivalent; CCAR = California Climate Action Registry; SP = service population (see definition of service population below in discussion of Normalization/Service Population Metric).

Sources: EDAW 2007, ARB 2007b, CCAR 2007, CEC 2000

The specific plan example, when compared to the residential or commercial examples, illustrates the benefit of a mixed-use development when you look at CO_2e emissions per resident or job (service population) metric (see definition of service population below in discussion of Normalization/Service Population Metric). Though this particular specific plan is not an example of a true jobs/housing balance, the trend is clear: accommodating residents and jobs in a project is more efficient than residents or jobs alone.

Stationary- and Area-Source Project Types

GHG emissions from stationary or area sources that require a permit to operate from the air district also contain both direct and indirect sources of emissions. Examples of these types of sources would be fossil fuel power plants, cement plants, landfills, wastewater treatment plants, gas stations, dry cleaners and industrial boilers. All air districts have established procedures and methodologies for projects subject to air district permits to calculate their regulated pollutants. It is anticipated that these same procedures and methodologies could be extended to estimate a permitted facility's GHG calculations. For stationary and area sources that do not require air district permits, the same methodologies used for permitted sources could be used in addition to URBEMIS and CCAR GRP to calculate GHG emissions from these facilities.

Wastewater Treatment Facilities

Direct GHG emissions associated with a proposed waste water treatment plant can be calculated using AP-42 emission factors from Chapter 4.3.5 Evaporative Loss Sources: Waste Water-Greenhouse Gases and the CCAR methodology. In general, most wastewater operations recover CH_4 for energy, or use a flare to convert the CH_4 to CO_2. There are many types of wastewater treatment processes and the potential for GHG emissions from different types of plants varies substantially. There is not one standard set of emission factors that could be used to quantify GHG emissions for a state

"average" treatment plant. Thus, research will need to be conducted on a case-by-case basis to determine the "Fraction Anaerobically Digested" which is a function of the type of treatment process. Indirect emissions from these facilities can be calculated using the CCAR energy use protocols and URBEMIS model for transportation emissions.

Solid Waste Disposal Facilities

Air districts will have emission estimate methodologies established for methane emissions at permitted landfills. In addition, EPA's Landfill Gas Emissions Model (LandGem) and the CCAR methodology could also be used to quantify GHG emissions from landfill off gassing; however, this model requires substantial detail be input. The model uses a decomposition rate equation, where the rate of decay is dependent on the quantity of waste in place and the rate of change over time. This modeling tool is free to the public, but substantial project detail about the operation of the landfill is needed to run the model. Indirect emissions from these facilities can be calculated using the CCAR energy use protocols and URBEMIS model for transportation emissions.

Construction Emissions

GHG emissions would occur during project construction, over a finite time. In addition, a project could result in the loss of GHG sequestration opportunity due primarily to the vegetation removed for construction. URBEMIS should be used to quantify the mass of CO_2 that would occur during the construction of a project for land development projects. Some construction projects would occur over an extended period (up to 20–30 years on a planning horizon for general plan buildout, or 5–10 years to construct a dam, for example). OFFROAD emission factors are contained in URBEMIS for CO_2 emissions from construction equipment. For other types of construction projects, such as roadway construction projects or levee improvement projects, SMAQMD's spreadsheet modeling tool, the Road Construction Emissions Model (RoadMod), should be used. This tool is currently being updated to include CO_2 emissions factors from OFFROAD.

The full life-cycle of GHG emissions from construction activities is not accounted for in the modeling tools available, and the information needed to characterize GHG emissions from manufacture, transport, and end-of-life of construction materials would be speculative at the CEQA analysis level. The emissions disclosed will be from construction equipment and worker commutes during the duration of construction activities. Thus, the mass emissions in units of metric tons CO_2e/year should be reported in the environmental document as new emissions.

General Plans

In the short-term, URBEMIS can be used as a calculation tool to model GHG emissions from proposed general plans, but only if data from the traffic study is incorporated into model input. The same methodology applied above in the specific plan example applies to general plans. The CCAR GRP can be used to approximate indirect emissions from

increased energy consumption associated with the proposed plan area. The same models and methodologies discussed previously for wastewater, water supply and solid waste would be used to estimate indirect emissions resulting from buildout of the general plan.

In the longer-term, more complex modeling tools are needed, which would integrate GHG emission sources from land use interaction, such as I-PLACE^{3}S or CTG Energetics' Sustainable Communities Custom Model attempt to do. These models are not currently available to the public and only have applicability in certain areas of the state. It is important that a tool with statewide applicability be used to allow for consistency in project treatment, consideration, and approval under CEQA.

Scenarios

At the general plan level, the baseline used for analyzing most environmental impacts of a general plan update is typically no different from the baseline for other projects. The baseline for most impacts represents the existing conditions, normally on the date the Notice of Preparation is released. Several comparative scenarios could be relevant, depending on the exact methodological approach and significance criteria used for GHG assessment:

- Existing Conditions. The GHG emissions associated with the existing, on-the-ground conditions within the planning area.

- 1990 conditions. The GHG emissions associated with the general plan area in 1990. This is relevant due to the state's AB 32 GHG emission reduction goals' benchmark year of 1990. The GHG-efficiency of 1990 development patterns could be compared to that of the general plan buildout.

- Buildout of the Existing General Plan. The GHG emissions associated with buildout of the existing general plan (without the subject update). This is the no project alternative for the purposes of general plan CEQA analysis.

- Buildout of the Updated General Plan. The GHG emissions associated with buildout of the general plan, as proposed as a part of the subject update. This would include analysis of any changes included as a part of the general plan update for the existing developed portions of the planning area. Many communities include redevelopment and revitalization strategies as a part of the general plan update. The general plan EIR can include assumptions regarding what level and type of land use change could be facilitated by infill and redevelopment. Many jurisdictions wish to provide future projects consistent with these land use change assumptions with some environmental review streamlining. In addition, many communities include transit expansions, pedestrian/bicycle pathway improvements, multi-modal facility construction, travel demand policies, energy efficiency policies, or other measures that could apply to the existing developed area, just as they may apply to any new growth

areas. Such policies could affect the overall GHG emissions of the built out general plan area.

- Increment between Buildout of Updated General Plan and Existing General Plan Area. There are many important considerations associated with the characterization of the impact of the General Plan update. The actual GHG emissions impact could be described as the difference between buildout under the existing and proposed land use plan (No-Build Alternative). However, the courts have held that an EIR should also analyze the difference between the proposed General Plan and the existing environment (*Environmental Planning & Information Council v. County of El Dorado* (EPIC) (1982) 131 Cal.App.3d 350). At the General Plan level, over the course of buildout, some new land uses are introduced, which could potentially add operational GHG emissions and potentially remove existing sequestration potential. Some properties become vacant and are not redeveloped. Other properties become vacant and then are redeveloped. Communities cannot pretend to understand fully in advance each component of land use change. The programmatic document is the preferred method of environmental analysis. Through this programmatic framework, communities develop buildout assumptions as a part of the General Plan that are normally used as a basis of environmental analysis. For certain aspects of the impact analysis, it becomes important not just to understand how much "new stuff" could be accommodated under the updated General Plan, but also the altered interactions between both "new" and "existing" land uses within the planning area. As addressed elsewhere, there are tools available for use in understanding land use/transportation interactions at the General Plan level. Without the GHG targets established by AB 32, a simple mass comparison of existing conditions to General Plan buildout might be appropriate.

However, within the current legal context, the GHG efficiency of the updated General Plan becomes the focus of analysis. Some options in this regard include:

- Estimate the GHG emissions associated with all the land uses included within the planning area upon buildout of the General Plan using no project specific information (regional, countywide, or statewide defaults). Estimate GHG emissions using project specific information from the transportation engineer, transportation demand policies, community design elements, energy efficiency requirements, wastewater treatment and other public infrastructure design changes, and other components. Compare these two calculations. Is the second calculation reduced by the percent needed to meet AB 32 goals compared to the first calculation?

- Estimate the GHG emissions associated with the 1990 planning area and the per-capita or per-service population GHG associated with the 1990 planning area. (Many communities are establishing GHG inventories using different tools). Estimate the GHG emissions associated with buildout of the proposed General Plan update and the resulting per-capita or per-service population GHG

emissions. Compare the two calculations. Is the General Plan buildout per-capita or per-service population level greater than the 1990 estimate?

Example General Plan Update: Proposed new growth area

Project Attributes:

- 10,050 single family dwelling units
- 652 multi-family dwelling units
- 136 acres parks
- 2,047 ksf commercial (regional shopping center)
- 2,113 ksf office
- 383 acres industrial park
- 31,293 new residents
- 4,945 new jobs
- Located in Stanislaus County (SJVAPCD jurisdiction)
- Analysis year 2025

Table 9: General Plan Example GHG Emissions Estimates

URBEMIS Output (Project Specific)	**Metric Tons/Year CO_2e**	**Demographic Data**	
Construction emissions	12,083*	Residents	31,293
Area-source emissions	45,708		
Mobile-source emissions	263,954	Jobs	4,945
Indirect emissions (from CCAR Protocol)	78,385		
Total operational emissions	**388,046**	Service population	36,238
Operational emissions/SP	**10.7**		

* Approximately 241,656 metric tons CO_2e total at general plan buildout (assumes 20-year buildout period). Construction emissions were not included in total operational emissions.
Notes:
CO_2e = carbon dioxide equivalent; CCAR = California Climate Action Registry; SP = service population (see definition of service population below in discussion of Normalization/Service Population Metric).
Sources: EDAW 2007, ARB 2007b, CCAR 2007, CEC 2000

Due to the programmatic level of analysis that often occurs at the general plan level, and potential for many relevant GHG emission quantities, it could be preferable to use a qualitative approach. Such an analysis could address the presence of GHG-reducing policy language in the general plan.

Three possible tiers of approaches to addressing GHG mitigation strategies, either as general plan policy, general plan EIR mitigation measures, or both, include:

- Forward planning
- Project toolbox
- Defer to GHG reductions plan

The three basic approaches are described below.

1. Bring reduction strategies into the plan itself. The most effective way for local jurisdictions to achieve GHG emissions reductions in the medium- and long-term is through land use and transportation policies that are built directly into the community planning document. This involves creating land use diagrams and circulation diagrams, along with corresponding descriptive standards, that enable and encourage alternatives to travel and goods movement via cars and trucks. The land use and circulation diagrams provide a general framework for a community where people can conduct their everyday business without necessarily using their cars. The overall community layout expressed as a part of the land use and circulation diagrams is accompanied by a policy and regulatory scheme designed to achieve this community layout. Impact fees, public agency spending, regulations, administrative procedures, incentives, and other techniques are designed to facilitate land use change consistent with the communities' overall vision, as expressed in policy and in the land use diagram. There are many widely used design principles that can be depicted in land use and circulation diagrams and implemented according to narrative objectives, standards, and policies:

- Connectivity. A finely-connected transportation network shortens trip lengths and creates the framework for a community where homes and destinations can be placed close in proximity and along direct routes. A hierarchical or circuitous transportation network can increase trip lengths and create obstacles for walking, bicycling, and transit access. This policy language would likely be found in the Circulation Element.

- Compactness. Compact development, by its nature, can increase the efficiency of infrastructure provision and enable travel modes other than the car. If communities can place the same level of activity in a smaller space, GHG emissions would be reduced concurrently with VMT and avoid unnecessary conversion of open space. This policy language would likely be found in the Land Use Element.

- Diversity. Multiple land use types mixed in proximity around central "nodes" of higher-activity land uses can accommodate travel through means other than a car. The character and overall design of this land use mix is, of course, different from community to community. This policy language would likely be found in the Land Use Element.

- Facilities. Pedestrian, bicycle, and public transportation improvements, planning, and programming are sometimes an afterthought. To get a more GHG-efficient mode share, safe and convenient bike lanes, pedestrian pathways, transit shelters, and other facilities are required to be planned along with the vehicular travel network. This policy language would likely be found in the Circulation Element.

- Redevelopment. One way to avoid GHG emissions is to facilitate more efficient and economic use of the lands in already-developed portions of a community. Reinvestment in existing neighborhoods and retrofit of existing buildings is appreciably more GHG efficient than greenfield development, and can even result in a net reduction in GHG emissions. This policy language would likely be found in the Conservation or Land Use Element.

- Housing and Employment. Most communities assess current and future economic prospects along with long-range land use planning. Part of the objective for many communities is to encourage the coalescence of a labor force with locally available and appropriate job opportunities. This concept is best known as "jobs-housing balance." This policy language would likely be found in the Housing Element.

- Planning Level Versus Project Level. For transportation-related GHG emissions that local governments can mitigate through land use entitlement authority, the overall community land use strategy and the overall transportation network are the most fruitful areas of focus. The reduction capacity of project-specific mitigation measures is greatly limited if supportive land use and transportation policies are lacking at the community planning level. The regional economic context, of course, provides an important backdrop for land use and transportation policy to address GHG emissions. Within this context, the general plan is the readily available tool for local governments to establish such land use and transportation strategies. This policy language would likely be found in the Land Use and Circulation Elements.

- Shipping Mode Shift. Locate shipping-intensive land uses in areas with rail access. Some modes of shipping are more GHG-intensive than others. Rail, for example, requires only about 15 to 25 percent of the energy used by trucks to ship freight equivalent distances and involves reduced transportation-related GHG emissions. Cities and counties have little direct control over the method of shipment that any business may choose. Nevertheless, as a part of the general planning process, cities and counties can address constraints on the use of rail for transporting goods. This policy language would likely be found in the Land Use and Circulation Elements.

2. Provide a "toolbox" of strategies after the project site has been selected. In addition to the examples of design principles that are built into the community planning process, communities can offer project applicants a range of tools to reduce GHG emissions. Mitigation strategies are elaborated in detail in Chapter 9.

3. Defer to General Plan implementation measure. Develop and implement a GHG Emissions Reduction Plan. Another option for local governments would be development of an implementation measure as a part of the general plan that outlines an enforceable GHG reduction program. Perhaps the most well known example of this approach is the result of California's Attorney General settlement of the lawsuit brought against San

Bernardino County. The County has agreed to create a 1990 GHG inventory and develop measures to reduce such emissions according to the state's overall goals. Other communities have pursued similar programs (i.e., the City of San Diego, Marin County). Along with the inventories, targets, and example reduction measures, these programs would include quantitative standards for new development; targets for reductions from retrofitting existing development; targets for government operations; fee and spending program for GHG reduction programs; monitoring and reporting; and other elements. The local government itself should serve as a model for GHG reduction plan implementation, by inventorying emissions from government operations and achieving emission reductions in accordance with the plan's standards. An optional climate change element could be added to contain goals, policies, and this implementation strategy, or this could belong in an optional air quality element.

Other Project Types

Air District Rules, Regulations and Air Quality Plans

Air district air quality plans, rules and regulations could have the potential to increase or decrease GHG emissions within their respective jurisdiction. In general, air district air quality plans, rules and regulations act to reduce ozone precursors, criteria air pollutant and toxic air contaminant emissions, which would almost always act to reduce GHG emissions simultaneously. However, this may not always be the case.

Air Quality Plans

Air districts will have to include GHG emissions analysis as part of their criteria air pollutant and toxic air contaminant air pollutant analysis when considering the adoption of air quality plans and their subsequent rules and regulations needed to implement the plans. Multiple models and methodologies will be needed to accomplish this analysis.

Regional Transportation Plans

Regional transportation plans would also need to be evaluated on a case-by-case basis to determine if a net increase or decrease in GHG emissions would occur. Complex interactions between the roadway network, operating conditions, alternative transportation availability (such as public transit, bicycle pathways, and pedestrian infrastructure), and many other independent parameters specific to a region should be considered. Regional transportation models exist to estimate vehicular emissions associated with regional transportation plans, which includes the ability to estimate GHG emissions.

Normalization/Service Population Metric

The above methodology would provide an estimate of the mass GHG emissions generated by a proposed project, which could be compared to a mass emission threshold. EDAW developed a methodology that would measure a project's overall GHG efficiency

in order to determine if a project is more efficient than the existing statewide average for per capita GHG emissions. The following steps could be employed to estimate the GHG-"efficiency," which may be more directly correlated to the project's ability to help obtain objectives outlined in AB 32, although it relies on establishment of an efficiency-based significance threshold. The subcommittee believes this methodology may eventually be appropriate to evaluate the long-term GHG emissions from a project in the context of meeting AB 32 goals. However, this methodology will need substantially more work and is not considered viable for the interim guidance presented in this white paper.

- Divide the total operational GHG emissions by the Service Population (SP) supported by the project (where SP is defined as the sum of the number of residents and the number of jobs supported by the project). This value should be compared to that of the projected statewide GHG emissions inventory from the applicable end-use sectors (electricity generation, residential, commercial/institutional, and mobile-source) in 1990 divided by the projected statewide SP for the year 2020 (i.e., AB 32 requirements), to determine if the project would conflict with legislative goals.

    - If the project's operational GHG/SP falls below AB 32 requirements, then the project's GHG emissions are less than cumulatively considerable.

    - If the project's operational GHG/SP exceed AB 32 requirements (a substantial contribution), then the project's GHG emissions would conflict with legislative requirements, and the impact would be cumulatively considerable and mitigation would be required where feasible.

- New stationary and area sources/facilities: calculate GHG emissions using the CCAR GRP. All GHG emissions associated with new stationary or area sources should be treated as a net increase in emissions, and if deemed significant, should be mitigated where feasible.

- Road or levee construction projects or other construction-only projects: calculate GHG emissions using the RoadMod, which will be updated to contain GHG emission factors from EMFAC and OFFROAD. All construction-generated GHG emissions should be treated as a net increase, and if deemed significant, should be mitigated to the extent feasible.

- Air District rulemaking or air quality management plan-type projects should be evaluated on a case-by-case basis for secondary impacts of increased GHG emissions generation. In most cases, the types of projects that act to reduce regional air pollution simultaneously act to reduce GHG emissions, and would be beneficial, but should be evaluated for secondary effects from GHG emissions.

- Regional transportation plans should also be evaluated on a case-by-case basis for potential to either reduce or increase GHG emissions from the transportation sector. EMFAC can be utilized to determine the net change in GHG emissions

associated with projected vehicle VMT and from operating speed changes associated with additional or alleviated congestion.

To achieve the goals of AB 32, which are tied to GHG emission rates of specific benchmark years (i.e., 1990), California would have to achieve a lower rate of emissions per unit of population and per unit of economic activity than it has now. Further, in order to accommodate future population and economic growth, the state would have to achieve an even lower rate of emissions per unit than was generated in 1990. (The goal to achieve 1990 quantities of GHG emissions by 2020 means that this will need to be accomplished in light of 30 years of population and economic growth in place beyond 1990.) Thus, future planning efforts that would not encourage new development to achieve its fair share of reductions in GHG emissions would conflict with the spirit of the policy decisions contained in AB 32, thus impeding California's ability to comply with the mandate.

Thus, if a statewide context for GHG emissions were pursued, any net increase in GHG emissions within state boundaries would be considered "new" emissions. For example, a land development project, such as a specific plan, does not necessarily create "new" emitters of GHG, but would theoretically accommodate a greater number of residents in the state. Some of the residents that move to the project could already be California residents, while some may be from out of state (or would 'take the place' of in-state residents who 'vacate' their current residences to move to the new project). Some may also be associated with new births over deaths (net population growth) in the state. The out-of-state residents would be contributing new emissions in a statewide context, but would not necessarily be generating new emissions in a global context. Given the California context established by AB 32, the project would need to accommodate an increase in population in a manner that would not inhibit the state's ability to achieve the goals of lower total mass of emissions.

The average net influx of new residents to California is approximately 1.4 percent per year (this value represents the net increase in population, including the net contribution from births and deaths). With population growth, California also anticipates economic growth. Average statewide employment has grown by approximately 1.1 percent over the last 15 years. The average percentage of population employed over the last 15 years is 46 percent. Population is expected to continue growing at a projected rate of approximately 1.5 percent per year through 2050. Long-range employment projection data is not available from the California Department of Finance (DOF) and can be extrapolated in different ways (e.g., linear extrapolation by percentage rate of change, percentage of population employed, mathematical series expansion, more complex extrapolation based on further research of demographic projections such as age distribution). Further study would be needed to refine accurate employment projections from the present to 2050. For developing this framework, employment is assumed to have a constant proportionate relationship with the state's population. The projected number of jobs is assumed to be roughly 46 percent of the projected population.

In light of the statewide context established by California law, consistency is most important for evaluating GHG emissions from projects. Thus, URBEMIS and the CCAR GRP are the recommended tools for quantification of GHG emissions from most project types in the short term. Over the long term, more sophisticated models that integrate the relationship between GHG emissions and land use, transportation, energy, water, waste, and other resources, and have similar application statewide would have better application to the problem, but may not currently be as accessible or as easily operable. I-PLACE^{3}S and CTG Energetics' Sustainable Communities Model (SCM) are two examples of such models that contain emission factors for GHGs, which could be refined to have applicability statewide and made available to CEQA practitioners. Other models are likely to be developed, given the importance of this issue.

Short-Term and Long-Term Methodologies

The following tools can be used to quantify a project's GHG emissions until tools that are more comprehensive become available statewide:

1. Land development projects: URBEMIS 2007 v. 9.2 and the CCAR GRP v. 2.2 (short-term); further development of I-PLACE^{3}S or CTG's Sustainable Communities Model (long-term).
2. New stationary and area sources/facilities: AP-42 Chapter 4.3, LandGem v. 3.02, and/or CCAR GRP v. 2.2.
3. Road or levee construction projects or other construction-only projects: RoadMod/OFFROAD 2007.

Ideally, I-PLACE^{3}S or CTG's Sustainable Communities Model would be expanded to apply to all regions of the state. These types of models use an integrated approach, which is the best approach for reasonably approximating the emissions that result from interaction between land uses, but neither is available to the public and would create consistency problems in reporting emissions from projects across the state if these were used today. However, a similar model with statewide applicability will likely be developed due to the importance of the issue.Table 10 Summary of Modeling Tools for Estimating GHG Emissions and Project Applicability

Table 10: Summary of Modeling Tools for GHG Emissions

Method/Tool Description	Availability	Applicability	Scope	Ease of Use	Data Input (Requirements and Guidance)	Data Output	Recommendation Comments	Advantages/ Disadvantages
URBEMIS 2007	*Public domain -Download (www.urbemis.com) free of charge*	*Land development and construction projects (construction, mobile- and area-source emissions)*	*Local*	*Fairly Easy*	*Land use information, construction and operational data and assumptions (e.g., jurisdiction, acres of land use type, year of operation, etc.)*	*Mobile-source Construction & Operational CO_2 (lb/day or tons/year)*	*-Recommended for land use development and construction projects -Also recommended for net change in land use (zoning changes)*	*-Does not quantify indirect emissions from energy consumption or other GHGs (except methane from mobile-sources) -Free, available to public, and applicable statewide -Widely used for assessment of other air quality impacts*
California Climate Action Registry General Reporting Protocol v. 2.2	*Public guidance document*	*Indirect emissions from land development projects, stationary- and area-source facilities regulated under AB 32*	*State*	*Easy*	*Energy consumption*	*CO_2e (Metric tons/year)*	*-Recommended for indirect emissions from energy consumption for land use development projects, and for new stationary- or area- sources to be regulated*	*-Contains emission factors for CH_4 and N_2O in addition to CO_2 -Does not contain emission factors broken down by utility provider (statewide average grid only)*
Clean Air and Climate Projection (CACP) Software	*Public agencies (members of ICLEI, NACAA, or similar)*	*Local governments used for emissions inventories*	*Local*	*N/A*	*Energy usage, waste generation/disposal transportation*	*CO_2e (tons/year)*	*-Recommended for inventories of local government entities activities (must be a member of affiliated agency or group)*	*-Not available to public*
CTG Sustainable Communities Model	*Custom model*	*Land development*	*Regional, scalable*	*N/A*	*Land use information, operational (mobile, energy, economic, infrastructure) assumptions*	*CO_2e (tons/year)*	*-An integrated and comprehensive modeling tool, but cannot obtain*	*-Not available to public*

Method/Tool Description	Availability	Applicability	Scope	Ease of Use	Data Input (Requirements and Guidance)	Data Output	Recommendation Comments	Advantages/ Disadvantages
I-PLACE^{3}S	*Access fee through local COG* *Only available for eight California counties*	*Land use change*	*Regional, scalable*	*Fairly Easy*	*Parcel information*	*CO_2 (lb/day or tons/year)*	*-Recommended for land use development projects and land use changes* *-Especially good for general plans*	*-Not freely available to public* *-Not applicable statewide* *-Actually provides insight into land use interaction* *-Can include very specific project attributes* *-Trip rates are from behavioral survey data, instead of ITE*
EMFAC 2007	*Public domain*	*On-road mobile-sources*	*Statewide, regional*	*Fairly Easy*	*Vehicle fleet information*	*CO_2 (grams/mile)*	*-Not recommended for most projects (URBEMIS preferred)* *-Could be used for certain Air District Rulemaking applications*	*-Can compare emissions based on speed-distribution* *-Emission factors contained in URBEMIS* *-Not a stand-alone model*
OFFROAD 2007	*Public domain*	*Off-road mobile sources (construction equipment)*	*Statewide, regional*	*Fairly Easy*	*Construction fleet information*	*CO_2 (lb/day)*	*-Not recommended (URBEMIS preferred)* *-could be used for certain Air District Rulemaking applications (re: construction equipment)*	*-Emission factors contained in URBEMIS*
RoadMod (to be updated to include CO_2)	*Public domain*	*Off-road and on-road mobile sources (construction equipment and material haul trucks)*	*Statewide*	*Easy*	*Construction information*	*CO_2 (lb/day or tons/project)*	*-Recommended for construction-only projects (linear in nature; i.e., levees, roads, pipelines)*	*-To be updated to support emissions factors from OFFROAD 2007*

Method/Tool Description	Availability	Applicability	Scope	Ease of Use	Data Input (Requirements and Guidance)	Data Output	Recommendation Comments	Advantages/ Disadvantages
DTIM	*Public domain*	*On-road mobile-sources*	*Statewide, regional*	*Difficult (consists of a series of three programs and requires input files from traffic and emissions modeling)*	*-EMFAC files* *-Traffic model output files (e.g., link, interzonal, and trip end data)* *-User options file* *-Optional files*	*CO_2 (tons/year)*	*-Not recommended*	*-Not updated to support EMFAC 2007 emission factors* *-Input files include output files from regional transportation models which more accurately reflect VMT*
Southeast Climate Change Partnership Spreadsheet Model (UK)	*Public domain http://www.climatesoutheast.org.uk/*	*UK Local government/ agencies/ organizations used for emissions inventories*	*Local, county, regional*	*Fairly easy*	*Energy usage, waste generation/disposal, transportation*	*CO_2 (tonnes/year)*	*-Not recommended for use in California, but could be a valuable source for building an applicable spreadsheet model*	*-Applicability for UK, but could be updated with CA-specific emission factors*
EPA AP-42; Evaporation Loss Sources Chapter 4.3.5	*Public reference document*	*GHG emissions from waste water treatment facilities*	*Facility level*	*Easy equation; substantial research needed to use*	*Biochemical oxygen demand (BOD) loading, Fraction anaerobically digested*	*CH4 (lb/year)*	*-Recommended for Publicly owned treatment works (POTW) projects*	*-Substantial research needed to determine the "fraction anaerobically digested" parameter, which is dependent on the type of treatment plant/process*
LandGem v. 3.02	*Public domain http://www.epa.gov/ttn/catc/dir1/landgem-v302.xls*	*GHG emissions from anaerobic decomposition associated with landfills*	*Facility Level*	*Moderate*	*Solid waste processing, year of analysis, lifetime of waste in place*	*CO_2, CH_4 (Mega grams/year)*	*-Recommended for landfill emissions*	*-Emission rates change dependent on years of decomposition, waste in place rates of change.* *-Complex decomposition rate equation, but good first approximation*

Method/Tool Description	Availability	Applicability	Scope	Ease of Use	Data Input (Requirements and Guidance)	Data Output	Recommendation Comments	Advantages/ Disadvantages
CARROT	*Registry members*	*Stationary source emissions, vehicle fleet mobile sources*	*Facility level*	*Moderate*	*Facility-specific information*	*All GHGs*	*-Recommended for reporting facilities under AB 32 and for indirect emissions from energy consumption (CCAR Protocol)*	*-Estimates all GHGs and normalizes to CO_2e* *-Not publicly available*

Notes:

GHG = greenhouse gas; AB = assembly bill; CO_2e = carbon dioxide equivalent; CH_4 = methane; N_2O = nitrous oxide; COG = council of governments ; ITE = Institute of Transportation Engineers; CCAR = California Climate Action Registry

Source: Data compiled by EDAW and the California Air Pollution Control Officers Association in 2007

Introduction

This chapter (and Appendix B) identifies existing and potential mitigation measures that could be applied to projects during the CEQA process to reduce a project's GHG emissions that would be identified using the analytical methodologies included in this white paper. The Subcommittee retained the services of EDAW to assist with this effort. EDAW performed a global search of mitigation measures currently in practice and under study that would reduce GHG emissions.

Table 16 (Appendix B) provides a brief description of each measure along with an assessment of their feasibility (from a standpoint of economical, technological, and logistical feasibility, and emission reduction effectiveness), and identifies their potential for secondary impacts to air quality. During the global search performed, EDAW also took note of GHG reduction strategies being implemented as rules and regulation (e.g., early action items under AB 32), which are summarized in Table 18 (Appendix C). It is important to note that though compliance with such would be required by regulation for some sources, such strategies may be applicable to other project and source types.

The recurring theme that echoes throughout a majority of these measures is the shift toward New Urbanism, and research has consistently shown that implementation of Neotraditional Development techniques reduces VMT and associated emissions. The material reviewed assessed reductions from transportation-related measures (e.g., bicycle, pedestrian, transit, and parking) as a single comprehensive approach to land use. This comprehensive approach focuses on development design criteria conducive to enhancing alternate modes of transportation, including transit, walking, and bicycling. Transportation Demand Management (TDM) programs are viewed as a mechanism to implement specific measures. TDM responsibilities may include offering incentives to potential users of alternative modes of transportation and monitoring and reporting mode split changes.

The comprehensive approach makes it more difficult to assess reductions attributable to each measure. Nevertheless, there is a strong interrelationship between many of the measures, which justifies a combined approach. Consider the relationship between bike parking nonresidential, bike parking residential, endtrip facilities, and proximity to bike path/bike lane measures. In reality, these measures combined act as incentives for one individual to bike to work, while implementation of a single measure without the others reduces effectiveness.

The global nature of GHG emissions is an important feature that enables unique mitigation: abatement. When designing a project subject to CEQA, the preferred practice is first to avoid, then to minimize, and finally to compensate for impacts. Where the impact cannot be mitigated on-site, off-site mitigation is often and effectively implemented in several resource areas, either in the form of offsetting the same impact or preserving the resource elsewhere in the region. Frequently, mitigation fee programs or funds are established, where the proponent pays into the program and fees collected

throughout the region or state are used to implement projects that, in turn, proportionately offset the impacts of the projects to the given resource. It may be more cost-effective to reduce as much GHG on-site as feasible (economically and technologically). Then the proponent would pay into a "GHG retrofit fund" to reduce equivalent GHG emissions off-site. In contrast to regional air pollutant offset programs such as the Carl Moyer Program, it matters greatly where reductions of ozone precursors occur, as ozone affects regional air quality. The GHG retrofit fund could be used to provide incentives to upgrade older buildings and make them more energy efficient. This would reduce demand on the energy sector and reduce stationary source emissions associated with utilities. This program has been successfully implemented in the United Kingdom where developments advertise "carbon neutrality." Of course, some GHG emissions occur associated with operation of the development, but the development would offset the remainder of emissions through off-site retrofit. Avoiding emissions that would otherwise continue to occur at existing development would be a unique opportunity for mitigation of GHG emissions. Reduction of GHG emissions also may have important side benefits including reduction of other forms of pollution.

Depending on the significance threshold concept adopted, projects subject to the CEQA process would either qualitatively or quantitatively identify the amount of GHG emissions associated with their project using the analytical methodologies identified in the previous chapter. The analysis would then apply the appropriate number of mitigation measures listed in Appendix B to their project to reduce their GHG emissions below the significance level. Calculating the amount of GHG emission reductions attributable to a given mitigation measure would require additional research. The examples below illustrate how a project would be mitigated using this approach.

Residential Project Example

Project Attributes:

- 68 detached dwelling units
- 15.9 acres
- Located in unincorporated Placer County PCAPCD jurisdiction)
- Assume URBEMIS defaults for a rural project in Placer County, in absence of a traffic study (This is contrary to the recommendations contained under Task 1; a traffic study is necessary to asses project-specific GHG emissions).
- Analysis year 2009

Table 11: Residential Project Example GHG Emissions Estimates with Mitigation

URBEMIS Output (Unmitigated)	Metric Tons/Year CO_2e	URBEMIS Output (Mitigated)	Metric Tons/Year CO_2e	Percent Reduction
Area-source emissions	252	Area-source emissions	215	14.6
Mobile-source emissions	1,047	Mobile-source emissions	916	12.5
Total direct operational emissions (area + mobile)	1,299	Total operational emissions (area + mobile)	1,131	12.9

Notes:
CO_2e = carbon dioxide equivalent

Sources: Data compiled by EDAW in 2007

Using URBEMIS 2007 and assuming the project would implement the mitigation measures listed below, yearly project-generated emissions of CO_2e would be reduced by approximately 13 percent. Implementation of the following mitigation measures is assumed:

- 100 housing units within one-half-mile radius of project's center, including this project's 68 residential units;
- provision of 80 jobs in the study area;
- retail uses present with one-half-mile radius of project's center;
- 10 intersections per square mile;
- 100% of streets with sidewalks on one side;
- 50% of streets with sidewalks on both sides;
- 30% of collectors and arterials with bike lanes, or where suitable, direct parallel routes exist;
- 15% of housing units deed restricted below market rate;
- 20% energy efficiency increase beyond Title 24; and
- 100% of landscape maintenance equipment electrically powered and electrical outlets in front and rear of units.

Example Project Methodology and Mitigation

Table 12 –Residential Projects Example Methodology and Mitigation

Source	Methodology	Mitigation
Direct Emissions		
Construction	URBEMIS (OFFROAD emission factors)	MM C-1→MM C-4
Mobile Sources	URBEMIS (EMFAC emission factors)	MM T-3→MM T-8, MM T-10→ MM T-14, MM T-16, MM T-19→ MM T-21 MM D-2→MM D-8, MM D-10→ MM D-15, MM D-17 MM S-1→MM S-2 MM M-1→MM M-2
Area Sources	URBEMIS	MM D-13→MM D-15, MM D-17 MM E-1→MM E-8, MM E-10, MM E-12→MM E-23 MM S-1→MM S-2 MM M-1→MM M-2
Indirect Emissions		
Energy Consumption	CCAR GRP & CEC	

Table 13 –Commercial Projects Example Methodology and Mitigation

Source	Methodology	Mitigation
Direct Emissions		
Construction	URBEMIS (OFFROAD emission factors)	MM C-1→MM C-4
Mobile Sources	URBEMIS (EMFAC emission factors)	MM T-1→MM T-2, MM T-4→ MM T-15, MM T-17→MM T-21 MM D-1→MM D-3, MM D-5→ MM D-6, MM D-10, MM D-12, MM D-14→MM D-17 MM E-24 MM S-1→MM S-2 MM M-1→MM M-2
Area Sources	URBEMIS	MM D-14→MM D-17 MM E-1, MM E-4→MM E-13, MM E-16→MM E-24 MM S-1→MM S-2 MM M-1→MM M-2
Indirect Emissions		
Energy Consumption	CCAR GRP & CEC	

Table 14 –Specific Plans Example Methodology and Mitigation

Source	Methodology	Mitigation
Direct Emissions		
Construction	URBEMIS (OFFROAD emission factors)	MM C-1→MM C-4
Mobile Sources	Short-term: URBEMIS (EMFAC emission factors). Long-term: I-PLACE^{3}S/CTG SCM	MM T-1→MM T-21 MM D-1→MM D-12, MM D-18→ MM D-19 MM E-24 MM S-1→MM S-2 MM M-1→MM M-2
Area Sources	Short-term: URBEMIS (EMFAC emission factors). Long-term: I-PLACE^{3}S/CTG SCM	MM D-13→MM D-19 MM E-1→MM E-24 MM S-1→MM S-2 MM M-1→MM M-2
Indirect Emissions		
Energy Consumption	Short-term: CCAR GRP & CEC. Long-term: I-PLACE^{3}S/CTG SCM	

General Plans

- Include a general plan policy to reduce emissions within planning area to a level consistent with legislative requirements.
- Implementation strategies include preparation of a GHG reduction plan.
- Projects consistent with a general plan could be responsible for complying with such a policy.

Table 15 –General Plans Example Methodology and Mitigation

Source	Methodology	Mitigation
Direct Emissions		
Construction	URBEMIS (OFFROAD emission factors).	MS G-1 MM G-15
Mobile Sources	Short-term: URBEMIS (EMFAC emission factors). Long-term: I-PLACE^{3}S/CTG SCM	MS G-1 MS G-2→MS C-7, MS G-9, MS G-12, MS-13→MS-14, MS-16→MS-23
Area Sources	Short-term: URBEMIS (EMFAC emission factors). Long-term: I-PLACE^{3}S/CTG SCM	MS G-1 MS G-8→MS C-11, MS G-134, MS G-12, MS-15, MS-17, MS-22
Indirect Emissions		
Energy Consumption	Short-term: CCAR GRP & CEC. Long-term: I-PLACE^{3}S/CTG SCM	

Other Project Types

Air District Rules and Regulations

Air district rules and regulations could have the potential to increase or decrease GHG emissions within the respective jurisdiction. In general, air district rules and regulations act to decrease criteria air pollutant or toxic air contaminant emissions, which would usually act to reduce GHG emissions simultaneously. However, this may not always be the case and air district rules and regulations could address emissions from a large variety of different source types. Reductions of GHG emissions associated with implementation of applicable mitigation, which could also vary greatly, would need to be evaluated on a case-by-case basis. However, once applicable mitigation measures are identified, percent reductions based on the best available research to date, such as those specified in Table 15, could be applied to determine mitigated emissions.

Air Quality Plans

Similarly to air district rules and regulations, air quality plans could have the potential to increase or decrease GHG emissions because of criteria air pollutant reduction strategies. In general, strategies implemented by air districts to reduce criteria air pollutants also act to reduce GHG emissions. However, this may not always be the case. Reductions of GHG emissions associated with implementation of applicable mitigation would need to be evaluated on a case-by-case basis. The methodology identified above for determining whether the strategies contained within the GHG reduction plan would adhere to the level specified in general plan policy could also be used to determine the reductions associated with CAP strategies.

Regional Transportation Plans

Regional transportation plans and reductions of GHG emissions associated with implementation of applicable mitigation would also need to be evaluated on a case-by-case basis to determine if a net increase or decrease in GHG emissions would occur. Complex interactions between the roadway network, operating conditions, alternative transportation availability (such as public transit, bicycle pathways, and pedestrian infrastructure), and many other independent parameters specific to a region should be considered. EMFAC 2007 can be used with VMT from the RTP to create an inventory of GHG emissions. Reductions associated with implementation of applicable measures contained in Table 16 could be accomplished by accounting for VMT reductions in the traffic model.

Many states, counties, and cities have developed policies and regulations concerning greenhouse gas emissions that seek to require or promote reductions in GHG emissions through standards for vehicle emissions, fuels, electricity production/renewables, building efficiency, and other means. However, we could only identify three public agencies in the United States that are considering formally requiring the analysis of greenhouse gas emissions and climate change for development projects during their associated environmental processes. There may be others, but they were not identified during research conducted during preparation of this paper.

The following is a summary of those three efforts.

Commonwealth of Massachusetts - MEPA Greenhouse Gas Emissions Policy and Protocol

The Massachusetts Executive Office of Energy and Environmental Affairs (EEA) has determined that the phrase "damage to the environment" as used in the Massachusetts Environmental Policy Act (MEPA) includes the emission of greenhouse gases caused by projects subjects to MEPA Review. EEA has published a Greenhouse Gas Emissions Policy (GGEP) to fulfill the statutory obligation to take all feasible measurers to avoid, minimize or mitigate damage to the environment.

The GGEP concerns the following projects only:

- The Commonwealth or a state agency is the proponent;
- The Commonwealth or a state agency is providing financial assistance;
- The project is privately funded, but requires an Air Quality Permit from the department of Environmental Protection;
- The project is privately funded, but will generate:
    - 3,000 or more new vehicle trips per day for office projects;
    - 6,000 or more new vehicle trips per day for mixed use projects that are 25% or more office space; or
    - 10,000 or more new vehicle trips per day for other projects.

As a comparison, the trip generation amounts correspond as follows:

- 3,000 vehicle trips per day = approximately 250,000 square foot office development;
- 6,000 or more new vehicle trips per day for mixed use projects that are 25% or more office space = if 25% office space, then equivalent to approximately 130,000 square feet of office and either 100,000 square feet of retail or 450 single-family residential units or some combination thereof.
- 10,000 or more new vehicle trips per day = approximately 1,000 single family residential units or 250,000 square feet retail.

The draft policy states it is not intended to create a numerical GHG emission limit or a numerical GHG emissions reduction target, but rather to ensure that project proponents and reviewers have considered the GHG emissions impacts of their projects and taken all feasible means and measure to reduce those impacts.

The draft policy notes that some projects within these categories will have little or no greenhouse gas emission and the policy will not apply to such projects. EEA intends to identify in the scoping certificate whether a project falls within this *de minimis* exception.

The GGEP requires qualifying projects to do the following:

- to quantify their GHG emissions;
- identify measures to minimize or mitigate such emissions;
- quantify the reduction in emissions and energy savings from mitigation.

Emissions inventories are intended to focus on carbon dioxide, but analysis of other GHGs may be required for certain projects. EEA will require analysis of direct GGH emissions and indirect (electricity and transportation) emissions. The GGEP references the protocols prepared by the World Resource Institute as guidance for inventory preparation.

The policy is still in draft form, but the comment period closed on August 10, 2007.

King County, Washington - Executive Order on the Evaluation of Climate Change Impacts through the State Environmental Policy Act (SEPA)

On June 27, 2007, the King County Executive Ron Sims directed all King County Departments, as follows:

> *"…effective September 1, 2007 to require that climate impacts, including, but not limited to those pertaining to greenhouse gases, be appropriately identified and evaluated when such Departments are acting as the lead agency in reviewing the environmental impacts of private or public proposals pursuant to the State Environmental Policy Act".*

The Executive Order does not define what a "climate impact" is. Based on statements of the County Deputy Chief of Staff[*]

- County agencies will ask project proponents to supply information on transportation, energy usage and other impacts of proposed projects using the County's existing SEPA checklist.

[*] Marten Law Group: Environmental News, August 1, 2007, "King County (WA) First in Nation to Require Climate Change Impacts to be Considered During Environmental Review of New Projects".

- There is no current plan to require project proponents to take action to mitigate the impacts identifies.
- Development of emissions thresholds and mitigation requirements will be undertaken in connection with the County's upcoming 2008 update of its Comprehensive Plan.

Sacramento Metropolitan Air Quality Management District

The Sacramento Metropolitan Air Quality Management District released an interim guidance on addressing climate change in CEQA documents on September 6, 2007. While very general in nature, the District recommends that CEQA environmental documents include a discussion of anticipated GHG emissions during both the construction and operation phases of the project. This includes assessing the GHG emissions from projects (using readily available models) to determine whether a project may have a significant impact. If so, then the District recommends addressing all of the District's GHG mitigation measures (drawn from comments made by the California Attorney General) – with explanations on how the mitigation will be implemented or providing rationale for why a measure would be considered infeasible. The District provides assistance to agencies in their analysis of GHG emissions and the applicability of specific mitigation measures. The District's guidance can be found at: http://64.143.64.21/climatechange/ClimateChangeCEQAguidance.pdf

Mendocino Air Quality Management District – CEQA Guidelines

The Mendocino AQMD updated its "Guidelines for Use During Preparation of Air Quality Impacts in EIRs or Mitigated Negative Declarations" in May 2007. The guidelines call for preparing estimates of the increased emissions of air contaminations (including GHG) for projects.

The guidelines state that GHG emissions should be presumed to have a significant impact if CO emissions from District-approved modeling exceed either of the following:

- 80% of the level defined as significant for stationary sources in Regulation1, Rule 130 (s2) of the District (which is 550 lbs/day for CO, meaning a threshold of 440 lbs/day for CO for stationary sources); or
- levels established in District Regulation 1 Rule 130 (i2) for indirect sources (which is 690 lbs/day for CO for indirect sources).

If an average passenger vehicle emits 22 grams of CO/mile and 0.8 lb/mile of CO_2, then the 690-lb/day threshold for CO corresponds to approximately 11,400 lb/day CO_2 threshold for passenger vehicle-related emissions. If one assumes that the average passenger vehicle goes 12,500 miles/year (about 35 miles/day), then this is a threshold equivalent to about 420 vehicles. Using an average in California of about 1.77 vehicles/household, this would correspond to about 250 households/dwelling units.

Appendix A

Relevant Citations

Citations from the Public Resources Code (Division 13, §21000 et seq.) as amended through January 1, 2005.

Public Resources Code – Section 21004, MITIGATING OR AVOIDING A SIGNIFICANT EFFECT; POWERS OF PUBLIC AGENCY:

"In mitigating or avoiding a significant effect of a project on the environment, a public agency may exercise only those express or implied powers provided by law other than this division. However, a public agency may use discretionary powers provided by such other law for the purpose of mitigating or avoiding a significant effect on the environment subject to the express or implied constraints or limitations that may be provided by law."

Public Resources Code – Section 21082.2, SIGNIFICANT EFFECT ON ENVIRONMENT; DETERMINATION; ENVIRONMENTAL IMPACT REPORT PREPARATION:

(a) The lead agency shall determine whether a project may have a significant effect on the environment based on substantial evidence in light of the whole record.

(b) The existence of public controversy over the environmental effects of a project shall not require preparation of an environmental impact report if there is no substantial evidence in light of the whole record before the lead agency that the project may have a significant effect on the environment.

(c) Argument, speculation, unsubstantiated opinion or narrative, evidence which is clearly inaccurate or erroneous, or evidence of social or economic impacts which do not contribute to, or are not caused by, physical impacts on the environment, is not substantial evidence. Substantial evidence shall include facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts.

(d) If there is substantial evidence, in light of the whole record before the lead agency, that a project may have a significant effect on the environment, an environmental impact report shall be prepared.

(e) Statements in an environmental impact report and comments with respect to an environmental impact report shall not be deemed determinative of whether the project may have a significant effect on the environment.

Citations from the Guidelines for California Environmental Quality Act, CCR, Title 14, Division 6 (§15000 et seq.) as amended through July 27, 2007.

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State CEQA Guidelines – Section 15064, DETERMINING THE SIGNIFICANCE OF THE ENVIRONMENTAL EFFECTS CAUSED BY A PROJECT:

(a) Determining whether a project may have a significant effect plays a critical role in the CEQA process.

(1) If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, the agency shall prepare a draft EIR.

(2) When a final EIR identifies one or more significant effects, the Lead Agency and each Responsible Agency shall make a finding under Section 15091 for each significant effect and may need to make a statement of overriding considerations under Section 15093 for the project.

(b) The determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data. An ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting. For example, an activity which may not be significant in an urban area may be significant in a rural area.

(c) In determining whether an effect will be adverse or beneficial, the Lead Agency shall consider the views held by members of the public in all areas affected as expressed in the whole record before the lead agency. Before requiring the preparation of an EIR, the Lead Agency must still determine whether environmental change itself might be substantial.

(d) In evaluating the significance of the environmental effect of a project, the Lead Agency shall consider direct physical changes in the environment which may be caused by the project and reasonably foreseeable indirect physical changes in the environment which may be caused by the project.

(1) A direct physical change in the environment is a physical change in the environment which is caused by and immediately related to the project. Examples of direct physical changes in the environment are the dust, noise, and traffic of heavy equipment that would result from construction of a sewage treatment plant and possible odors from operation of the plant.

(2) An indirect physical change in the environment is a physical change in the environment which is not immediately related to the project, but which is caused indirectly by the project. If a direct physical change in the environment in turn causes another change in the environment, then the other change is an indirect physical change in the environment. For example, the construction of a new sewage treatment plant may facilitate population growth in the service area due to the increase in sewage treatment capacity and may lead to an increase in air pollution.

(3) An indirect physical change is to be considered only if that change is a reasonably foreseeable impact which may be caused by the project. A change which is speculative or unlikely to occur is not reasonably foreseeable.

(e) Economic and social changes resulting from a project shall not be treated as significant effects on the environment. Economic or social changes may be used, however, to determine that a physical change shall be regarded as a significant effect on the environment. Where a physical change is caused by economic or social effects of a

project, the physical change may be regarded as a significant effect in the same manner as any other physical change resulting from the project. Alternatively, economic and social effects of a physical change may be used to determine that the physical change is a significant effect on the environment. If the physical change causes adverse economic or social effects on people, those adverse effects may be used as a factor in determining whether the physical change is significant. For example, if a project would cause overcrowding of a public facility and the overcrowding causes an adverse effect on people, the overcrowding would be regarded as a significant effect.
(f) The decision as to whether a project may have one or more significant effects shall be based on substantial evidence in the record of the lead agency.
(1) If the lead agency determines there is substantial evidence in the record that the project may have a significant effect on the environment, the lead agency shall prepare an EIR (Friends of B Street v. City of Hayward (1980) 106 Cal.App.3d 988). Said another way, if a lead agency is presented with a fair argument that a project may have a significant effect on the environment, the lead agency shall prepare an EIR even though it may also be presented with other substantial evidence that the project will not have a significant effect (No Oil, Inc. v. City of Los Angeles (1974) 13 Cal.3d 68).
(2) If the lead agency determines there is substantial evidence in the record that the project may have a significant effect on the environment but the lead agency determines that revisions in the project plans or proposals made by, or agreed to by, the applicant would avoid the effects or mitigate the effects to a point where clearly no significant effect on the environment would occur and there is no substantial evidence in light of the whole record before the public agency that the project, as revised, may have a significant effect on the environment then a mitigated negative declaration shall be prepared.
(3) If the lead agency determines there is no substantial evidence that the project may have a significant effect on the environment, the lead agency shall prepare a negative declaration (Friends of B Street v. City of Hayward (1980) 106 Cal.App. 3d 988).
(4) The existence of public controversy over the environmental effects of a project will not require preparation of an EIR if there is no substantial evidence before the agency that the project may have a significant effect on the environment.
(5) Argument, speculation, unsubstantiated opinion or narrative, or evidence that is clearly inaccurate or erroneous, or evidence that is not credible, shall not constitute substantial evidence. Substantial evidence shall include facts, reasonable assumptions predicated upon facts, and expert opinion support by facts.
(6) Evidence of economic and social impacts that do not contribute to or are not caused by physical changes in the environment is not substantial evidence that the project may have a significant effect on the environment.
(7) The provisions of sections 15162, 15163, and 15164 apply when the project being analyzed is a change to, or further approval for, a project for which an EIR or negative declaration was previously certified or adopted (e.g. a tentative subdivision, conditional use permit). Under case law, the fair argument standard does not apply to determinations of significance pursuant to sections 15162, 15163, and 15164.
(g) After application of the principles set forth above in Section 15064(f)(g), and in marginal cases where it is not clear whether there is substantial evidence that a project may have a significant effect on the environment, the lead agency shall be guided by the following principle: If there is disagreement among expert opinion supported by facts

over the significance of an effect on the environment, the Lead Agency shall treat the effect as significant and shall prepare an EIR.
(h)(1) When assessing whether a cumulative effect requires an EIR, the lead agency shall consider whether the cumulative impact is significant and whether the effects of the project are cumulatively considerable. An EIR must be prepared if the cumulative impact may be significant and the project's incremental effect, though individually limited, is cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.
(2) A lead agency may determine in an initial study that a project's contribution to a significant cumulative impact will be rendered less than cumulatively considerable and thus is not significant. When a project might contribute to a significant cumulative impact, but the contribution will be rendered less than cumulatively considerable through mitigation measures set forth in a mitigated negative declaration, the initial study shall briefly indicate and explain how the contribution has been rendered less than cumulatively considerable.
(3) A lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program which provides specific requirements that will avoid or substantially lessen the cumulative problem (e.g., water quality control plan, air quality plan, integrated waste management plan) within the geographic area in which the project is located. Such plans or programs must be specified in law or adopted by the public agency with jurisdiction over the affected resources through a public review process to implement, interpret, or make specific the law enforced or administered by the public agency. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding that the project complies with the specified plan or mitigation program addressing the cumulative problem, an EIR must be prepared for the project.
(4) The mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable.

State CEQA Guidelines – Section 15130, DISCUSSION OF CUMULATIVE IMPACTS:
(a)(3). "An EIR may determine that a project's contribution to a significant cumulative impact will be rendered less than cumulatively considerable and thus is not significant. A project's contribution is less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact. The lead agency shall identify facts and analysis supporting its conclusion that the contribution will be rendered less than cumulatively considerable.

State CEQA Guidelines – Section 15064.7, THRESHOLDS OF SIGNIFICANCE:
"Each public agency is encouraged to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects. A threshold of significance is an identifiable quantitative, qualitative or performance level

of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant."

Appendix B

Mitigation Measure Summary

Table 16
Mitigation Measure Summary

Mitigation Measure	Applicable Project/Source Type[1]	Effective	Feasible (Yes/No)			Secondary Effects (Yes/No)	Agency/Organization/Other[6]	Description/Comments
		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
Transportation								
Bicycle/Pedestrian/Transit Measures								
MM T-1: Bike Parking	LD (C, M), I, SP, TP, AQP, RR, P/Mobile	1%-5%/High: CCAP presents combined % reductions for a range of mitigation measures (Dierkers et al. 2007). SMAQMD allocates combined reductions among individual measures (e.g., 2.5% reduction for all bicycle-related measures and one-quarter of 2.5% for each individual measure) (TIAX 2005, EDAW 2006, SMAQMD 2007). VTPI presents % reductions for showers and combined measures in the TDM encyclopedia (VTPI	Yes: Lockers ($1,200-$2,950, $700/bike on average), Racks ($70-$2,000, $70/bike on average).	Yes (Caltrans 2005, Dierkers et al. 2007, VTPI 2007)	Yes (Caltrans 2005, Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs	Caltrans, Portland Bicycle Master Plan (City of Portland 1998), CCAP Transportation Emissions Guidebook (Dierkers et al. 2007), SMAQMD Recommended Guidance for Land Use Emission Reductions (SMAQMD 2007), VTPI, CA air quality management and control districts, and cities/counties.	Nonresidential projects provide plentiful short- and long-term bicycle parking facilities to meet peak season maximum demand (e.g., one bike rack space per 20 vehicle/employee parking spaces.
MM T-2: End of Trip Facilities	LD (C, M), I, SP, TP, AQP, RR, P/Mobile		Yes	Yes (Caltrans 2005, Dierkers et al. 2007, VTPI 2007)	Yes (Caltrans 2005, Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs		Nonresidential projects provide "end-of-trip" facilities including showers, lockers, and changing space (e.g., four clothes lockers and one shower provided for every 80 employee parking spaces, separate facilities for each gender for projects with 160 or more employee parking spaces).
MM T-3: Bike-Parking at Multi-	LD (R, M), SP, AQP, RR,		Yes: Lockers ($1,200-	Yes (Caltrans 2005,	Yes (Caltrans	Adverse: No Beneficial:		Long-term bicycle parking is provided at apartment

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
Unit Residential	P/Mobile	2007). JSA bases estimates on CCAP information (JSA 2004).	$2,950, $700/bike on average), Racks ($70-$2,000, $70/bike on average).	Dierkers et al. 2007, VTPI 2007)	2005, Dierkers et al. 2007, VTPI 2007)	CAPs, TACs		complexes or condominiums without garages (e.g., one long-term bicycle parking space for each unit without a garage). Long-term facilities shall consist of one of the following: a bicycle locker, a locked room with standard racks and access limited to bicyclists only, or a standard rack in a location that is staffed and/or monitored by video surveillance 24 hours per day.
[M T-4: roximity to Bike Path/Bike Lanes	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile		Yes	Yes (Caltrans 2005, Dierkers et al. 2007, VTPI 2007)	Yes (Caltrans 2005, Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs		Entire project is located within one-half mile of an existing/planned Class I or Class II bike lane and project design includes a comparable network that connects the project uses to the existing offsite facility. Project design includes a designated bicycle route connecting all units, on-site bicycle parking facilities, offsite bicycle facilities, site entrances, and primary building entrances to existing Class I or Class II bike lane(s) within one-half mile. Bicycle route connects to all streets contiguous with project site. Bicycle route has minimum conflicts with automobile parking and circulation

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
								facilities. All streets internal to the project wider than 75 feet have Class II bicycle lanes on both sides.

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
MM T-5: Pedestrian Network	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	1%-10%/High: CCAP presents combined % reductions for a range of mitigation measures (Dierkers et al. 2007). SMAQMD allocates 1% for each individual measure (TIAX 2005, EDAW 2006, SMAQMD 2007).	Yes	Yes (Dierkers et al. 2007, VTPI 2007)	Yes (Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs	CCAP Transportation Emissions Guidebook (Dierkers et al. 2007), SMAQMD Recommended Guidance for Land Use Emission Reductions (SMAQMD 2007), VTPI, CA air quality management and control districts, and cities/counties.	The project provides a pedestrian access network that internally links all uses and connects to all existing/planned external streets and pedestrian facilities contiguous with the project site. Project design includes a designated pedestrian route interconnecting all internal uses, site entrances, primary building entrances, public facilities, and adjacent uses to existing external pedestrian facilities and streets. Route has minimal conflict with parking and automobile circulation facilities. Streets (with the exception of alleys) within the project have sidewalks on both sides. All sidewalks internal and adjacent to project site are minimum of five feet wide. All sidewalks feature vertical curbs. Pedestrian facilities and improvements such as grade separation, wider sidewalks, and traffic calming are implemented wherever feasible to minimize pedestrian barriers. All site entrances provide pedestrian access.
MM T-6: Pedestrian	LD (R, C, M), I, SP, TP,		Yes	Yes (Dierkers et al. 2007,	Yes (Dierkers et	Adverse: No Beneficial:		Site design and building placement minimize barriers to

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
Barriers Minimized	AQP, RR, P/Mobile			VTPI 2007)	al. 2007, VTPI 2007)	CAPs, TACs		pedestrian access and interconnectivity. Physical barriers such as walls, berms, landscaping, and slopes between residential and nonresidential uses that impede bicycle or pedestrian circulation are eliminated.
MM T-7: Bus Shelter for Existing/Planned Transit Service	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	1%-2%/High: CCAP presents these % reductions (Dierkers et al., 2007). SMAQMD assigns from .25%-1%, depending on headway frequency (TIAX 2005, EDAW 2006, SMAQMD 2007).	Yes: $15,000-$70,000.	Yes (Dierkers et al. 2007, VTPI 2007)	Yes (Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs	CCAP Transportation Emissions Guidebook (Dierkers et al. 2007), SMAQMD Recommended Guidance for Land Use Emission Reductions (SMAQMD 2007), VTPI, City of Calgary (City of Calgary 2004), CA air quality management and control districts, and cities/counties.	Bus or streetcar service provides headways of one hour or less for stops within one-quarter mile; project provides safe and convenient bicycle/pedestrian access to transit stop(s) and provides essential transit stop improvements (i.e., shelters, route information, benches, and lighting).

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
MM T-8: Traffic Calming	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	1%-10%/High: CCAP presents combined % reductions for a range of mitigation measures (Dierkers et al. 2007). SMAQMD allocates .25%-1.0% for each individual measure depending on percent of intersections and streets with improvements (TIAX 2005, EDAW 2006, SMAQMD 2007).	Yes	Yes (Dierkers et al. 2007, VTPI 2007)	Yes (Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs	CCAP Transportation Emissions Guidebook (Dierkers et al. 2007), SMAQMD Recommended Guidance for Land Use Emission Reductions (SMAQMD 2007), VTPI, CA air quality management and control districts, and cities/counties.	Project design includes pedestrian/bicycle safety and traffic calming measures in excess of jurisdiction requirements. Roadways are designed to reduce motor vehicle speeds and encourage pedestrian and bicycle trips by featuring traffic calming features. All sidewalks internal and adjacent to project site are minimum of five feet wide. All sidewalks feature vertical curbs. Roadways that converge internally within the project are routed in such a way as to avoid "skewed intersections;" which are intersections that meet at acute, rather than right, angles. Intersections internal and adjacent to the project feature one or more of the following pedestrian safety/traffic calming design techniques: marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, raised intersections, median islands, tight corner radii, and roundabouts or mini-circles. Streets internal and adjacent to the project feature pedestrian safety/traffic calming measures such as on-street parking, planter strips with street trees,

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
								and chicanes/chokers (variations in road width to discourage high-speed travel).
Parking Measures								
MM T-9: Paid Parking (Parking Cash Out)	LD (C, M), I, SP, TP, AQP, RR, P/Mobile	1%-30%/High: CCAP presents a range of 15%-30% reduction for parking programs (Dierkers et al. 2007). SMAQMD presents a range of 1.0%-7.2%, depending on cost/day and distance to transit (TIAX 2005, EDAW 2006, SMAQMD 2007). Shoupe presents a 21% reduction [$5/day for commuters to downtown LA, with elasticity of -0.18 (e.g., if price increases 10%, then solo driving goes down by 1.8% more)] (Shoupe 2005). Urban Transit Institute	Yes: Vary by location and project size.	Yes (Dierkers et al. 2007, VTPI 2007)	Yes (Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs	CCAP Transportation Emissions Guidebook (Dierkers et al. 2007), SMAQMD Recommended Guidance for Land Use Emission Reductions (SMAQMD 2007), VTPI, CA air quality management and control districts, and cities/counties.	Project provides employee and/or customer paid parking system. Project must have a permanent and enforceable method of maintaining user fees for all parking facilities. The facility may not provide customer or employee validations. Daily charge for parking must be equal to or greater than the cost of a transit day/monthly pass plus 20%.

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
		presents a range of 1%-10% reduction in trips to central city sites, and 2%-4% in suburban sites (VTPI 2007).						
MM T-10: Minimum Parking	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	1%-30%/High: CCAP presents a range of 15%-30% reduction for parking programs (Dierkers et al. 2007). SMAQMD presents a maximum of 6% (Nelson/Nygaard Consulting Associates, 2005, TIAX 2005, EDAW 2006).	Yes	Yes (Dierkers et al. 2007, VTPI 2007)	Yes (Dierkers et al. 2007, VTPI 2007), Note that in certain areas of the state, the minimum parking required by code is greater than the peak period parking demand for most land uses. Simply meeting minimum code requirements in these areas would not result in an emissions reduction.	Adverse: No Beneficial: CAPs, TACs	CCAP Transportation Emissions Guidebook (Dierkers et al. 2007), SMAQMD Recommended Guidance for Land Use Emission Reductions (SMAQMD 2007), VTPI, Governor's Office of Smart Growth (Annapolis, Maryland) (Zimbler), CA air quality management and control districts, and cities/counties.	Provide minimum amount of parking required. Once land uses are determined, the trip reduction factor associated with this measure can be determined by utilizing the ITE parking generation publication. The reduction in trips can be computed as shown below by the ratio of the difference of minimum parking required by code and ITE peak parking demand to ITE peak parking demand for the land uses multiplied by 50%. Percent Trip Reduction = 50 * [(min parking required by code – ITE peak parking demand)/ (ITE peak parking demand)]

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
MM T-11: Parking Reduction Beyond Code/Shared Parking	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	1%-30%/High: CCAP presents a range of 15%-30% reduction for parking programs (Dierkers et al. 2007). SMAQMD presents a maximum of 12% (Nelson/Nygaard, 2005, TIAX 2005, EDAW 2006).	Yes	Yes (Dierkers et al. 2007, VTPI 2007)	Yes (Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs		Provide parking reduction less than code. This measure can be readily implemented through a shared parking strategy, wherein parking is utilized jointly among different land uses, buildings, and facilities in an area that experience peak parking needs at different times of day and day of the week.
MM T-12: Pedestrian athway hrough Parking	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	1%-4%/Moderate: CCAP presents combined % reductions for a range of mitigation measures (Dierkers et al. 2007). SMAQMD allocates 0.5% reduction for this measure (TIAX 2005, EDAW 2006, SMAQMD 2007).	Yes	Yes (Dierkers et al. 2007, VTPI 2007)	Yes (Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs		Provide a parking lot design that includes clearly marked and shaded pedestrian pathways between transit facilities and building entrances.

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
MM T-13: Off - Street Parking	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	1%-4%/Moderate: CCAP presents combined % reductions for a range of mitigation measures (Dierkers et al. 2007). SMAQMD allocates a range of 0.1%-1.5% for this measure (TIAX 2005, EDAW 2006, SMAQMD 2007).	Yes	Yes (Dierkers et al. 2007, VTPI 2007)	Yes (Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs		Parking facilities are not adjacent to street frontage.
[M T-14: arking Area ree Cover	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	Annual net CO_2 reduction of 3.1 kg/m^2 canopy cover/Moderate (McPherson 2001).	Yes: $19 per new tree for CA, cost varies for maintenance, removal and replacement (McPherson 2001).	Yes	Yes	Adverse: VOCs Beneficial: CAPs, TACs	AG, State of CA Department of Justice (Goldberg 2007) and cities/counties (e.g., parking lot ordinances in Sacramento, Davis, and Los Angeles, CA).	Provide parking lot areas with 50% tree cover within 10 years of construction, in particular low emitting, low maintenance, native drought resistant trees. Reduces urban heat island effect and requirement for air conditioning, effective when combined with other measures (e.g., electrical maintenance equipment and reflective paving material).
MM T-15: Valet Bicycle Parking	LD (C, M), SP, AQP, TP, RR, P/Mobile	NA/Low	Yes	Yes	Yes: Raley Field (Sacramento, CA)	Adverse: No Beneficial: CAPs, TACs	Raley Field (Sacramento, CA).	Provide spaces for the operation of valet bicycle parking at community event "centers" such as amphitheaters, theaters, and stadiums.
MM T-16: Garage Bicycle Storage	LD (R, M), SP, AQP, TP, RR, P/Mobile	NA/Low	Yes: Less than $200/multiple bike rack.	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	City of Fairview, OR	Provide storage space in one-car garages for bicycles and bicycle trailers.

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
MM T-17: Preferential Parking for EVs/CNG Vehicles	LD (C, M), I, SP, TP, AQP, RR, P/Mobile	NA/Low	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	USGBC, CA air quality management and control districts and cities/counties (e.g., BAAQMD).	Provide preferential parking space locations for EVs/CNG vehicles.
MM T-18: Reduced/No Parking Fee for EVs/CNG Vehicles	LD (C, M), I, SP, TP, AQP, RR, P/Mobile	NA/Low	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	Hotels (e.g., Argonaut in San Francisco, CA)	Provide a reduced/no parking fee for EVs/CNG vehicles.

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
Miscellaneous Measure								
MM T-19: TMA Membership	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	1%-28%/High: CCAP presents a range of 3%-25% for TDMs with complementary transit and land use measures (Dierkers et al. 2007). VTPI presents a range of 6%-7% in the TDM encyclopedia (VTPI 2007). URBEMIS offers a 2%-10% range in reductions for a TDM that has 5 elements that are pedestrian and transit friendly and 1%-5% for 3 elements. SMAQMD presents a reduction of 5% (TIAX 2005, EDAW 2006, SMAQMD 2007).	Yes	Yes (Dierkers et al. 2007, VTPI 2007)	Yes (Dierkers et al. 2007, VTPI 2007)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Include permanent TMA membership and funding requirement. Funding to be provided by Community Facilities District or County Service Area or other nonrevocable funding mechanism. TDMs have been shown to reduce employee vehicle trips up to 28% with the largest reductions achieved through parking pricing and transit passes. The impact depends on the travel alternatives.
MM T-20: ULEV	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	NA/Low	Yes: Higher than corresponding gasoline models.	Yes	Yes: Fueling stations might not be readily available depending on location. More than 900 E85 fueling	Adverse: No Beneficial: CAPs, TACs	DGS, CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Use of and/or provide ULEV that are 50% cleaner than average new model cars (e.g., natural gas, ethanol, electric).

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
					stations in the U.S., 5 in CA. Vehicles available in select regions only			
MM T-21: Flex Fuel Vehicles	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	5466.97 lb GHG/year/Low (DOE Fuel Economy)	Yes: E85 costs less than gasoline per gallon, but results in lower fuel economy.	Yes	Yes: More than 900 E85 fueling stations in the U.S., 5 in CA. Vehicles available in select regions only	Adverse: Yes Issues with the energy intensive ethanol production process (e.g., wastewater treatment requirements). Beneficial: CAPs, TACs	DGS, CA air quality management and control districts and cities/counties (e.g., SJVAPCD).	Use of and/or provide vehicles that utilize gasoline/ethanol blends (e.g., E85).
Design								
Commercial & Residential Building Design Measures								
MM D-1: Office/Mixed Use Density	LD (C, M), SP, TP, AQP, RR, P/Mobile	0.05%-2%/Moderate: This range is from SMAQMD, depending	Yes	Yes (VTPI 2007)	Yes (VTPI 2007)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties	Project provides high density office or mixed-use proximate to transit. Project must provide

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
		on FAR and headway frequencies (Nelson/Nygaard Consulting Associates 2005, EDAW 2006, SMAQMD 2007).					(e.g., SMAQMD).	safe and convenient pedestrian and bicycle access to all transit stops within one-quarter mile.
MM D-2: Orientation to Existing/Planned Transit, Bikeway, or Pedestrian Corridor	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	0.4%-1%/Moderate: CCAP attributes a 0.5% reduction per 1% improvement in transit frequency (Dierkers et al. 2007). SMAQMD presents a range of 0.25%-5% (JSA 2005, EDAW 2006, SMAQMD 2007).	Yes	Yes (Dierkers et al. 2007)	Yes (Dierkers et al. 2007)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project is oriented towards existing transit, bicycle, or pedestrian corridor. Setback distance between project and existing or planned adjacent uses is minimized or nonexistent. Setback distance between different buildings on project site is minimized. Setbacks between project buildings and planned or existing sidewalks are minimized. Buildings are oriented towards existing or planned street frontage. Primary entrances to buildings are located along planned or existing public street frontage. Project provides bicycle access to any planned bicycle corridor(s). Project provides pedestrian access to any planned pedestrian corridor(s).
MM D-3: Services Operational	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	0.5%-5%/Moderate	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project provides on-site shops and services for employees.

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
MM D-4: Residential Density (Employ Sufficient Density for New Residential Development to Support the Use of Public Transit)	LD (R, M), SP, TP, AQP, RR, P/Mobile	1%-40%/High: #7, EPA presents a range of 32%-40% (EPA 2006). SMAQMD presents a range of 1%-12% depending on density and headway frequencies (Nelson/Nygaard Consulting Associates 2005, JSA 2005, EDAW 2006, SMAQMD 2007). Nelson/Nygaard presents a trip reduction formula: Trip Reduction = 0.6*(1-(19749*((4.814+ households per residential acre)/(4.814+7.14))^-06.39)/25914).	Yes	Yes (VTPI 2007, Holtzclaw 2007)	Yes (VTPI 2007, Holtzclaw 2007)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project provides high-density residential development. Transit facilities must be within one-quarter mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within one-quarter mile of project border.
MM D-5: Street Grid	LD (R, C, M), I, SP, TP, AQP, RR,	1%/Moderate: SMAQMD presents this % reduction (JSA	Yes	Yes (Dierkers et al. 2007, VTPI 2007)	Yes (Dierkers et al. 2007,	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties	Multiple and direct street routing (grid style). This measure only applies to projects

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
	P/Mobile	2005, EDAW 2006, SMAQMD 2007).			VTPI 2007)		(e.g., SMAQMD).	with an internal CF >/= 0.80, and average of one-quarter mile or less between external connections along perimeter of project. [CF= # of intersections / (# of cul-de-sacs + intersections)]. Cul-de-sacs with bicycle/pedestrian through access may be considered "complete intersections" when calculating the project's internal connectivity factor. External connections are bike/pedestrian pathways and access points, or streets with safe and convenient bicycle and pedestrian access that connect the project to adjacent streets, sidewalks, and uses. If project site is adjacent to undeveloped land; streets, pathways, access points, and right-of-ways that provide for future access to adjacent uses may count for up to 50% of the external connections. Block perimeter (the sum of the measurement of the length of all block sides) is limited to no more than 1,350 feet. Streets internal to the project should connect to streets external to the project whenever possible.

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MM D-6: NEV Access	LD (R, C, M), SP, TP, AQP, RR, P/Mobile	0.5%-1.5%/Low: SMAQMD presents this % reduction (EDAW 2006, SMAQMD 2007).	Yes	Yes (Litman 1999, Sperling 1994)	Yes (Litman 1999, Sperling 1994)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Make physical development consistent with requirements for neighborhood electric vehicles. Current studies show that for most trips, NEVs do not replace gas-fueled vehicles as the primary vehicle.
MM D-7: Affordable Housing Component	LD (R, M), SP, TP, AQP, RR, P/Mobile	0.4%-6%/Moderate: SMAQMD presents this % reduction (Nelson/Nygaard Consulting Associates 2005, EDAW 2006, SMAQMD 2007).	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Residential development projects of five or more dwelling units provide a deed-restricted low-income housing component on-site (or as defined in the code). Developers who pay into In-Lieu Fee Programs are not considered eligible to receive credit for this measure. The award of emission reduction credit shall be based only on the proportion of affordable housing developed on-site because in-lieu programs simply induce a net increase in development. Percentage reduction shall be calculated according to the following formula:

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		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
								% reduction = % units deed-restricted below market rate housing * 0.04
MM D-8: Recharging Area	LD (R, M), SP, TP, AQP, RR, P/Mobile	NA/Low	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs		Provide residential buildings with a "utility" room or space for recharging batteries, whether for use in a car, electric lawnmower, other electric landscaping equipment, or even batteries for small items such as flashlights.
Mixed-Use Development Measures								
MM D-9: Urban Mixed-Use	LD (M), SP, TP, AQP, RR, P/Mobile	3%-9%/Moderate: SMAQMD presents this % reduction (TIAX 2005, EDAW 2006, SMAQMD 2007).	Yes	Yes (EPA 2006)	Yes (EPA 2006)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Development of projects predominantly characterized by properties on which various uses, such as office, commercial, institutional, and residential, are combined in a single building or on a single site in an integrated development project with functional interrelationships and a coherent physical design.
MM D-10: Suburban Mixed-Use	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	3%/Moderate: SMAQMD presents this % reduction (TIAX 2005, EDAW 2006, SMAQMD 2007).	Yes	Yes (EPA 2006)	Yes (EPA 2006)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Have at least three of the following on site and/or offsite within one-quarter mile: Residential Development, Retail Development, Park, Open Space, or Office.
MM D-11: Other Mixed-Use	LD (R, M), SP, TP, AQP, RR, P/Mobile	1%/Moderate: SMAQMD presents this % reduction (TIAX 2005, EDAW	Yes	Yes (EPA 2006)	Yes (EPA 2006)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	All residential units are within one-quarter mile of parks, schools or other civic uses.

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		2006, SMAQMD 2007).						
MM D-12: Infill Development	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	3%-30%/High: Infill development reduces vehicle trips and VMT by 3% and 20%, respectively (Fehr & Peers 2007). CCAP identifies a site level VMT reduction range of 20%-30% (Dierkers et al. 2007).	Yes	Yes (Dierkers et al. 2007)	Yes (Dierkers et al. 2007)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project site is on a vacant infill site, redevelopment area, or brownfield or greyfield lot that is highly accessible to regional destinations, where the destinations rating of the development site (measured as the weighted average travel time to all other regional destinations) is improved by 100% when compared to an alternate greenfield site.
Miscellaneous Measures								
MM D-13: Electric Lawnmower	LD (R, M), SP, AQP, RR, P/Area	1%/Low: SMAQMD presents this % reduction (EDAW 2006, SMAQMD 2007).	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Provide a complimentary electric lawnmower to each residential buyer.

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MM D-14: Enhanced Recycling/Waste Reduction, Reuse, Composting	LD (R, C, M), I, SP, AQP, RR, P/Stationary & Area	NA/Low	Yes	Yes	Yes: Association with social awareness.	Adverse: No Beneficial: CAPs, TACs	CIWMB	Provide infrastructure/education that promotes the avoidance of products with excessive packaging, recycle, buying of refills, separating of food and yard waste for composting, and using rechargeable batteries.
MM D-15: LEED Certification	LD (R, C, M), I, SP, AQP, RR, P/Stationary & Area	NA/Moderate	Yes: Receive tax rebates, incentives (e.g., EDAW San Diego office interior remodel cost $1,700,000 for 32,500 square feet) (USGBC 2007)	Yes	Yes: More than 700 buildings of different certifications in CA (USGBC 2007).	Adverse: No Beneficial: CAPs, TACs	USGBC, CA air quality management and control districts and cities/counties (e.g., BAAQMD).	LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality.
MM D-16: Retro-Commissioning	LD (C, M), I, SP, AQP, RR, P/Stationary & Area	8%-10% reduction in energy usage/Moderate: (Mills et al. 2004)	Yes: Average $0.28/square feet, varies with building size (Haasl and Sharp 1999).	Yes	Yes: 27 projects underway in CA, 21 more to be completed in 2007, mostly state buildings owned by DGS (DGS 2007).	Adverse: No Beneficial: CAPs, TACs	DGS, CA air quality management and control districts and cities/counties (e.g., BAAQMD).	The process ensures that all building systems perform interactively according to the contract documents, the design intent and the owner's operational needs to optimize energy performance.
MM D-17 Landscaping	LD (R, C, M), I, SP, AQP, RR,	NA/Low	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	Alliance for the Chesapeake Bay, EPA Green Landscaping	Project shall use drought resistant native trees, trees with low emissions and high carbon

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	P/Stationary & Area						Resources	sequestration potential. Evergreen trees on the north and west sides afford the best protection from the setting summer sun and cold winter winds. Additional considerations include the use of deciduous trees on the south side of the house that will admit summer sun; evergreen plantings on the north side will slow cold winter winds; constructing a natural planted channel to funnel summer cooling breezes into the house. Neighborhood CCR's not requiring that front and side yards of single family homes be planted with turf grass. Vegetable gardens, bunch grass, and low-water landscaping shall also be permitted, or even encouraged.
MM D-18: Local Farmers' Market	LD (M), SP/Mobile, Stationary, &	NA/Low	Yes	Yes	Yes: Associated with social	Adverse: No Beneficial: CAPs, TACs	Cities/counties (e.g., Davis, Sacramento)	Project shall dedicate space in a centralized, accessible location for a weekly farmers' market.

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	Area				choice and public awareness.			
MM D-19: Community Gardens	LD (M), SP/Mobile, Stationary, & Area	NA/Low	Yes	Yes	Yes: Associated with social choice and public awareness.	Adverse: No Beneficial: CAPs, TACs	Cities/counties (e.g., Davis)	Project shall dedicate space for community gardens.
Energy Efficiency/Building Component								
MM E-1: High-Efficiency Pumps	LD (R, C, M), SP, AQP, RR, P/Stationary & Area	NA/Low	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., BAAQMD).	Project shall use high-efficiency pumps.
MM E-2: Wood Burning Fireplaces/Stoves	LD (R, M), SP, AQP, RR, P/Stationary & Area	NA/Low: EDAW 2006	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project does not feature fireplaces or wood burning stoves.
MM E-3: Natural Gas Stove	LD (R, M), SP, AQP, RR, P/Stationary & Area	NA/Low: EDAW 2006	Yes: Cost of stove—$350 (gas) and $360 (electric) same brand, total yearly cost of $42.17 as opposed to $56.65 for electric (Saving Electricity 2006).	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project features only natural gas or electric stoves in residences.

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MM E-4: Energy Star Roof	LD (R, C, M), I, SP, AQP, RR, P/Stationary & Area	0.5%-1%/Low: SMAQMD presents this % reduction (EDAW 2006, SMAQMD 2007).	Yes	Yes	Yes: 866 Energy Star labeled buildings in California (Energy Star 2007)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project installs Energy Star labeled roof materials.
MM E-5: On-site Renewable Energy System	LD (R, C, M), I, SP, AQP, RR, P/Stationary & Area	1%-3%/Moderate: SMAQMD presents this % reduction (USGBC 2002 and 2005, EDAW 2006, SMAQMD 2007).	Yes	Yes (USGBC 2002 and 2005)	Yes (USGBC 2002 and 2005)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project provides onsite renewable energy system(s). Nonpolluting and renewable energy potential includes solar, wind, geothermal, low-impact hydro, biomass and bio-gas strategies. When applying these strategies, projects may take advantage of net metering with the local utility.

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MM E-6: Exceed Title 24	LD (R, C, M), I, GSP, AQP, RR, P/Stationary & Area	1%/Moderate: SMAQMD presents this % reduction (EDAW 2006, SMAQMD 2007).	Yes	Yes (PG&E 2002, SMUD 2006)	Yes (PG&E 2002, SMUD 2006)	Adverse: No Beneficial: CAPs, TACs	PG&E, SMUD, CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project exceeds title 24 requirements by 20%.
MM E-7: Solar Orientation	LD (R, C, M), I, SP, AQP, RR, P/Stationary & Area	0.5%/Low: SMAQMD presents this % reduction (EDAW 2006, SMAQMD 2007).	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project orients 75% or more of homes and/or buildings to face either north or south (within 30° of N/S). Building design includes roof overhangs that are sufficient to block the high summer sun, but not the lower winter sun, from penetrating south facing windows. Trees, other landscaping features and other buildings are sited in such a way as to maximize shade in the summer and maximize solar access to walls and windows in the winter.
MM E-8: Nonroof Surfaces	LD (R, C, M), I, GSP, AQP, RR, P/Stationary & Area	1.0%/Low: SMAQMD presents this % reduction (EDAW 2006, SMAQMD 2007).	Yes	Yes (USGBC 2002 and 2005)	Yes (USGBC 2002 and 2005)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Provide shade (within 5 years) and/or use light-colored/high-albedo materials (reflectance of at least 0.3) and/or open grid pavement for at least 30% of the site's nonroof impervious surfaces, including parking lots, walkways, plazas, etc.; OR place a minimum of 50% of parking spaces underground or covered by structured parking; OR use an open-grid pavement system (less than 50% impervious) for a minimum of

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							50% of the parking lot area. The mitigation measure reduces heat islands (thermal gradient differences between developed and undeveloped areas to minimize impact on microclimate and human and wildlife habitats. This measure requires the use of patented or copyright protected methodologies created by the ASTM. The SRI is a measure of the constructed surface's ability to reflect solar heat, as shown by a small rise in temperature. It is defined so that a standard black (reflectance 0.05, emittance 0.90) is "0" and a standard white (reflectance 0.80, emittance 0.90) is 100. To calculate SRI for a given material, obtain the reflectance value and emittance value for the material. SRI is calculated according to ASTM E 1980-01. Reflectance is measured

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								according to ASTM E 903, ASTM E 1918, or ASTM C 1549. Emittance is measured according to ASTM E 408 or ASTM C 1371. Default values for some materials will be available in the LEED-NC v2.2 Reference Guide.
MM E-9: Low-Energy Cooling	LD (C, M), I, SP, AQP, RR, P/Stationary & Area	1%-10%/Low: EDAW presents this percent reduction range (EDAW 2006).	Yes	Yes (USGBC 2002 and 2005)	Yes (USGBC 2002 and 2005)	Adverse: No Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Project optimizes building's thermal distribution by separating ventilation and thermal conditioning systems.
[M E-10: reen Roof	LD (R, C, M), I, SP, AQP, RR, P/Stationary & Area	1.0%/Moderate: SMAQMD presents this % reduction (EDAW 2006, SMAQMD 2007).	Yes	Yes (USGBC 2002 and 2005)	Yes (USGBC 2002 and 2005)	Adverse: Increased Water Consumption Beneficial: CAPs, TACs	CA air quality management and control districts and cities/counties (e.g., SMAQMD).	Install a vegetated roof that covers at least 50% of roof area. The reduction assumes that a vegetated roof is installed on a least 50% of the roof area or that a combination high albedo and vegetated roof surface is installed that meets the following standard: (Area of SRI Roof/0.75)+(Area of vegetated roof/0.5) >= Total Roof Area. Water consumption reduction measures shall be considered in the design of the green roof.
MM E-11: EV Charging Facilities	LD (C, M), SP, AQP, RR, P/Stationary & Area	NA/Low	Yes: $500-$5000/ vehicle site (PG&E 1999)	Yes	Yes: 381 facilities in CA (Clean Air Maps 2007).	Adverse: No Beneficial: CAPs, TACs	DOE, EERE, CA air quality management and control districts and cities/counties (e.g., BAAQMD).	Project installs EV charging facilities.
MM E-12:	LD (R, C, M),	NA/Low: Increasing	Yes: Light	Yes	Yes: Apply	Adverse: No		Project provides light-colored

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Light-Colored Paving	I, SP, AQP, RR, P/Stationary & Area	the albedo of 1,250 km of pavement by 0.25 would save cooling energy worth $15M per year.	colored aggregates and white cement are more expensive than gray cement. Certain blended cements are very light in color and may reflect similarly to white cement at an equivalent cost to normal gray cement.		natural sand or gravel colored single surface treatments to asphalt (EOE 2007).	Beneficial: CAPs, TACs		paving (e.g., increased albedo pavement).
MM E-13: Cool Roofs	LD (R, C, M), I, SP, AQP, RR, P/Stationary & Area	NA/Low	Yes: 0.75–1.5/square feet coating (EPA 2007a)	Yes	Yes: Over 90% of the roofs in the United States are dark colored	Adverse: No Beneficial: CAPs, TACs	CEC	Project provides cool roofs. Highly reflective, highly emissive roofing materials that stay 50-60°F cooler than a normal roof under a hot summer sun. CA's Cool Savings

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					(EPA 2007a).			Program provided rebates to building owners for installing roofing materials with high solar reflectance and thermal emittance. The highest rebate went to roofs on air conditioned buildings, while buildings with rooftop ducts and other nonresidential buildings were eligible for slightly less. The program aimed to reduce peak summer electricity demand and was administered by the CEC.
[M E-14: Solar ater Heaters	LD (R, M), SP, AQP, RR, P/Stationary & Area	20%–70% reduction in cooling energy needs/Moderate	Yes: $1675/20 square feet, requires a 50 gallon tank, annual operating cost of $176 (DOE 2007).	Yes	Yes: Based on solar orientation, building codes, zoning ordinances.	Adverse: No Beneficial: CAPs, TACs	Europe	Project provides solar water heaters.
MM E-15: Electric Yard Equipment Compatibility	LD (R, M), SP, AQP, RR, P/Stationary & Area	NA/Low	Yes: $75–$250/outlet from existing circuit (Cost Helper 2007).	Yes	Yes	Adverse: No Beneficial: CAPs, TACs		Project provides electrical outlets at building exterior areas.
MM E-16: Energy Efficient Appliance Standards	LD (R, C, M), SP, AQP, RR, P/Stationary & Area	NA/Low	Yes: Varies for each appliance—higher capital costs, lower operating costs (Energy	Yes	Yes: Major retail stores.	Adverse: No Beneficial: CAPs, TACs		Project uses energy efficient appliances (e.g., Energy Star).

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			Star 2007).				
MM E-17: Green Building Materials	LD (R, C, M), SP, AQP, RR, P/Stationary & Area	NA/Low: 25-30% more efficient on average.	Yes	Yes: BEES software allows users to balance the environmental and economic performance of building products; developed by NIST (NIST 2007).	Yes	Adverse: No Beneficial: CAPs, TACs	Project uses materials which are resource efficient, recycled, with long life cycles and manufactured in an environmentally friendly way.
MM E-18: Shading Mechanisms	LD (R, C, M), I, SP, AQP, RR, P/Stationary, & Area	NA/Low: Up to $450 annual energy savings (Energy Star 2007).	Yes: Higher capital costs, lower operating and maintenance costs (Energy Star 2007).	Yes	Yes: Major retail stores.	Adverse: No Beneficial: CAPs, TACs	Install energy-reducing shading mechanisms for windows, porch, patio and walkway overhangs.

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MM E-19: Ceiling/Whole-House Fans	LD (R, C, M), I, SP, AQP, RR, P/Stationary, & Area	NA/Low: 50% more efficient than conventional fans (Energy Star 2007).	Yes: $45-$200/fan, installation extra (Lowe's 2007).	Yes	Yes: Major retail stores.	Adverse: No Beneficial: CAPs, TACs		Install energy-reducing ceiling/whole-house fans.
MM E-20: Programmable Thermostats	LD (R, C, M), I, SP, AQP, RR, P/Stationary, & Area	NA/Low: $100 annual savings in energy costs (Energy Star 2007).	Yes: $60/LCD display and 4 settings for typical residential use (Lowe's 2007).	Yes	Yes: Major retail stores.	Adverse: Yes, Mercury Beneficial: CAPs, TACs		Install energy-reducing programmable thermostats that automatically adjust temperature settings.
MM E-21: Passive Heating and Cooling Systems	LD (R, C, M), I, SP, AQP, RR, P/Stationary, & Area	NA/Low	Yes: $800 (wall heaters) to $4,000+ (central systems)	Yes	Yes	Adverse: No Beneficial: CAPs, TACs		Install energy-reducing passive heating and cooling systems (e.g., insulation and ventilation).
MM E-22: Day Lighting Systems	LD (R, C, M), I, SP, AQP, RR, P/Stationary, & Area	NA/Low	Yes: $1,300 to $1,500 depending upon the kind of roof (Barrier 1995), installation extra.	Yes	Yes: Work well only for space near the roof of the building, little benefit in multi-floor buildings.	Adverse: No Beneficial: CAPs, TACs		Install energy-reducing day lighting systems (e.g., skylights, light shelves and interior transom windows).
MM E-23: Low-Water Use Appliances	LD (R, C, M), I, SP, AQP, RR, P/Stationary, & Area	NA/Low: Avoided water agency cost for using water-efficient kitchen pre-rinse spray valves of $65.18 per acre-foot.	Yes: Can return their cost through reduction in water consumption,	Yes	Yes	Adverse: No Beneficial: CAPs, TACs		Require the installation of low-water use appliances.

Table 16
Mitigation Measure Summary

Mitigation Measure	Applicable Project/Source Type[1]	Effective	Feasible (Yes/No)			Secondary Effects (Yes/No)	Agency/Organization/Other[6]	Description/Comments
		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
			pumping, and treatment.					
MM E-24: Goods Transport by Rail	LD (C, M), I, SP, AQP, RR, P/Mobile	NA/Moderate	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs	ARB Goods Movement Plan (ARB 2007)	Provide a spur at nonresidential projects to use nearby rail for goods movement.
Social Awareness/Education								
MM S-1: GHG Emissions Reductions Education	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile, Stationary, & Mobile	NA/Low	Yes	Yes	Yes: Similar programs currently exist in CA.	Adverse: No Beneficial: CAPs, TACs		Provide local governments, businesses, and residents with guidance/protocols/information on how to reduce GHG emissions (e.g., energy saving, food miles).
MM S-2: School Curriculum	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile, Stationary, & Mobile	NA/Low	Yes	Yes	Yes: Similar programs currently exist in CA.	Adverse: No Beneficial: CAPs, TACs		Include how to reduce GHG emissions (e.g., energy saving, food miles) in the school curriculum.
Construction								
MM C-1: ARB-Certified Diesel Construction Equipment	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	NA/Low	Yes: Oxidation Catalysts, $1,000-	Yes	Yes	Adverse: Yes, NO_x Beneficial: CAPs, TACs	AG, EPA, ARB, and CA air quality management and pollution control districts.	Use ARB-certified diesel construction equipment. Increases CO_2 emissions when trapped CO and carbon particles

AG=Attorney General; ARB=California Air Resources Board; ASTM=American Society for Testing and Material; BAAQMD=Bay Area Air Quality Management District; BEES= Building for Environmental and Economic Sustainability; CA=California; Caltrans=California Department of Transportation; CAPs=Criteria Air Pollutants; CCAP=Center for Clean Air Policy; CF=Connectivity Factor; CIWMB=California Integrated Waste Management Board; CO= Carbon Monoxide; CO_2=Carbon Dioxide; DGS=Department of General Services; DOE=U.S. Department of Energy; DPF=Diesel particulate Filter; E85=85% Ethanol; EERE=Energy Efficiency and Renewable Energy; EOE=Encyclopedia of Earth; EPA=U.S. Environmental Protection Agency; ETC=Edmonton Trolley Coalition; EVs/CNG=Electric Vehicles/Compressed Natural Gas; FAR=Floor Area Ratio; GHG=Greenhouse Gas; ITE=Institute of Transportation Engineers; kg/m^2=kilogram per square meter; km=Kilometer; lb=pound; LEED=Leadership in Energy and Environmental Design; M=Million; NA=Not Available; NEV=Neighborhood Electric Vehicle; NIST=National Institute of Standards and Technology; NO_X=Oxides of Nitrogen; NREL=National Renewable Energy Laboratory; N/S=North/South; PG&E=Pacific Gas and Electric; PM=Particulate Matter; SJVAPCD=San Joaquin Valley Air Pollution Control District; SMAQMD=Sacramento Metropolitan Air Quality Management District; SMUD=Sacramento Municipal Utilities District; SO_x=Sulfur Oxides; SRI=Solar Reflectance Index; TACs=Toxic Air Contaminants; TDM=Transportation Demand Management; TMA=Transportation Management Association; THC=Total Hydrocarbon; ULEV=Ultra Low Emission Vehicle; USGBC=U.S. Green Building Council; and VTPI=Victoria Transit Policy.

Table 16
Mitigation Measure Summary

Mitigation Measure	Applicable Project/Source Type[1]	Effective	Feasible (Yes/No)			Secondary Effects (Yes/No)	Agency/Organization/Other[6]	Description/Comments
		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
			$2,000. DPF, $5000-$10,000; installation extra (EPA 2007b).					are oxidized (Catalyst Products 2007, ETC 2007).
MM C-2: Alternative Fuel Construction Equipment	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	NA/Low	Yes	Yes	Yes	Adverse: Yes, THC, NO_x Beneficial: CO, PM, SO_x	AG, EPA, ARB, and CA air quality management and pollution control districts.	Use alternative fuel types for construction equipment. At the tailpipe biodiesel emits 10% more CO_2 than petroleum diesel. Overall lifecycle emissions of CO_2 from 100% biodiesel are 78% lower than those of petroleum diesel (NREL 1998, EPA 2007b).
MM C-3: Local Building Materials	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	NA/Low	Yes	Yes	Yes: Depends on location of building material manufacture sites.	Adverse: No Beneficial: CAPs, TACs		Use locally made building materials for construction of the project and associated infrastructure.
MM C-4: Recycle Demolished Construction Material	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile	NA/Low	Yes	Yes	Yes	Adverse: No Beneficial: CAPs, TACs		Recycle/Reuse demolished construction material. Use locally made building materials for construction of the project and associated infrastructure.

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Table 16
Mitigation Measure Summary

Mitigation Measure	Applicable Project/Source Type[1]	Effective	Feasible (Yes/No)			Secondary Effects (Yes/No)	Agency/Organization/Other[6]	Description/Comments
		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
Miscellaneous								
MM M-1: Off-Site Mitigation Fee Program	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile & Area	NA/Moderate-High: Though there is currently no program in place, the potential for real and quantifiable reductions of GHG emissions could be high if a defensible fee program were designed.	Yes	Yes	No: Program does not exist in CA, but similar programs currently exist (e.g., Carl Moyer Program, SJVAPCD Rule 9510, SMAQMD Off-Site Construction Mitigation Fee Program).	Adverse: No Beneficial: CAPs, TACs		Provide/Pay into an off-site mitigation fee program, which focuses primarily on reducing emissions from existing development and buildings through retro-fit (e.g., increased insulation).
MM M-2: Offset Purchase	LD (R, C, M), I, SP, TP, AQP, RR, P/Mobile, Stationary, & Area	NA/Low	Yes	Yes	No: ARB has not adopted official program, but similar programs	No		Provide/purchase offsets for additional emissions by acquiring carbon credits or engaging in other market "cap and trade" systems.

AG=Attorney General; ARB=California Air Resources Board; ASTM=American Society for Testing and Material; BAAQMD=Bay Area Air Quality Management District; BEES= Building for Environmental and Economic Sustainability; CA=California; Caltrans=California Department of Transportation; CAPs=Criteria Air Pollutants; CCAP=Center for Clean Air Policy; CF=Connectivity Factor; CIWMB=California Integrated Waste Management Board; CO= Carbon Monoxide; CO_2=Carbon Dioxide; DGS=Department of General Services; DOE=U.S. Department of Energy; DPF=Diesel particulate Filter; E85=85% Ethanol; EERE=Energy Efficiency and Renewable Energy; EOE=Encyclopedia of Earth; EPA=U.S. Environmental Protection Agency; ETC=Edmonton Trolley Coalition; EVs/CNG=Electric Vehicles/Compressed Natural Gas; FAR=Floor Area Ratio; GHG=Greenhouse Gas; ITE=Institute of Transportation Engineers; kg/m^2=kilogram per square meter; km=Kilometer; lb=pound; LEED=Leadership in Energy and Environmental Design; M=Million; NA=Not Available; NEV=Neighborhood Electric Vehicle; NIST=National Institute of Standards and Technology; NO_X=Oxides of Nitrogen; NREL=National Renewable Energy Laboratory; N/S=North/South; PG&E=Pacific Gas and Electric; PM=Particulate Matter; SJVAPCD=San Joaquin Valley Air Pollution Control District; SMAQMD=Sacramento Metropolitan Air Quality Management District; SMUD=Sacramento Municipal Utilities District; SO_x=Sulfur Oxides; SRI=Solar Reflectance Index; TACs=Toxic Air Contaminants; TDM=Transportation Demand Management; TMA=Transportation Management Association; THC=Total Hydrocarbon; ULEV=Ultra Low Emission Vehicle; USGBC=U.S. Green Building Council; and VTPI=Victoria Transit Policy.

Table 16
Mitigation Measure Summary

Mitigation Measure	Applicable Project/Source Type[1]	Effective	Feasible (Yes/No)			Secondary Effects (Yes/No)	Agency/Organization/Other[6]	Description/Comments
		Emissions Reduction/Score[2]	Cost (Yes/No)[3]	Technical[4]	Logistical[5]			
					currently exist.			
Regional Transportation Plan Measures								
MM RTP-1: Dedicate High Occupancy Vehicle (HOV) lanes prior to adding capacity to existing highways.	RTP		Yes	Yes	Yes	Adverse: possible local CO Beneficial: regional CAPs, TACs	Caltrans, local government	Evaluate the trip reduction (and GHG reduction) potential of adding HOV lanes prior to adding standard lanes.
MM RTP-2: nplement ll/user fee programs prior to adding capacity to existing highways.	RTP		Yes	Yes	Yes	Adverse: possible local CO. Beneficial: regional CAPs, TACs	Caltrans	Evaluate price elasticity and associated trip reduction (and GHG reduction) potential with adding or increasing tolls prior to adding capacity to existing highways.

Note:
[1] Where LD (R, C, M) =Land Development (Residential, Commercial, Mixed-Use), I=Industrial, GP=General Plan, SP=Specific Plan, TP=Transportation Plans, AQP=Air Quality Plans, RR=Rules/Regulations, and P=Policy. It is important to note that listed project types may not be directly specific to the mitigation measure (e.g., TP, AQP, RR, and P) as such could apply to a variety of source types, especially RR and P.
[2] This score system entails ratings of high, moderate, and low that refer to the level of the measure to provide a substantive, reasonably certain (e.g., documented emission reductions with proven technologies), and long-term reduction of GHG emissions.
[3] Refers to whether the measure would provide a cost-effective reduction of GHG emissions based on available documentation.
[4] Refers to whether the measure is based on currently, readily available technology based on available documentation.
[5] Refers to whether the measure could be implemented without extraordinary effort based on available documentation.
[6] List is not meant to be all inclusive.
Source: Data complied by EDAW in 2007

Table 17
General Planning Level Mitigation Strategies Summary

Strategy	Source Type[1]	Agency/Organization[2]	Description/Comments
MS G-1: Adopt a GHG reduction plan	GP/ Mobile, Stationary, & Area	City of San Bernardino	- Adopt GHG reduction targets for the planning area, based on the current legislation providing direction for state-wide targets, and update the plan as necessary. -The local government agency should serve as a model by inventorying its GHG emissions from agency operations, and implementing those reduction goals.
Circulation			
MS G-2: Provide for convenient and safe local travel	GP/ Mobile	Cities/Counties (e.g., Aliso Viejo, Claremont)	- Create a gridded street pattern with small block sizes. This promotes walkability through direct routing and ease of navigation. -Maintain a high level of connectivity of the roadway network. Minimize cul-de-sacs and incomplete roadway segments. -Plan and maintain an integrated, hierarchical and multi-modal system of roadways, pedestrian walks, and bicycle paths throughout the area. -Apply creative traffic management approaches to address congestion in areas with unique problems, particularly on roadways and intersections in the vicinity of schools in the morning and afternoon peak hours, and near churches, parks and community centers. -Work with adjacent jurisdictions to address the impacts of regional development patterns (e.g. residential development in surrounding communities, regional universities, employment centers, and commercial developments) on the circulation system. -Actively promote walking as a safe mode of local travel, particularly for children attending local schools. -Employ traffic calming methods such as median landscaping and provision of bike or transit lanes to slow traffic, improve roadway capacity, and address safety issues.
MS G-3: Enhance the regional transportation network and maintain effectiveness	GP/ Mobile	Cities/Counties (e.g., Aliso Viejo, Claremont)	-Encourage the transportation authority to reduce fees for short distance trips. -Ensure that improvements to the traffic corridors do not negatively impact the operation of local roadways and land uses.

Table 17
General Planning Level Mitigation Strategies Summary

Strategy	Source Type[1]	Agency/Organization[2]	Description/Comments
			-Cooperate with adjacent jurisdictions to maintain adequate service levels at shared intersections and to provide adequate capacity on regional routes for through traffic. -Support initiatives to provide better public transportation. Work actively to ensure that public transportation is part of every regional transportation corridor. - Coordinate the different modes of travel to enable users to transfer easily from one mode to another. -Work to provide a strong paratransit system that promotes the mobility of all residents and educate residents about local mobility choices. - Promote transit-oriented development to facilitate the use of the community's transit services.
MS G-4: Promote and support an efficient public transportation network connecting activity centers in the area to each other and the region.	GP/ Mobile	Cities/Counties (e.g., Aliso Viejo, Claremont)	-Promote increased use of public transportation and support efforts to increase bus service range and frequency within the area as appropriate. -Enhance and encourage provision of attractive and appropriate transit amenities, including shaded bus stops, to encourage use of public transportation. -Encourage the school districts, private schools and other operators to coordinate local bussing and to expand ride-sharing programs. All bussing options should be fully considered before substantial roadway improvements are made in the vicinity of schools to ease congestion.
MS G-5: Establish and maintain a comprehensive system, which is safe and convenient, of pedestrian ways and bicycle routes that provide viable options to travel by automobile.	GP/ Mobile	Cities/Counties (e.g., Aliso Viejo, Claremont)	-Improve area sidewalks and rights-of-way to make them efficient and appealing for walking and bicycling safely. Coordinate with adjacent jurisdictions and regional agencies to improve pedestrian and bicycle trails, facilities, signage, and amenities. -Provide safe and convenient pedestrian and bicycle connections to and from town centers, other commercial districts, office complexes, neighborhoods, schools, other major activity centers, and surrounding communities. -Work with neighboring jurisdictions to provide well-designed pedestrian and bicycle crossings of major roadways. -Promote walking throughout the community. Install sidewalks where missing and make improvements

Table 17
General Planning Level Mitigation Strategies Summary

Strategy	Source Type[1]	Agency/Organization[2]	Description/Comments
			to existing sidewalks for accessibility purposes. Particular attention should be given to needed sidewalk improvement near schools and activity centers. -Encourage businesses or residents to sponsor street furniture and landscaped areas. - Strive to provide pedestrian pathways that are well shaded and pleasantly landscaped to encourage use. - Attract bicyclists from neighboring communities to ride their bicycles or to bring their bicycles on the train to enjoy bicycling around the community and to support local businesses. - Meet guidelines to become nationally recognized as a Bicycle-Friendly community. - Provide for an education program and stepped up code enforcement to address and minimize vegetation that degrades access along public rights-of-way. -Engage in discussions with transit providers to increase the number of bicycles that can be accommodated on buses
MS G-6: Achieve optimum use of regional rail transit.	GP/ Mobile	Cities/Counties (e.g., Aliso Viejo, Claremont)	-Support regional rail and work with rail authority to expand services. - Achieve better integration of all transit options. -Work with regional transportation planning agencies to finance and provide incentives for multimodal transportation systems. - Promote activity centers and transit-oriented development projects around the transit station.
MS G-7: Expand and optimize use of local and regional bus and transit systems.	GP/ Mobile	Cities/Counties (e.g., Aliso Viejo, Claremont)	-Encourage convenient public transit service between area and airports. -Support the establishment of a local shuttle to serve commercial centers. -Promote convenient, clean, efficient, and accessible public transit that serves transit-dependent riders and attracts discretionary riders as an alternative to reliance on single-occupant automobiles.

Table 17
General Planning Level Mitigation Strategies Summary

Strategy	Source Type[1]	Agency/Organization[2]	Description/Comments
			- Empower seniors and those with physical disabilities who desire maximum personal freedom and independence of lifestyle with unimpeded access to public transportation. -Integrate transit service and amenities with surrounding land uses and buildings.
Conservation, Open Space			
MS G-8: Emphasize the importance of water conservation and maximizing the use of native, low-water landscaping.	GP/Stationary & Area	Cities/Counties (e.g., Aliso Viejo, Claremont)	-Reduce the amount of water used for landscaping and increase use of native and low water plants. Maximize use of native, low-water plants for landscaping of areas adjacent to sidewalks or other impermeable surfaces. -Encourage the production, distribution and use of recycled and reclaimed water for landscaping projects throughout the community, while maintaining urban runoff water quality objectives. -Promote water conservation measures, reduce urban runoff, and prevent groundwater pollution within development projects, property maintenance, area operations and all activities requiring approval. -Educate the public about the importance of water conservation and avoiding wasteful water habits. -Work with water provider in exploring water conservation programs, and encourage the water provider to offer incentives for water conservation.
MS G-9: Improve air quality within the region.	GP/ Mobile, Stationary, & Area	Cities/Counties (e.g., Aliso Viejo, Claremont)	-Integrate air quality planning with area land use, economic development and transportation planning efforts. -Support programs that reduce air quality emissions related to vehicular travel. -Support alternative transportation modes and technologies, and develop bike- and pedestrian-friendly neighborhoods to reduce emissions associated with automobile use. -Encourage the use of clean fuel vehicles. -Promote the use of fuel-efficient heating and cooling equipment and other appliances, such as water

Table 17
General Planning Level Mitigation Strategies Summary

Strategy	Source Type[1]	Agency/Organization[2]	Description/Comments
			heaters, swimming pool heaters, cooking equipment, refrigerators, furnaces, and boiler units. - Promote the use of clean air technologies such as fuel cell technologies, renewable energy sources. UV coatings, and alternative, non-fossil fuels. -Require the planting of street trees along streets and inclusion of trees and landscaping for all development projects to help improve airshed and minimize urban heat island effects. - Encourage small businesses to utilize clean, innovative technologies to reduce air pollution. - Implement principles of green building. - Support jobs/housing balance within the community so more people can both live and work within the community. To reduce vehicle trips, encourage people to telecommute or work out of home or in local satellite offices.
MS G-10: Encourage and maximize energy conservation and identification of alternative energy sources.	GP/ Stationary & Area	Cities/Counties (e.g., Aliso Viejo, Claremont)	-Encourage green building designs for new construction and renovation projects within the area. -Coordinate with regional and local energy suppliers to ensure adequate supplies of energy to meet community needs, implement energy conservation and public education programs, and identify alternative energy sources where appropriate. -Encourage building orientations and landscaping that enhance natural lighting and sun exposure. -Encourage expansion of neighborhood-level products and services and public transit opportunities throughout the area to reduce automobile use. - Incorporate the use of energy conservation strategies in area projects. - Promote energy-efficient design features, including appropriate site orientation, use of light color roofing and building materials, and use of evergreen trees and wind-break trees to reduce fuel consumption for heating and cooling.

Table 17 General Planning Level Mitigation Strategies Summary			
Strategy	Source Type[1]	Agency/Organization[2]	Description/Comments
			-Explore and consider the cost/benefits of alternative fuel vehicles including hybrid, natural gas, and hydrogen powered vehicles when purchasing new vehicles. -Continue to promote the use of solar power and other energy conservation measures. - Encourage residents to consider the cost/benefits of alternative fuel vehicles. - Promote the use of different technologies that reduce use of non-renewable energy resources. -Facilitate the use of green building standards and LEED in both private and public projects. -Promote sustainable building practices that go beyond the requirements of Title 24 of the California Administrative Code, and encourage energy-efficient design elements, as appropriate. -Support sustainable building practices that integrate building materials and methods that promote environmental quality, economic vitality, and social benefit through the design, construction, and operation of the built environment. - Investigate the feasibility of using solar (photovoltaic) street lights instead of conventional street lights that are powered by electricity in an effort to conserve energy. - Encourage cooperation between neighboring development to facilitate on-site renewable energy supplies or combined heat and power co-generation facilities that can serve the energy demand of contiguous development.

Table 17
General Planning Level Mitigation Strategies Summary

Strategy	Source Type[1]	Agency/Organization[2]	Description/Comments
MS G-11: Preserve unique community forests, and provide for sustainable increase and maintenance of this valuable resource.	GP/Stationary & Area	Cities/Counties (e.g., Aliso Viejo, Claremont)	- Develop a tree planting policy that strives to accomplish specific % shading of constructed paved and concrete surfaces within five years of construction. -Provide adequate funding to manage and maintain the existing forest, including sufficient funds for tree planting, pest control, scheduled pruning, and removal and replacement of dead trees. -Coordinate with local and regional plant experts in selecting tree species that respect the natural region in which Claremont is located, to help create a healthier, more sustainable urban forest. - Continue to plant new trees (in particular native tree species where appropriate), and work to preserve mature native trees. -Increase the awareness of the benefits of street trees and the community forest through a area wide education effort. -Encourage residents to properly care for and preserve large and beautiful trees on their own private property.
Housing			
MS G-12: Provide affordability levels to meet the needs of community residents.	GP/ Mobile	Cities/Counties (e.g., Aliso Viejo, Claremont)	-Encourage development of affordable housing opportunities throughout the community, as well as development of housing for elderly and low and moderate income households near public transportation services. -Ensure a portion of future residential development is affordable to low and very low income households.
Land Use			
MS G-13: Promote a visually-cohesive urban form and establish connections between the urban core and outlying portions of the	GP/ Mobile, Stationary, & Area	Cities/Counties (e.g., Aliso Viejo, Claremont)	-Preserve the current pattern of development that encourages more intense and higher density development at the core of the community and less intense uses radiating from the central core. -Create and enhance landscaped greenway, trail and sidewalk connections between neighborhoods and to commercial areas, town centers, and parks.

Table 17
General Planning Level Mitigation Strategies Summary

Strategy	Source Type[1]	Agency/Organization[2]	Description/Comments
community.			-Identify ways to visually identify and physically connect all portions of the community, focusing on enhanced gateways and unifying isolated and/or outlying areas with the rest of the area. -Study and create a diverse plant identity with emphasis on drought-resistant native species.
MS G-14: Provide a diverse mix of land uses to meet the future needs of all residents and the business community.	GP/ Mobile	Cities/Counties (e.g., Aliso Viejo, Claremont)	-Attract a broad range of additional retail, medical, and office uses providing employment at all income levels. -Support efforts to provide beneficial civic, religious, recreational, cultural and educational opportunities and public services to the entire community. -Coordinate with public and private organizations to maximize the availability and use of parks and recreational facilities in the community. -Support development of hotel and recreational commercial land uses to provide these amenities to local residents and businesses.
MS G-15: Collaborate with providers of solid waste collection, disposal and recycling services to ensure a level of service that promotes a clean community and environment.	GP/ Stationary, & Area	Cities/Counties (e.g., Aliso Viejo, Claremont)	-Require recycling, composting, source reduction and education efforts throughout the community, including residential, businesses, industries, and institutions, within the construction industry, and in all sponsored activities.
MS G-16: Promote construction, maintenance and active use of publicly- and privately-operated parks, recreation programs, and a community center.	GP/ Mobile	Cities/Counties (e.g., Aliso Viejo, Claremont)	-Work to expand and improve community recreation amenities including parks, pedestrian trails and connections to regional trail facilities. -As a condition upon new development, require payment of park fees and/or dedication and provision of parkland, recreation facilities and/or multi-use trails that improve the public and private recreation system. -Research options or opportunities to provide necessary or desired community facilities.

Table 17
General Planning Level Mitigation Strategies Summary

Strategy	Source Type[1]	Agency/Organization[2]	Description/Comments
MS G-17: Promote the application of sustainable development practices.	GP/ Mobile, Stationary, & Area	Cities/Counties (e.g., Aliso Viejo, Claremont)	- Encourage sustainable development that incorporates green building best practices and involves the reuse of previously developed property and/or vacant sites within a built-up area. - Encourage the conservation, maintenance, and rehabilitation of the existing housing stock. -Encourage development that incorporates green building practices to conserve natural resources as part of sustainable development practices. -Avoid development of isolated residential areas in the hillsides or other areas where such development would require significant infrastructure investment, adversely impact biotic resources. - Provide land area zoned for commercial and industrial uses to support a mix of retail, office, professional, service, and manufacturing businesses.
MS G-18: Create activity nodes as important destination areas, with an emphasis on public life within the community.	GP/ Mobile	Cities/Counties (e.g., Aliso Viejo, Claremont)	-Provide pedestrian amenities, traffic-calming features, plazas and public areas, attractive streetscapes, shade trees, lighting, and retail stores at activity nodes. -Provide for a mixture of complementary retail uses to be located together to create activity nodes to serve adjacent neighborhoods and to draw visitors from other neighborhoods and from outside the area.
MS G-19: Make roads comfortable, safe, accessible, and attractive for use day and night.	GP/ Mobile	Cities/Counties (e.g., Aliso Viejo, Claremont)	-Provide crosswalks and sidewalks along streets that are accessible for people with disabilities and people who are physically challenged. -Provide lighting for walking and nighttime activities, where appropriate. -Provide transit shelters that are comfortable, attractive, and accommodate transit riders.
MS G-20: Maintain and expand where possible the system of neighborhood connections that attach neighborhoods to larger roadways.	GP/ Mobile	Cities/Counties (e.g., Aliso Viejo, Claremont)	- Provide sidewalks where they are missing, and provide wide sidewalks where appropriate with buffers and shade so that people can walk comfortably. -Make walking comfortable at intersections through traffic-calming, landscaping, and designated crosswalks.

Table 17
General Planning Level Mitigation Strategies Summary

Strategy	Source Type[1]	Agency/Organization[2]	Description/Comments
			-Look for opportunities for connections along easements & other areas where vehicles not permitted.
MS G-21: Create distinctive places throughout the area.	GP/ Mobile	Cities/Counties (e.g., Aliso Viejo, Claremont)	-Provide benches, streetlights, public art, and other amenities in public areas to attract pedestrian activities. -Encourage new developments to incorporate drought tolerant and native landscaping that is pedestrian friendly, attractive, and consistent with the landscaped character of area. -Encourage all new development to preserve existing mature trees. -Encourage streetscape design programs for commercial frontages that create vibrant places which support walking, bicycling, transit, and sustainable economic development. -Encourage the design and placement of buildings on lots to provide opportunities for natural systems such as solar heating and passive cooling. - Ensure that all new industrial development projects are positive additions to the community setting, provide amenities for the comfort of the employees such as outdoor seating area for breaks or lunch, and have adequate landscape buffers.
MS G-22: Reinvest in existing neighborhoods and promote infill development as a preference over new, greenfield development	GP/ Mobile, Stationary, & Area	Cities/Counties (e.g., Aliso Viejo, Claremont)	- Identify all underused properties in the plan area and focus development in these opportunity sites prior to designating new growth areas for development. - Implement programs to retro-fit existing structures to make them more energy-efficient. -Encourage compact development, by placing the desired activity areas in smaller spaces.

Table 17
General Planning Level Mitigation Strategies Summary

Strategy	Source Type[1]	Agency/Organization[2]	Description/Comments
Public Safety			
MS G-23: Promote a safe community in which residents can live, work, shop, and play.	GP/ Mobile	Cities/Counties (e.g., Aliso Viejo, Claremont)	- Foster an environment of trust by ensuring non-biased policing, and by adopting policies and encouraging collaboration that creates transparency. - Facilitate traffic safety for motorists and pedestrians through proper street design and traffic monitoring.

Note:
[1] Where GP=General Plan.
[2] List is not meant to be all inclusive.
Source: Data complied by EDAW in 2007

Appendix C

Rule and Regulation Summary

Table 18
Rule and Regulation Summary

Rule/Regulation	Reduction	Implementation Date	Agency	Description	Comments
Low Carbon Fuel Standard	10-20 MMT CO_2e by 2020	January 1, 2010	ARB	This rule/regulation will require fuel providers (e.g., producers, importers, refiners and blenders) to ensure that the mix of fuels they sell in CA meets the statewide goal to reduce the carbon intensity of CA's transportation fuels by at least 10% by the 2020 target.	ARB Early Action Measure
Reduction of HFC-134a Emissions from Nonprofessional Servicing of Motor Vehicle Air Conditioning Systems	1-2 MMT CO_2e by 2020	January 1, 2010	ARB	This rule/regulation will restrict the use of high GWP refrigerants for nonprofessional recharging of leaky automotive air conditioning systems.	ARB Early Action Measure
Landfill Gas Recovery	2-4 MMT CO_2e by 2020	January 1, 2010	IWMB, ARB	This rule/regulation will require landfill gas recovery systems on small to medium landfills that do not have them and upgrade the requirements at landfills with existing systems to represent best capture and destruction efficiencies.	ARB Early Action Measure
Vehicle Climate Change Standards (AB 1493 Pavley, Chapter 200, Statutes of 2002)	30 MMT CO_2e by 2020	2009	ARB	This rule/regulation will require ARB to achieve the maximum feasible and cost effective reduction of GHG emissions from passenger vehicles and light-duty trucks.	ARB Early Action Measure
Reduction of PFCs from the Semiconductor Industry	0.5 MMT CO_2e by 2020	2007–2009	ARB	This rule/regulation will reduce GHG emissions by process improvements/source reduction, alternative chemicals capture and beneficial reuse, and destruction technologies	Underway or to be initiated by CAT members in 2007-2009 period

AB=Assembly Bill; ARB=California Air Resources Board; Calfire=California Fire; CA=California; Caltrans=California Department of Transportation; CAT=California Action Team; CEC=California Energy Commission; CDFA=California Department of Food and Agriculture; CH_4=Methane; CO_2=Carbon Dioxide; CPUC=California Public Utilities Commission; CUFR=California Urban Forestry; DGS=Department of General Services; DWR=Department of Water Resources; GHG=Greenhouse Gas; GWP=Global Warming Potential; IGCC= Integrated Gasification Combined Cycle; IOU= Investor-Owned Utility; IT=Information Technology; IWCB= Integrated Waste Management Board; LNG= Liquefied Natural Gas; MMT CO_2e=Million Metric Tons Carbon Dioxide Equivalent; MW=Megawatts; NA=Not Available; N_2O=Nitrous Oxide; PFC= Perfluorocompound; POU= Publicly Owned Utility; RPS= Renewable Portfolio Standards; RTP=Regional Transportation Plan SB=Senate Bill; SWP=State Water Project; TBD=To Be Determined; UC/CSU=University of California/California State University; ULEV=Ultra Low Emission Vehicle.

Table 18 Rule and Regulation Summary					
Rule/Regulation	Reduction	Implementation Date	Agency	Description	Comments
Restrictions on High GWP Refrigerants	9 MMT CO_2e by 2020	2010	ARB	This rule/regulation will expand and enforce the national ban on release of high GWP refrigerants during appliance lifetime.	ARB Early Action Measure
Cement Manufacture	<1 MMT CO_2e per year (based on 2004 production levels)	2010	Caltrans	This rule/regulation will allow 2.5% interground limestone concrete mix in cement use.	CAT Early Action Measure
Hydrogen Fuel Standards (SB 76 of 2005)	TBD	By 2008	CDFA	This rule/regulation will develop hydrogen fuel standards for use in combustion systems and fuel cells.	CAT Early Action Measure
Regulation of GHG from Load Serving Entities (SB 1368)	15 MMT CO_2e by 2020	May 23, 2007	CEC, CPUC	This rule/regulation will establish a GHG emission performance standard for baseload generation of local publicly owned electric utilities that is no higher than the rate of emissions of GHG for combined-cycle natural gas baseload generation.	CAT Early Action Measure
Energy Efficient Building Standards	TBD	In 2008	CEC	This rule/regulation will update of Title 24 standards.	CAT Early Action Measure
Energy Efficient Appliance Standards	TBD	January 1, 2010	CEC	This rule/regulation will regulate light bulb efficiency	CAT Early Action Measure
Tire Efficiency (Chapter 8.7 Division 15 of the Public Resources Code)	<1 MMT CO_2e by 2020	January 1, 2010	CEC & IWMB	This rule/regulation will ensure that replacement tires sold in CA are at least as energy efficient, on average, as tires sold in the state as original equipment on these vehicles.	CAT Early Action Measure
New Solar Homes Partnership	TBD	January 2007	CEC	Under this rule/regulation, approved solar systems will receive incentive funds based on system performance above building standards.	CAT Early Action Measure

Table 18
Rule and Regulation Summary

Rule/Regulation	Reduction	Implementation Date	Agency	Description	Comments
Water Use Efficiency	1 MMT CO_2e by 2020	2010	DWR	This rule/regulation will adopt standards for projects and programs funded through water bonds that would require consideration of water use efficiency in construction and operation.	CAT Early Action Measure
State Water Project	TBD	2010	DWR	This rule/regulation will include feasible and cost effective renewable energy in the SWP's portfolio.	CAT Early Action Measure
Cleaner Energy for Water Supply	TBD	2010	DWR	Under this rule/regulation, energy supply contracts with conventional coal power plants will not be renewed.	CAT Early Action Measure
IOU Energy Efficiency Programs	4 MMT CO_2e by 2020	2010	CPUC	This rule/regulation will provide a risk/reward incentive mechanism for utilities to encourage additional investment in energy efficiency; evaluate new technologies and new measures like encouraging compact fluorescent lighting in residential and commercial buildings	CAT Early Action Measure
Solar Generation	TBD	2007–2009	DGS	3 MW of clean solar power generation implemented in CA last year, with another 1 MW coming up. The second round is anticipated to total additional 10 MW and may include UC/CSU campuses and state fairgrounds.	Underway or to be initiated by CAT members in 2007-2009 period

AB=Assembly Bill; ARB=California Air Resources Board; Calfire=California Fire; CA=California; Caltrans=California Department of Transportation; CAT=California Action Team; CEC=California Energy Commission; CDFA=California Department of Food and Agriculture; CH_4=Methane; CO_2=Carbon Dioxide; CPUC=California Public Utilities Commission; CUFR=California Urban Forestry; DGS=Department of General Services; DWR=Department of Water Resources; GHG=Greenhouse Gas; GWP=Global Warming Potential; IGCC= Integrated Gasification Combined Cycle; IOU= Investor-Owned Utility; IT=Information Technology; IWCB= Integrated Waste Management Board; LNG= Liquefied Natural Gas; MMT CO_2e=Million Metric Tons Carbon Dioxide Equivalent; MW=Megawatts; NA=Not Available; N_2O=Nitrous Oxide; PFC= Perfluorocompound; POU= Publicly Owned Utility; RPS= Renewable Portfolio Standards; RTP=Regional Transportation Plan SB=Senate Bill; SWP=State Water Project; TBD=To Be Determined; UC/CSU=University of California/California State University; ULEV=Ultra Low Emission Vehicle.

Table 18
Rule and Regulation Summary

Rule/Regulation	Reduction	Implementation Date	Agency	Description	Comments
Transportation Efficiency	9 MMT CO_2e by 2020	2007–2009	Caltrans	This rule/regulation will reduce congestion, improve travel time in congested corridors, and promote coordinated, integrated land use.	Underway or to be initiated by CAT members in 2007-2009 period
Smart Land Use and Intelligent Transportation	10 MMT CO_2e by 2020	2007–2009	Caltrans	This rule/regulation will integrate consideration of GHG reduction measures and energy efficiency factors into RTPs, project development etc.	Underway or to be initiated by CAT members in 2007-2009 period
Cool Automobile Paints	1.2 to 2.0 MMT CO_2e by 2020	2009	ARB	Cool paints would reduce the solar heat gain in a vehicle and reduce air conditioning needs.	ARB Early Action Measure
Tire Inflation Program	TBD	2009	ARB	This rule/regulation will require tires to be checked and inflated at regular intervals to improve fuel economy.	ARB Early Action Measure
Electrification of Stationary Agricultural Engines	0.1 MMT CO_2e by 2020	2010	ARB	This rule/regulation will provide incentive funding opportunities for replacing diesel engines with electric motors.	ARB Early Action Measure
Desktop Power Management	Reduce energy use by 50%	2007–2009	DGS, ARB	This rule/regulation will provide software to reduce electricity use by desktop computers by up to 40%.	Currently deployed in DGS
Reducing CH_4 Venting/Leaking from Oil and Gas Systems (EJAC-3/ARB 2-12)	1 MMT CO_2e by 2020	2010	ARB	This rule/regulation will reduce fugitive CH_4 emissions from production, processing, transmission, and distribution of natural gas and oil.	ARB Early Action Measure
Replacement of High GWP Gases Used in Fire Protection Systems with Alternate Chemical (ARB 2-10)	0.1 MMT CO_2e by 2020	2011	ARB	This rule/regulation will require the use of lower GWP substances in fire protection systems.	ARB Early Action Measure
Contracting for Environmentally Preferable Products	NA	2007–2009	DGS	New state contracts have been or are being created for more energy and resource efficient IT goods, copiers, low mercury fluorescent lamps, the CA Gold Carpet Standard and office furniture.	Underway or to be initiated by CAT members in 2007-2009 period
Hydrogen Fuel Cells	NA	2007–2009	DGS	This rule/regulation will incorporate clean hydrogen fuel cells in stationary applications	Underway or to be initiated by CAT members in 2007-2009

Table 18
Rule and Regulation Summary

Rule/Regulation	Reduction	Implementation Date	Agency	Description	Comments
				at State facilities and as back-up generation for emergency radio services.	period
High Performance Schools	NA	2007–2009	DGS	New guidelines adopted for energy and resource efficient schools; up to $100 million in bond money for construction of sustainable, high performance schools.	Underway or to be initiated by CAT members in 2007-2009 period
Urban Forestry	1 MMT CO_2e by 2020	2007–2009	Calfire, CUFR	This rule/regulation will provide five million additional trees in urban areas by 2020.	Underway or to be initiated by CAT members in 2007-2009 period
Fuels Management/Biomass	3 MMT CO_2e by 2020	2007–2009	Calfire	This rule/regulation will provide biomass from forest fuel treatments to existing biomass utilization facilities.	Underway or to be initiated by CAT members in 2007-2009 period
Forest Conservation and Forest Management	10 MMT CO_2e by 2020	2007–2009	Calfire, WCB	This rule/regulation will provide opportunities for carbon sequestration in Proposition 84 forest land conservation program to conserve an additional 75,000 acres of forest landscape by 2010.	Underway or to be initiated by CAT members in 2007-2009 period
Afforestation/Reforestation	2 MMT CO_2e by 2020	2007–2009	Calfire	This rule/regulation will subsidize tree planting.	Underway or to be initiated by CAT members in 2007-2009 period
Dairy Digesters	TBD	January 1, 2010	CDFA	This rule/regulation will develop a dairy digester protocol to document GHG emission reductions from these facilities.	ARB Early Action Measure

AB=Assembly Bill; ARB=California Air Resources Board; Calfire=California Fire; CA=California; Caltrans=California Department of Transportation; CAT=California Action Team; CEC=California Energy Commission; CDFA=California Department of Food and Agriculture; CH_4=Methane; CO_2=Carbon Dioxide; CPUC=California Public Utilities Commission; CUFR=California Urban Forestry; DGS=Department of General Services; DWR=Department of Water Resources; GHG=Greenhouse Gas; GWP=Global Warming Potential; IGCC= Integrated Gasification Combined Cycle; IOU= Investor-Owned Utility; IT=Information Technology; IWCB= Integrated Waste Management Board; LNG= Liquefied Natural Gas; MMT CO_2e=Million Metric Tons Carbon Dioxide Equivalent; MW=Megawatts; NA=Not Available; N_2O=Nitrous Oxide; PFC= Perfluorocompound; POU= Publicly Owned Utility; RPS= Renewable Portfolio Standards; RTP=Regional Transportation Plan SB=Senate Bill; SWP=State Water Project; TBD=To Be Determined; UC/CSU=University of California/California State University; ULEV=Ultra Low Emission Vehicle.

Table 18
Rule and Regulation Summary

Rule/Regulation	Reduction	Implementation Date	Agency	Description	Comments
Conservation Tillage and Enteric Fermentation	1 MMT CO_2e by 2020	2007–2009	CDFA	This rule/regulation will develop and implement actions to quantify and reduce enteric fermentation emissions from livestock and sequester soil carbon using cover crops and conservation tillage.	Underway or to be initiated by CAT members in 2007-2009 period
ULEV	TBD	2007–2009	DGS	A new long term commercial rental contract was released in March 2007 requiring a minimum ULEV standard for gasoline vehicles and requires alternative fuel and hybrid-electric vehicles.	Underway or to be initiated by CAT members in 2007-2009 period
Flex Fuel Vehicles	370 metric tons CO_2, 0.85 metric tons of CH_4, and 1.14 metric tons of N_2O	2007–2009	DGS	Under this rule/regulation, DGS is replacing 800 vehicles with new, more efficient vehicles.	Underway or to be initiated by CAT members in 2007-2009 period
Climate Registry	TBD	2007–2009	DGS	Benchmarking and reduction of GHG emissions for state owned buildings, leased buildings and light duty vehicles.	Underway or to be initiated by CAT members in 2007-2009 period
Municipal Utilities Electricity Sector Carbon Policy	Included in SB 1368 reductions	2007–2009	CEC, CPUC, ARB	Under this rule/regulation, GHG emissions cap policy guidelines for CA's electricity sector (IOUs and POUs).	Underway or to be initiated by CAT members in 2007-2009 period
Alternative Fuels: Nonpetroleum Fuels	TBD	2007–2009	CEC	State plan to increase the use of alternative fuels for transportation; full fuel cycle assessment.	Underway or to be initiated by CAT members in 2007-2009 period
Zero Waste/High Recycling Strategy	5 MMT CO_2e by 2020	2007–2009	IWMB	This rule/regulation will identify materials to focus on to achieve GHG reduction at the lowest possible cost; Builds on the success of 50% Statewide Recycling Goal.	Underway or to be initiated by CAT members in 2007-2009 period
Organic Materials Management	TBD	2007–2009	IWMB	This rule/regulation will develop a market incentive program to increase organics diversion to the agricultural industry.	Underway or to be initiated by CAT members in 2007-2009 period
Landfill Gas Energy	TBD	2007–2009	IWMB	Landfill Gas to Energy & LNG/biofuels	Underway or to be initiated by CAT members in 2007-2009 period

Table 18
Rule and Regulation Summary

Rule/Regulation	Reduction	Implementation Date	Agency	Description	Comments
Target Recycling	TBD	2007–2009	IWMB	This rule/regulation will focus on industry/public sectors with high GHG components to implement targeted commodity recycling programs.	Underway or to be initiated by CAT members in 2007-2009 period
Accelerated Renewable Portfolio Standard	Included in SB 1368 reductions	2007–2009	CPUC	This rule/regulation will examine RPS long term planning and address the use of tradable renewable energy credits for RPS compliance.	Underway or to be initiated by CAT members in 2007-2009 period
CA Solar Initiative	1 MMT CO_2e by 2020	2007–2009	CPUC	Initiative to deliver 2000 MWs of clean, emissions free energy to the CA grid by 2016.	Underway or to be initiated by CAT members in 2007-2009 period
Carbon Capture and Sequestration	TBD	2007–2009	CPUC	Proposals for power plants with IGCC and/or carbon capture in the next 18 months.	Underway or to be initiated by CAT members in 2007-2009

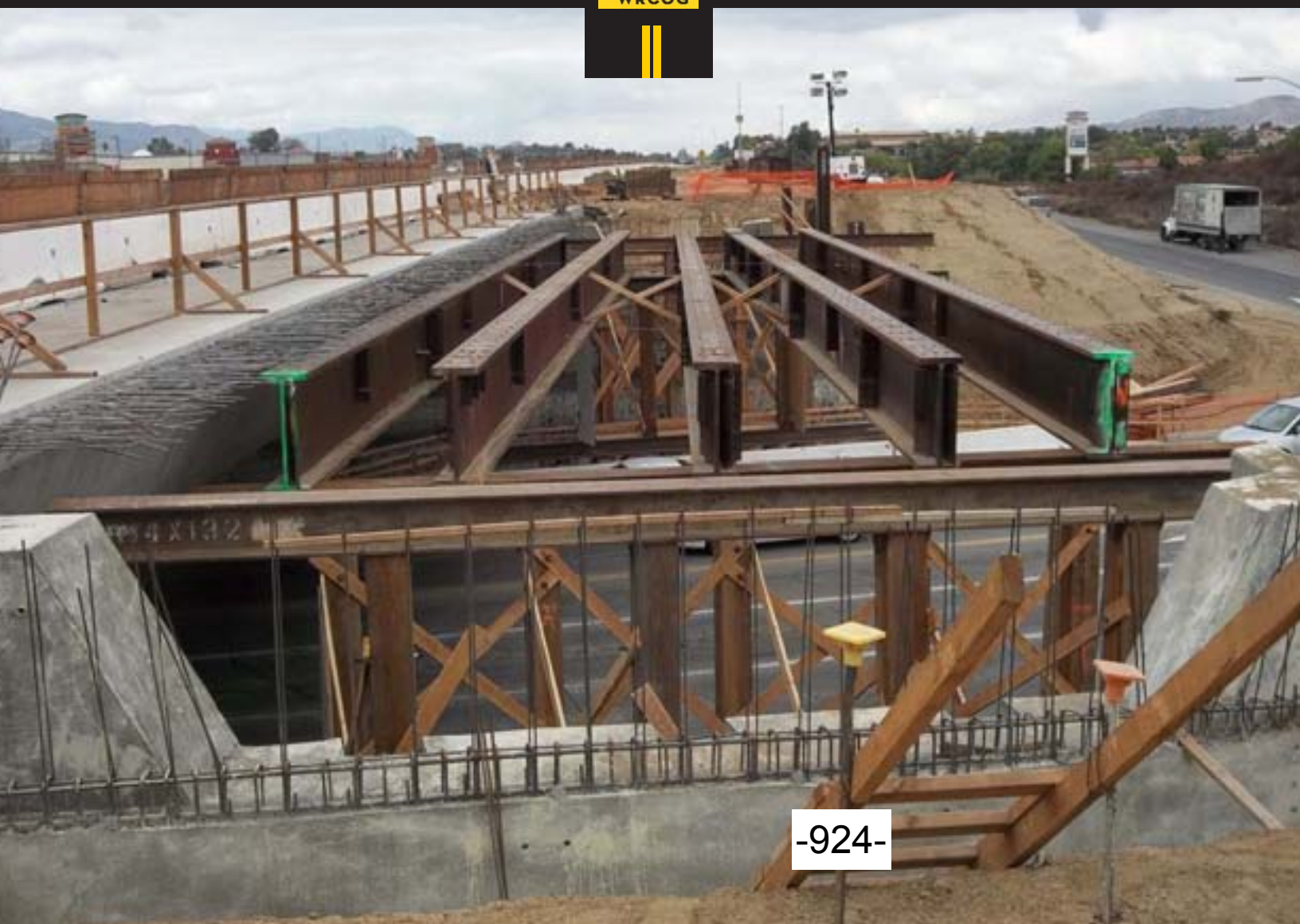
Source: Data complied by EDAW in 2007

AB=Assembly Bill; ARB=California Air Resources Board; Calfire=California Fire; CA=California; Caltrans=California Department of Transportation; CAT=California Action Team; CEC=California Energy Commission; CDFA=California Department of Food and Agriculture; CH_4=Methane; CO_2=Carbon Dioxide; CPUC=California Public Utilities Commission; CUFR=California Urban Forestry; DGS=Department of General Services; DWR=Department of Water Resources; GHG=Greenhouse Gas; GWP=Global Warming Potential; IGCC= Integrated Gasification Combined Cycle; IOU= Investor-Owned Utility; IT=Information Technology; IWCB= Integrated Waste Management Board; LNG= Liquefied Natural Gas; MMT CO_2e=Million Metric Tons Carbon Dioxide Equivalent; MW=Megawatts; NA=Not Available; N_2O=Nitrous Oxide; PFC= Perfluorocompound; POU= Publicly Owned Utility; RPS= Renewable Portfolio Standards; RTP=Regional Transportation Plan SB=Senate Bill; SWP=State Water Project; TBD=To Be Determined; UC/CSU=University of California/California State University; ULEV=Ultra Low Emission Vehicle.

2011 Annual Report

Transportation Uniform Mitigation Fee Program

WESTERN RIVERSIDE COUNCIL OF GOVERNMENTS



Dear Friend,

No doubt about it, crop circles are intriguing, even fascinating, to many. Are the circles the work of alien visitors? Are they a natural phenomenon? Perhaps elaborate hoaxes perpetrated by some very dedicated humans? Whatever you believe them to be, you can't deny that the topic makes for great conversation.

Farmers have reported finding strange circles in their fields for centuries. The earliest mention of a crop circle dates back to the 1500s. Observations of crop circles were sporadic until the 20th century, when circles began appearing in the 1960s and 1970s in England and the United States. By the 1990s, crop circles had become something of a tourist attraction. In 1990 alone, more than 500 circles emerged in Europe. Within the next few years, there were thousands. Visitors came from around the world to see them. They became associated with strange lights, reports of malfunctioning electronic equipment, and positive health effects on people visiting circles, suggesting that the phenomenon involves unexplained forces.

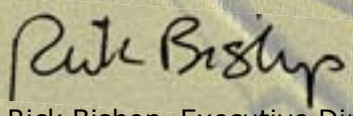
In 2003, to considerably less fanfare, a series of circles also began appearing in Western Riverside County. Unlike the mysteriousness surrounding crop circle origins, those sighted in the WRCOG subregion (see p. 46 of this Annual Report for a closer look) do not defy explanation. The concentric circles found in these pages simply show the total value of road, bridge and interchange improvements to be constructed using revenues from WRCOG's Transportation Uniform Mitigation Fee (TUMF) Program within 3, 5, and 10-mile diameters from each city center in Western Riverside County. No hoaxes. No flashy lights. No alien trails. Just fact.

WRCOG's circles demonstrate the immense ***regional value*** of the TUMF Program, the nation's largest uniform development fee program for transportation improvements. ***Regional value*** is the centerpiece of the TUMF Program, recognizing that residents and employees in all of Western Riverside County's jurisdictions utilize arterials located not just in the city in which they live and/or work, but also those in adjacent jurisdictions and beyond. Without TUMF's regional approach to funding transportation improvements, there is no way any single jurisdiction could, by itself, raise the revenues needed to construct the transportation infrastructure that will be coming their way via this Program. Developers in the City of Lake Elsinore, for example, will contribute approximately $50 million to the TUMF Program over time, yet more than $480 million in TUMF improvements are identified to be constructed within 10 miles from the City center. The circle pattern repeats itself in each of WRCOG's jurisdictions: $429 million in TUMF improvements are identified within 10 miles of Hemet's City center, $648 million from Jurupa Valley's city center, $827 million from Murrieta's City center, and so on.

When completed, the TUMF Program will construct 1,229 new lane-miles of arterials, improve 58 interchanges, construct or widen 56 bridges, construct 17 railroad grade separations, provide more than $61 million for regional transit improvements, and provide nearly $60 million for acquisition of sensitive habitat. Already, at the end of the 2010/2011 fiscal year, 46 TUMF-funded projects had been completed.

As the administrator of the TUMF Program, WRCOG is pleased to provide this 2011 TUMF Annual Report. The Report provides detailed information about the history and status of the Program, including revenues collected, projects completed and programmed, as well as the latest updates regarding which projects are to be constructed. Our goal is to provide information that will be helpful in understanding the direction and accomplishments of the TUMF Program.

Crop circles have been said to bestow health benefits to those who visit them. We can't vouch for that, but we do believe that health benefits - in the form of reduced congestion - will come to residents and employees who drive within WRCOG's circles in the future.



Rick Bishop, Executive Director
Western Riverside Council of Governments

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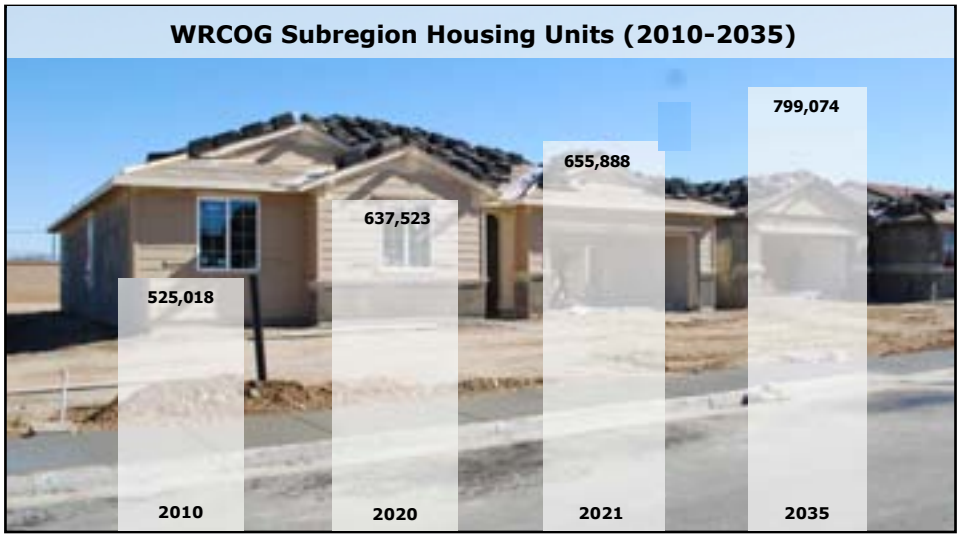
Cover photo: Construction underway on the Cal Oaks / I-15 Interchange Improvement Project, City of Murrieta (Photo courtesy of City of Murrieta)

Introduction

SR-74 (4th) / I-215 Interchange Project (City of Perris (Photo courtesy of RCTC)

Green River Road / SR-91 Interchange construction (Photo courtesy of RCTC)

Riverside County is the fourth most populated California county, and the eleventh most populated County in the United States. Western Riverside County includes seventeen incorporated Cities and the unincorporated county, covering an area of approximately 2,100 square miles. The subregion's population is over 1.7 million people and will grow by over 700,000 between now and 2035, reaching 2.46 million residents (in 1990, Western Riverside County had approximately 869,559 people). Between 2010 and 2011, Riverside County had the highest growth rate (1.59 percent) in the state, adding over 34,000 new residents during the year.



Source: Riverside County Center for Demographic Research

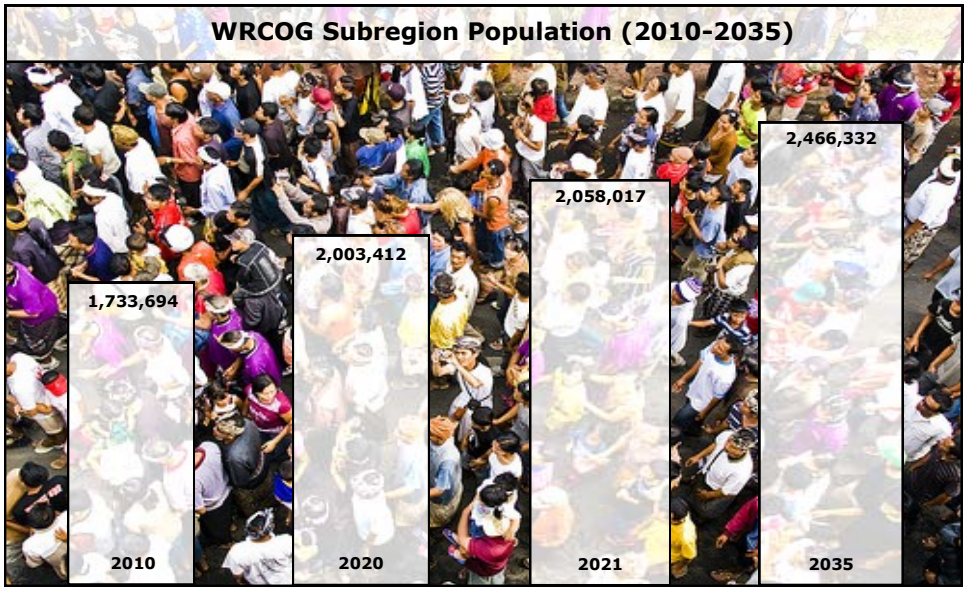
Along with the tremendous opportunities that growth brings comes consequences and challenges, including a heavy impact on transportation infrastructure.

Projected growth in Western Riverside County can be expected to significantly increase congestion and degrade mobility unless substantial investments are

made in the subregion's transportation infrastructure. This challenge is especially critical for arterial highways and roadways that carry a significant number of trips between the jurisdictions within the subregion. As more jobs come to the subregion, thousands of vehicle trips that occur on the freeways as commuters travel to other counties for employment are transitioning to the subregion's arterials, which are already heavily used by current commuters.

Traditional sources of transportation improvement funding (such as the gasoline tax) will not be sufficient to fund the transportation improvements needed to serve this significant new growth. Development conditions and local Development Impact Fees (DIFs) are limited in scope, and when applied, do not provide for regional improvements necessary to accommodate new growth, as improvements are usually confined to the area immediately adjacent to the respective development. Broad-based county-level funding sources, such as Riverside County's half-cent sales tax known as Measure A, focus most expenditures for freeways, designating lesser revenue allocations for arterial roadway improvements.

As a result of growth in Western Riverside County, additional pressure will be placed on the subregion's transportation infrastructure, particularly the arterial roadways, with Vehicle Miles Traveled (VMT) estimated to increase by 55 percent, or 1.6 percent compounded annually. By 2035, 36 percent of the total VMT on the regional arterial highway system is forecast to operate on facilities at Level Of Service (LOS) E or worse. (LOS is a qualitative measure used to describe traffic flow conditions, ranging from free flow conditions at LOS A to congested conditions at LOS F.)



Source: Riverside County Center for Demographic Research

In 2007, the total Vehicle Hours of Delay (VHD) experienced by area motorists on arterial highways was 25.8 million hours. Without improvements to the arterial highway system, VHD will increase by more than 5.4 percent per year to 50 million VHD by 2035. The need to improve these roadways and relieve future congestion is, therefore, directly linked to the future development that generates the travel demand.

Additionally, a substantial number of future trips will be served by bus transit services within Western Riverside County, which is also a result of future development.

In August 2000, the WRCOG Executive Committee directed that the development of a consolidated uniform mitigation fee program for all of Western Riverside County be undertaken. This action was based on the desire to establish a single uniform fee program to mitigate the cumulative regional impacts of new development on the subregion's arterial highway system, rather than having multiple and potential[illegible]rdinated fee programs with

varying policies, fee amounts and improvement projects. A regional transportation program was viewed as the most effective way to address the cumulative impacts of new development in the WRCOG subregion.

Corona Transit Center, City of Corona

The subregion's Public Works Directors identified a network of roads, bridges, interchanges and railroad grade separations that should be included in this Program. The network, known as the Regional System of Highways and Arterials (RSHA), represents the subregion's cumulative and seamless identification of transportation improvements needed to accommodate future growth in the subregion through 2035. The RSHA (see p. 8 of this Report) serves as the cornerstone of the TUMF Program, and provides the basis for the "Nexus Study" prepared to demonstrate the impact of future development on the subregion's RSHA, identify improvements needed to accommodate the projected growth, establish improvement costs and - ultimately - to determine the fee structure for the TUMF Program.

In order to ensure the TUMF Program's "Nexus Study" remains current, a new Nexus Study was prepared by WRCOG during the 2009/2010 fiscal year to update the TUMF Program. The updated Nexus Study continues to demonstrate the relationship between the fee collected and the proposed improvements due to new growth. Factors that reflect this relationship include the following:

- Western Riverside County is expected to continue to examine significant long-term growth.
- Continuing new growth will result in increasing congestion on arterial roadways.
- Future arterial roadway congestion is directly attributable to the cumulative regional transportation impacts of future development in Western Riverside County.
- Capacity improvements to the transportation system will be needed to mitigate the cumulative impacts of new development.
- Roads on the TUMF Network (Network) are the facilities that merit improvement through this fee Program.
- Improvements to the public transportation system will be needed to provide adequate mobility for the transit-dependent travelers and to provide an alternative to automotive travel.

The WRCOG Executive Committee approved the findings of the Nexus Study update and adopted the proposed fee structure. The fee is based on an updated growth forecast, an

updated cost of the improvements, a revised RSHA, and the elimination of existing need since it cannot be part of the fee.

Between now and 2035, the TUMF Program is estimated to provide $4.2 billion in arterial road, bridge, intersection and interchange improvements in Western Riverside County. Once fees are collected from new development by each of WRCOG's participating jurisdictions, TUMF Program dollars are programmed by WRCOG's partner agencies to implement the TUMF Program, which includes: the jurisdictions, the Riverside Transit Agency (RTA), the March Joint Powers Authority, and the Riverside County Transportation Commission (RCTC).

These jurisdictions and agencies are responsible for prioritizing which TUMF projects will be constructed first, and also for overseeing all aspects of project development. This implementation approach allows those agencies to move quickly in developing priorities and constructing projects.

As part of the Nexus Study update, the RSHA was revised to reflect the most current transportation needs and costs for Western Riverside County. The new Network reflected several changes due to completed projects and recommendations from the WRCOG Public Works Committee (PWC) to better represent the transportation needs of Western Riverside County.

The updated Network revised the number of lane miles, interchanges, intersections and grade separations from the previous network. In addition, it eliminated the following improvements: Category 4 interchange improvements (generally ramp improvements) and Category 5

SR-79 Winchester Road / I-15 Interchange Project, City of Temecula (Photo courtesy of City of Temecula)

interchange improvements (TUMF-to-TUMF grade separations); all costs associated with TUMF facilities as part of Communities Facilities District 93-1 in the City of Beaumont; TUMF-to-TUMF intersection improvements; and the Mid County Parkway segment from I-215 to I-15.

The updated Ntwork also reflects all completed TUMF projects, and no new projects were added, resulting in an overall RSHA reduction in cost.

Van Buren Bridge over Santa Ana River (Photo courtesy of TLMA)

A summary of improvements to the RSHA that will be provided by the TUMF Program is as follows:

- Construct 1,229 new lane miles of arterials.
- Improve 58 interchanges.
- Construct or widen 56 bridges.
- Provide more than $61 million for regional transit improvements.
- Provide nearly $60 million for acquisition of sensitive habitat.
- Construct 17 railroad grade separations.

This Annual Report provides a summary of revenues collected and expended during the 2010/2011 fiscal year. It summarizes projects that have been constructed, programmed, or are underway in accordance with adopted Transportation Improvement Programs (TIPs) for each of the Program's five zones, RCTC and RTA.

Visible evidence of Program implementation already exists, as 47 TUMF-funded projects are already built. The list of completed projects can be found in the "Projects" section (p. 45) of this Report.

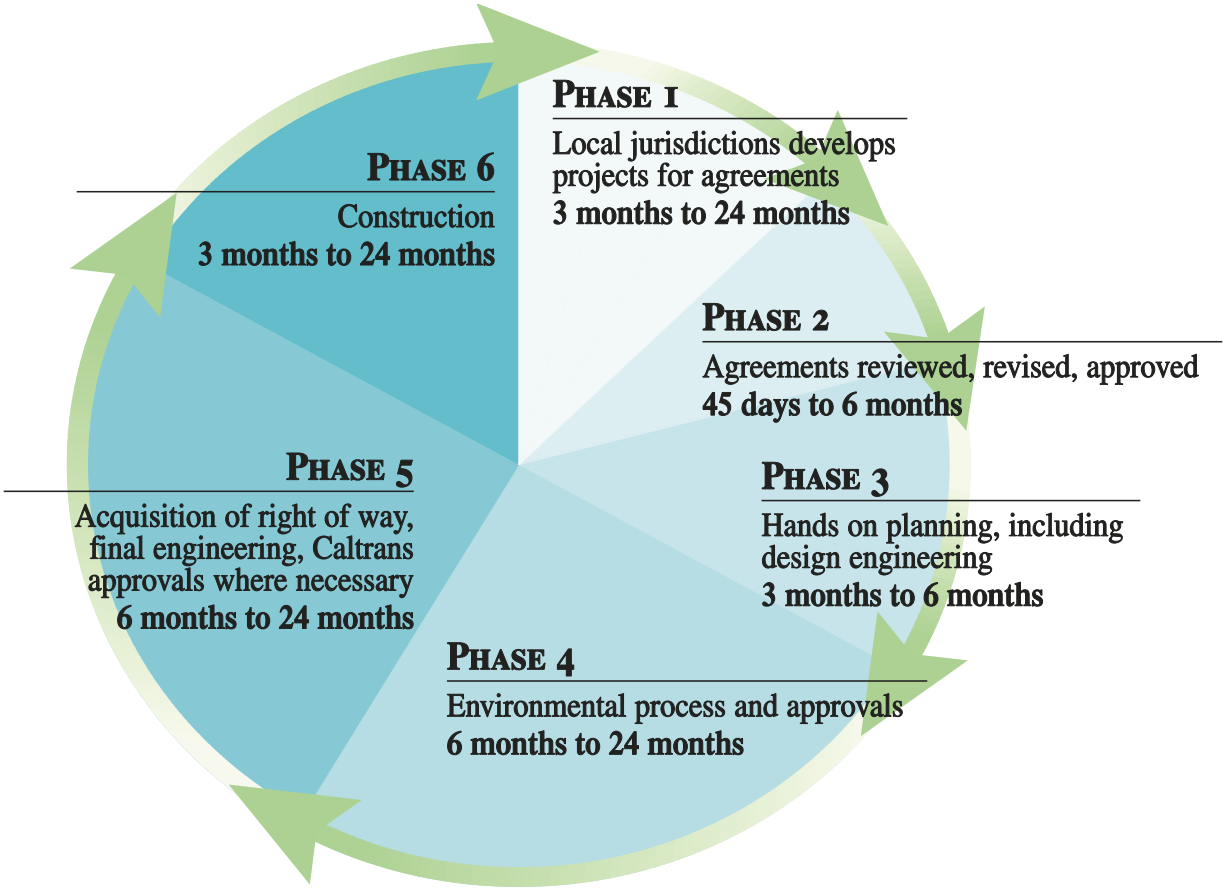
The TUMF Program is administered by WRCOG, a joint powers authority consisting of the 17 cities in Western Riverside County, the County of Riverside, the Eastern Municipal Water District and Western Municipal Water District, the Riverside County Superintendent of Schools and the March JPA (a voting member on TUMF items at the Technical Advisory Committee level).

For more information regarding WRCOG, or to find more details related to the TUMF Program, please visit WRCOG's website at www.wrcog.cog.ca.us.

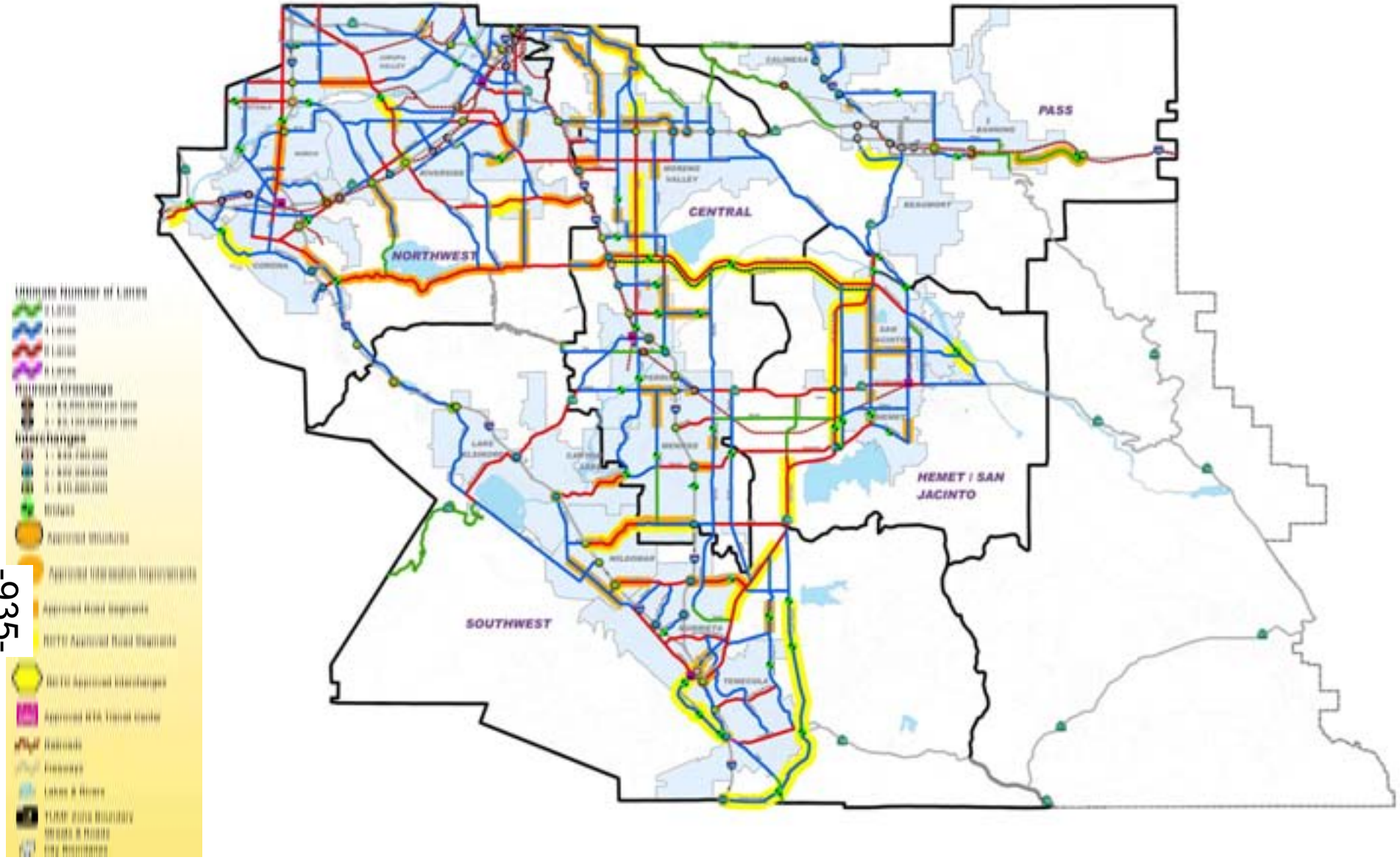
When the TUMF Program was initiated in 2003, there were virtually no "shelf-ready" projects ready to be built. Development of the TUMF Network (the RSHA) by the Public Works Directors in the subregion's then 15 jurisdictions was a significant accomplishment in itself, as it meant that for the first time the subregion had a comprehensive and cohesive arterial system that recognized the region's — and not just an individuals jurisdiction's — projected growth. By not having "shelf-ready" projects (projects that had already completed necessary planning and engineering studies, had right-of-way acquired, and had secured all required permits and funding), many projects proposed by the TUMF Program had to be developed from the ground up. In the initial stages of preparing projects for the jurisdictions in each Zone, WRCOG assisted with revenue projections and individual zone-level TIP development. Now that the Zone programs are up and running, the task of building projects takes center stage.

But how long does it take to deliver a project? As jurisdictions bring forward new projects, when can these projects expect to become a reality? There are a number of steps that need to occur for a typical transportation project to be built, and it is important to understand general timelines so that expectations can be realistic regarding the pace of TUMF project implementation. The "Life Cycle of a TUMF Project" diagram below provides, in general terms, the various steps and associated timeframes for a typical TUMF project.

LIFE CYCLE OF A TUMF PROJECT



Regional System of Highways and Arterials (RSHA)



The Regional System of Highways & Arterials depicts TUMF Program improvements. A detailed listing of Program improvements can be obtained by calling WRCOG at (951) 955-7985 or by visiting WRCOG's website at www.wrcog.cog.ca.us.

Revenue

Artist rendering of Cal Oaks/I-15 Interchange Project, City of Murrieta

I-215 / Clinton Keith Road Interchange Project, City of Murrieta (Photo courtesy City of Murrieta)

How Does the TUMF Program Work?

AB 1600, the California Mitigation Fee Act, requires that a reasonable relationship exist between a development impact fee collected and the proposed improvements for which a fee is used. WRCOG's TUMF Program Nexus Study satisfies the requirements of AB 1600, and has two primary objectives: 1) to demonstrate the relationship between the transportation improvements needed due to new growth and the estimated cost to construct improvements; and 2) to establish the "fair share" component of the improvements for each land use category (the TUMF Program cost to be applied to different land uses based on the trip-generating characteristics that are typically associated with such uses). The TUMF Program distinguishes between transportation improvements and trip-productions in five geographic zones (Northwest, Southwest, Hemet/San Jacinto, Central, and the Pass), regional transportation improvements, and regional transit improvements.

This distinction provides maximum flexibility for programming projects. The Nexus Study identifies the percentage of collected revenues that can be allocated for zone-level improvements, regional improvements, and for transit improvements.

After administrative costs and Multiple Species Habitat Conservation Plan (MSHCP) mitigation allocations are extracted from the revenues collected, WRCOG allocates revenues as follows:

- **46.9** percent is allocated for regional improvements. These revenues are programmed by the RCTC pursuant to an agreement with WRCOG.
- **46.9** percent is allocated to the geographic zone from which the fees are collected. Project prioritization and programming are undertaken by the jurisdictions in each of the five zones.

I-215 / Clinton Keith Road Interchange Project, City of Murrieta (After improvements) (Photo courtesy City of Murrieta)

- **1.7** percent is allocated for regional transit projects. WRCOG administers the funds on behalf of the RTA which prioritizes and programs capital transit projects.

As of June 30, 2011, WRCOG has received $539.9 million in revenues from the time the Program commenced (February 2003).

For Fiscal Year 2010/2011, $15.2 million in Program revenue was collected.

This report summarizes TUMF activities from July 1, 2010, to June 30, 2011. Financial information for the City of Jurupa Valley (incorporated on July 1, 2011) will be included in the 2012 Annual Report.

The TUMF Program collects fees from new residential and non-residential land uses.

Residential Uses

Residential uses include two categories; single-family residential and multi-family residential. A residential development with densities lower than eight units per acre is considered single-family residential for the purposes of calculating the fee. Developments with densities greater than eight units per acre are considered multi-family residential.

Non-residential Uses

Non-residential uses include three categories; industrial, retail and service commercial. The non-residential fee is based on the total square footage of the building or structure identified on the building permit and further specified and determined in WRCOG's TUMF Administrative Plan and TUMF 2005 Updated Fee Calculation Handbook Revised January 26, 2012. The applicable non-residential land use category is determined based on the predominate use of the building or structure associated with the new development and as further prescribed in the TUMF ordinances.

Nexus Study and Temporary Fee Reductions

In October 2009, WRCOG member agencies approved an updated TUMF Program Nexus Study. The Nexus Study established the impact future development will have on the existing subregion's arterials and determined the fee structure needed to pay for infrastructure to mitigate these impacts.

The 2009 Nexus Study projected a slower, more moderate forecast than previous studies. Coupled with lower construction costs and a revised Network, fees were reduced. For example, the fee for a single-family home decreased from $9,812 to $8,873. Fees for other residential and non-residential uses were also revised pursuant to the new Nexus Study. All participating agencies adopted the 2009 Nexus Study and fee structure.

In 2009, the WRCOG Executive Committee authorized jurisdictions to temporarily reduce TUMF by 50 percent so long as they "made up" any revenue gaps through alternative funding, cost saving and in-kind matches. Fee reductions are scheduled to sunset on December 31, 2012, or possibly sooner (the Executive Committee capped the total revenue shortfall at $20 million).

Fees effective July 1, 2010 through June 30, 2011:

Single-family residential	$8,873 per unit
Multi-family residential	$6,231 per unit
Industrial	$ 1.73 per square foot
Retail	$10.49 per square foot
Service	$ 4.19 per square foot
Class A & B Office	$ 2.19 per square foot

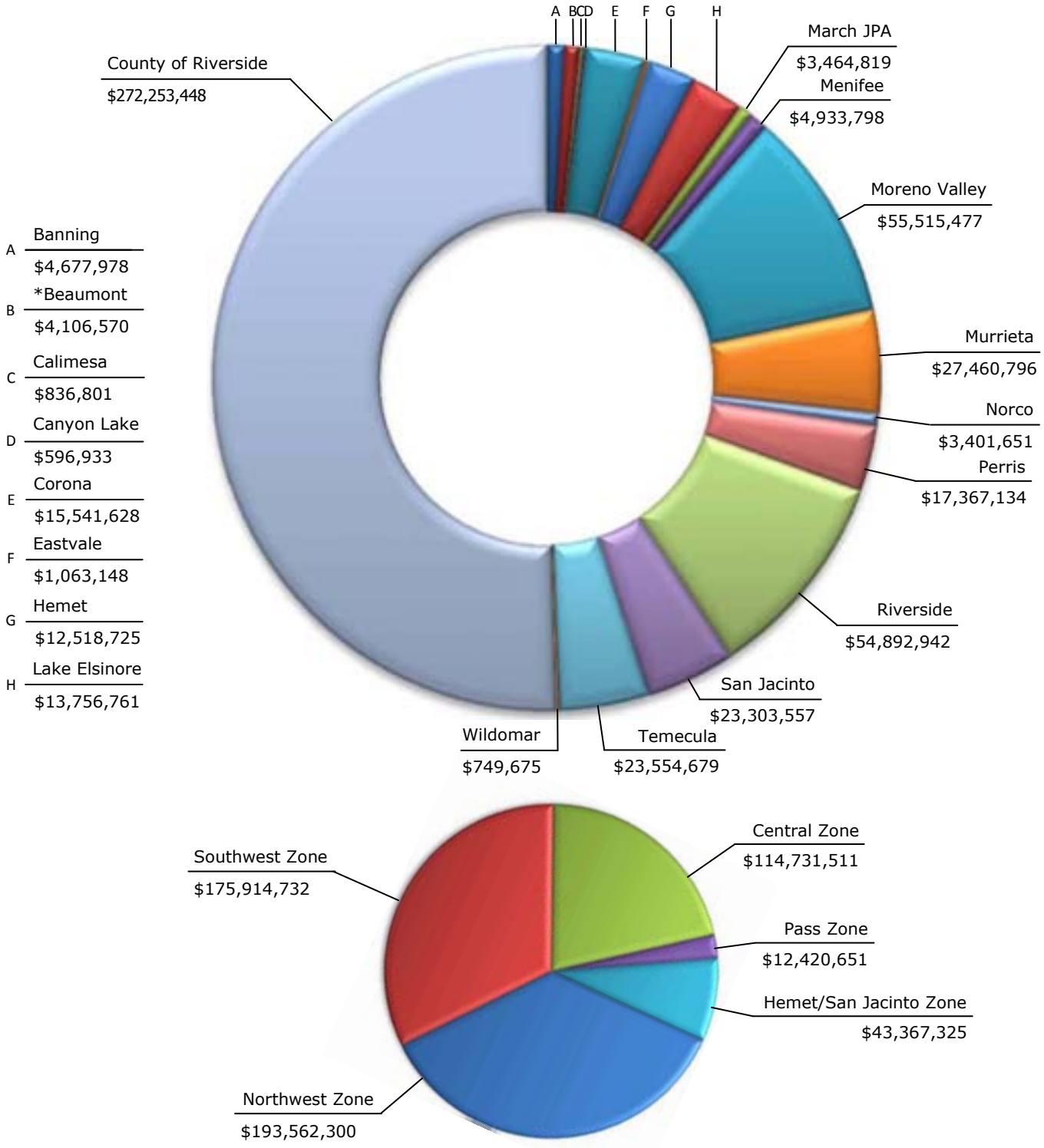
50% reduced fee is:

Single-family residential	$4,437 per unit
Multi-family residential	$3,115 per unit
Industrial	$ 0.86 per square foot
Retail	$ 5.24 per square foot
Service	$ 2.10 per square foot
Class A & B Office	$ 1.10 per square foot

TUMF Revenue by Jurisdiction and Zone

February 2003 through June 2011

Total Revenue: $539,996,519



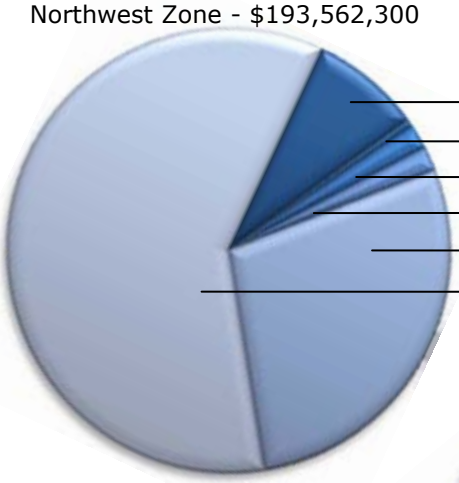
TUMF revenues are collected by each of the jurisdictions in the WRCOG subregion (17 cities and the County of Riverside unincorporated area within WRCOG's boundaries). TUMF revenues are also collected by the March Joint Powers Authority. From Program inception (February 2003) through the end of Fiscal Year 2010/2011 (June 30, 2011), a total of $539.9 million in TUMF Program revenue fees was collected.

*The City of Beaumont is no longer participating in the TUMF Program.

Actual jurisdiction revenues may vary by a dollar due to rounding.

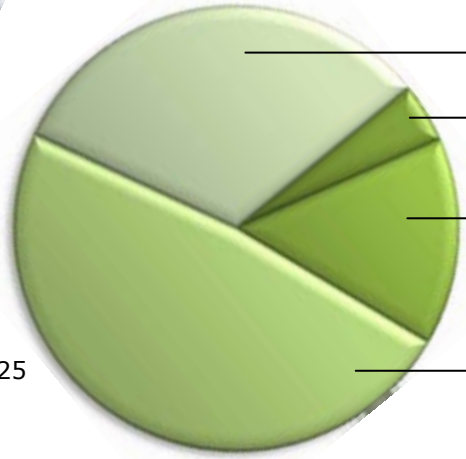
TUMF Revenue Breakdown By Zone and Jurisdiction (2003-2011)

Northwest Zone - $193,562,300



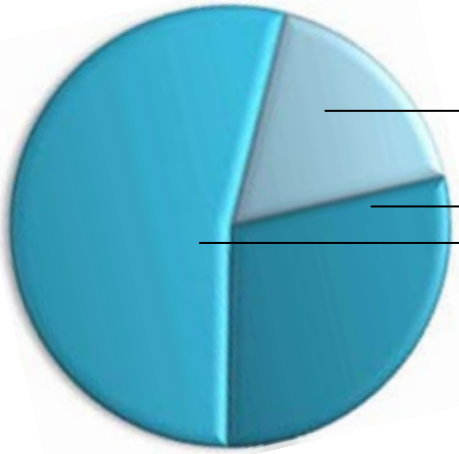
Corona	$	15,541,628
Eastvale	$	1,063,148
March JPA	$	3,464,819
Norco	$	3,401,651
Riverside	$	54,892,942
County of Riverside	$	115,198,113

Central Zone - $114,731,511



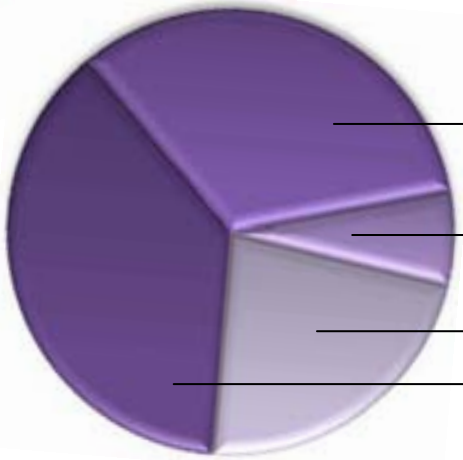
County of Riverside	$	36,915,103
Menifee	$	4,933,798
Perris	$	17,367,134
Moreno Valley	$	55,515,477

Hemet/San Jacinto Zone - $43,367,325



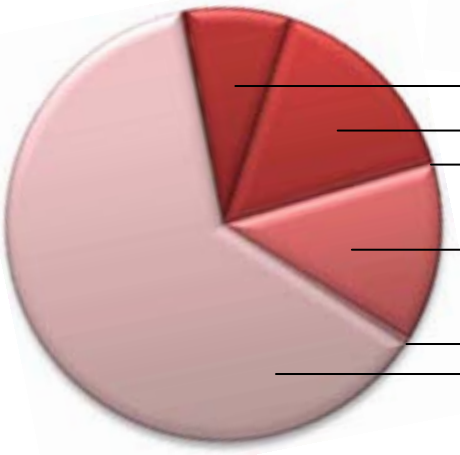
County of Riverside	$	7,545,042
Hemet	$	12,518,725
San Jacinto	$	23,303,557

Pass Zone - $12,420,651



Banning	$	4,677,978
Calimesa	$	836,801
County of Riverside	$	2,799,302
*Beaumont	$	4,106,570

Southwest Zone - $175,914,732



Lake Elsinore	$	13,756,761
Murrieta	$	27,460,796
Canyon Lake	$	596,933
Temecula	$	23,554,679
Wildomar	$	749,675
County of Riverside	$	109,795,888

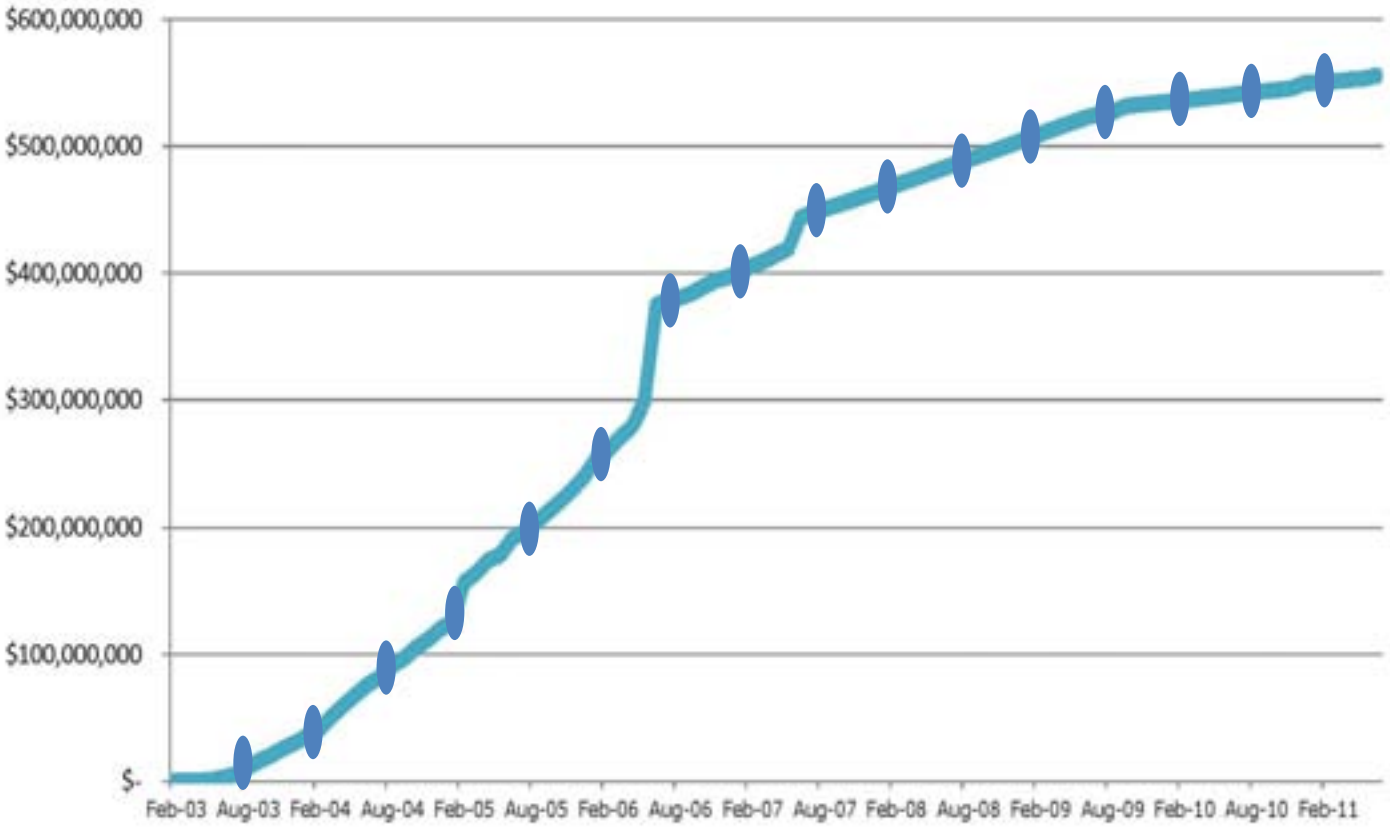
2003-2011 Revenue Total $539,996,519

*The City of Beaumont is no longer participating in the TUMF Program. Actual jurisdic-941-s may vary by a dollar due to rounding.

TUMF Revenues Collected by Fiscal Year

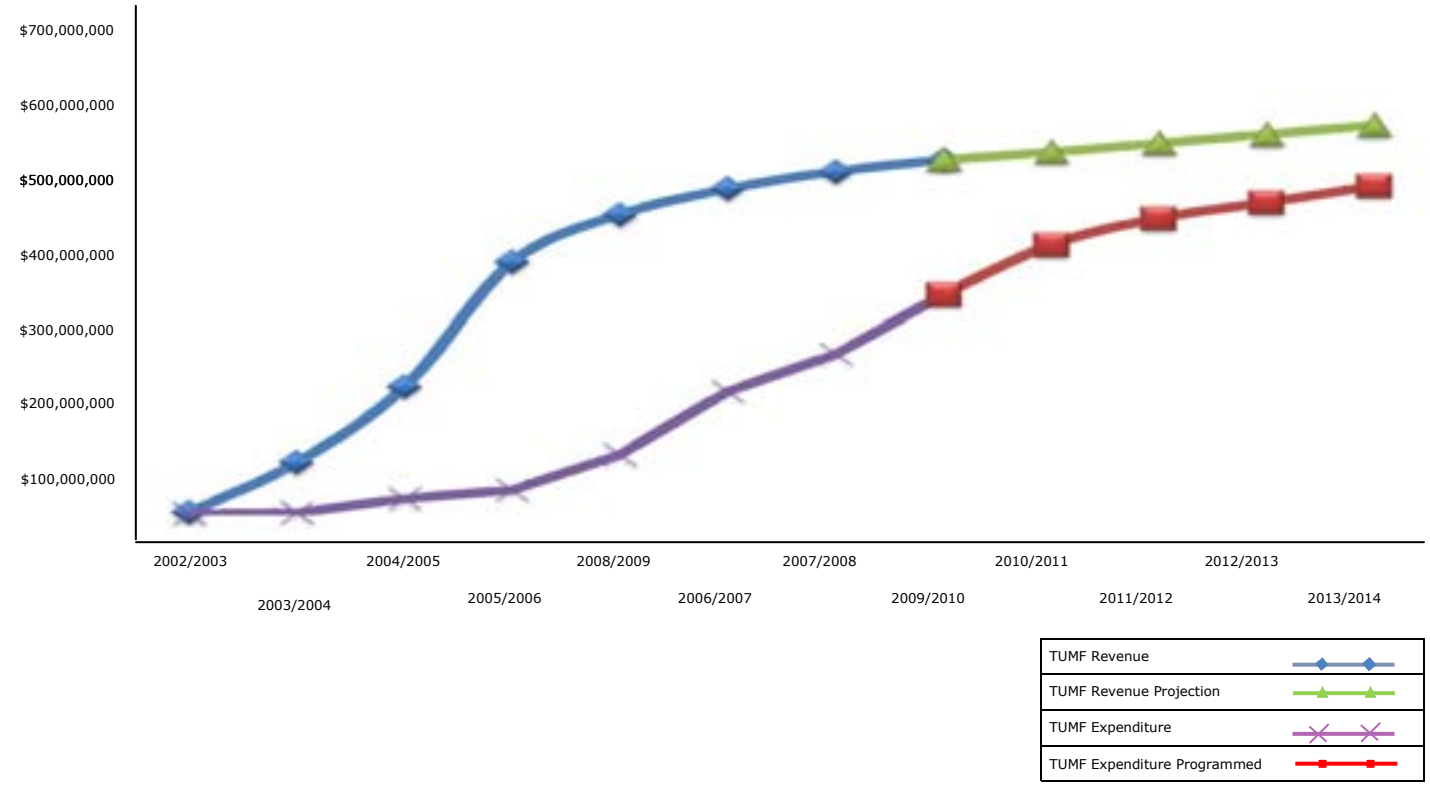
Note: In FY 2002/2003, revenues were not collected until February 2003

Total TUMF Revenue Collection (Cumulative)
February 2003 through June 2011

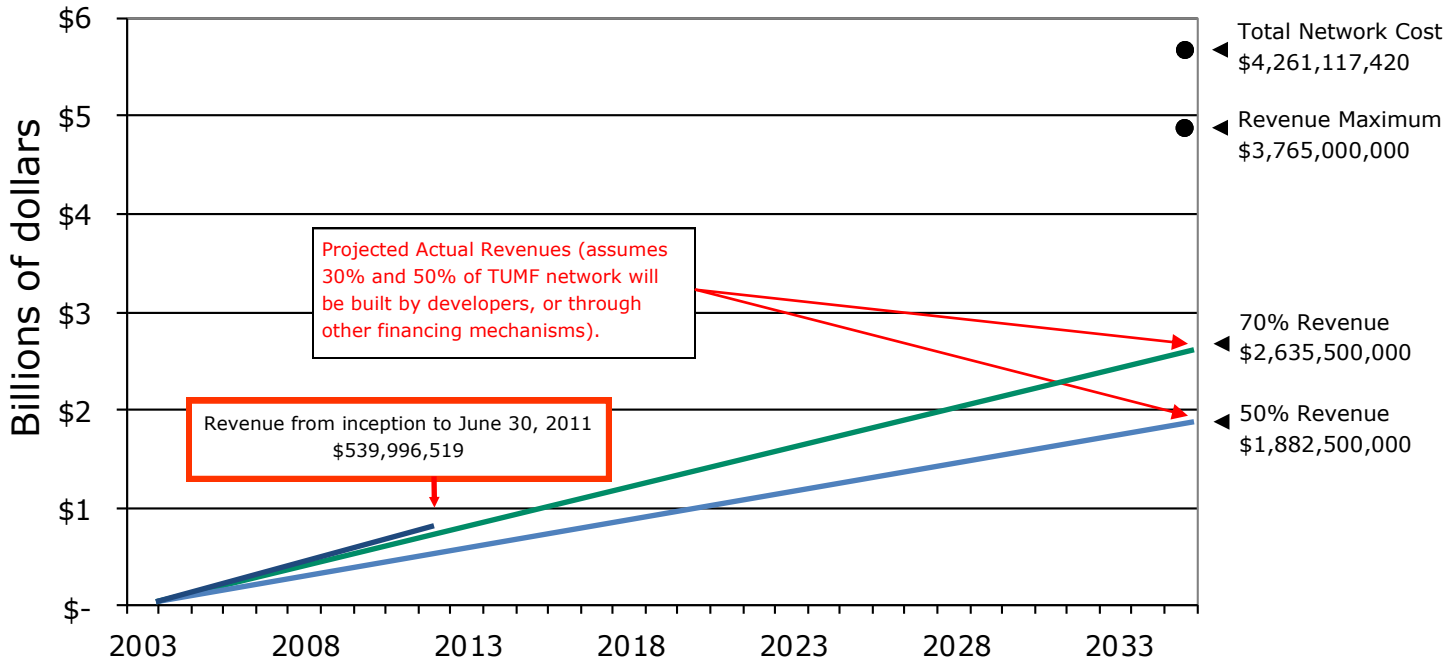


WRCOG TUMF Revenue vs. Expenditure (Cumulative)

February 2003 through June 2011



TUMF System Costs vs. Revenue Stream

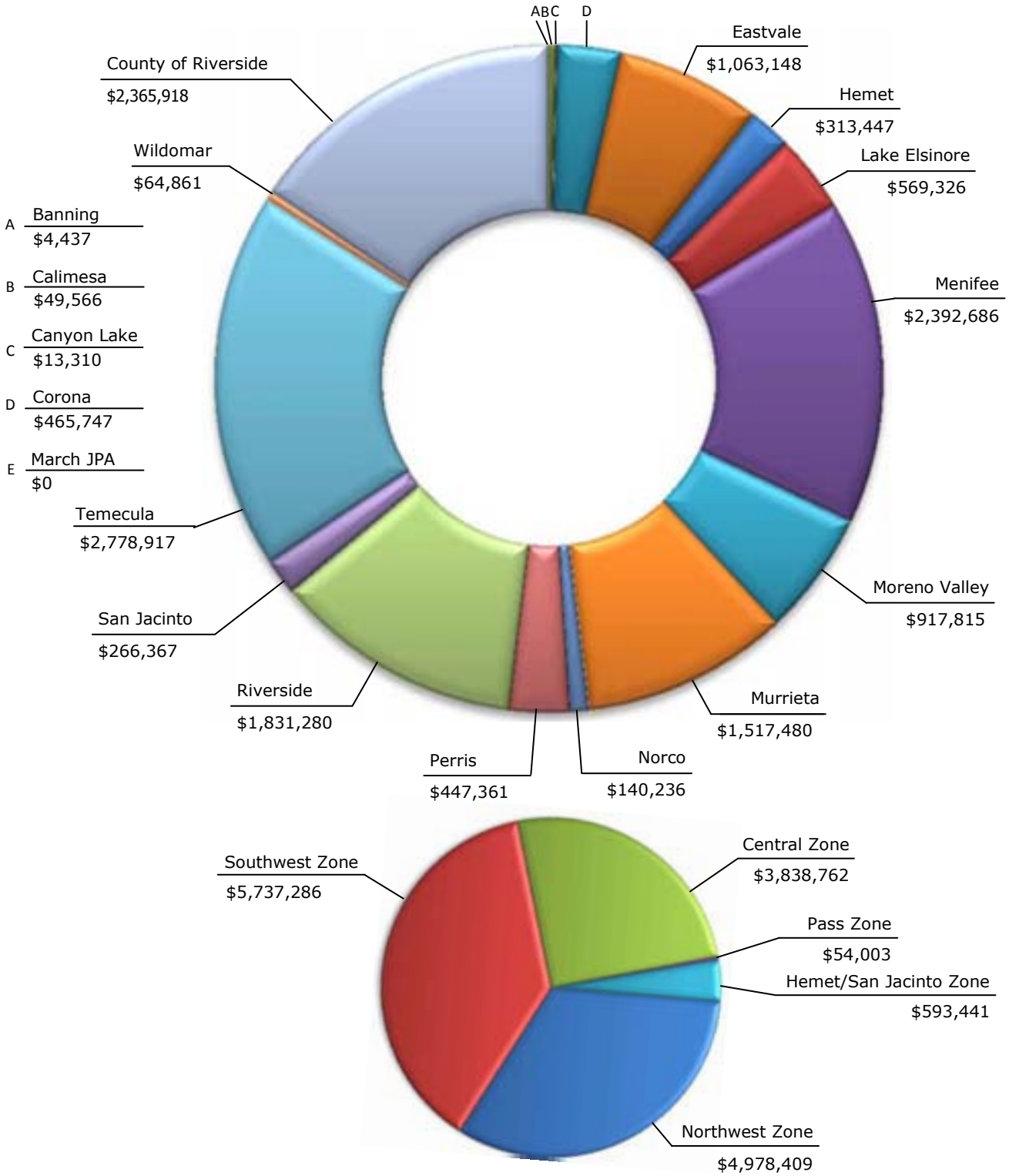


The total network cost of the Program (RSHA improvements) is $4.2 billion. Numerous elements affect the total potential revenue collected by the Program such as exemptions from TUMF due to vesting maps, development agreements, phasing of fees, and policy actions. As such, the maximum amount of fees that can be collected by the TUMF Program is approximately $3.765 billion. It is estimated that between 30% and 50% of the TUMF Network will be built by developers, or through alternative funding mechanisms such as Community Facilities Districts and Road and Bridge Benefit Districts. Actual fees to be collected, therefore, are estimated at $1.882 billion (assuming 50% of the Network is constructed by developers or through financing mechanisms in which case fees are not collected) or $2.635 billion (assuming 30% of the Network is constructed witho cted.)

TUMF Revenue by Jurisdiction and Zone

Fiscal Year 2010/2011 (July 1, 2010, to June 30, 2011)

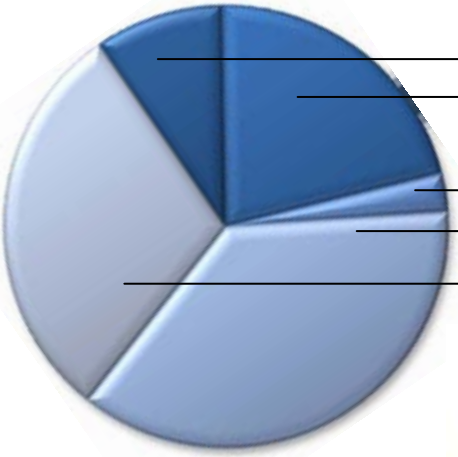
Total Revenue: $15,201,902



Actual jurisdiction revenues may vary by a dollar due to rounding.

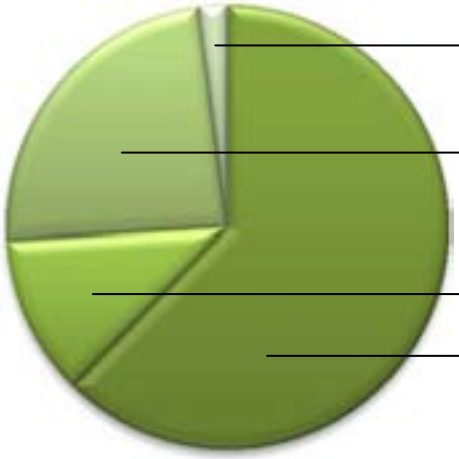
TUMF Revenue Breakdown By Zone and Jurisdiction (FY 2010/2011)

Northwest Zone - $4,978,409



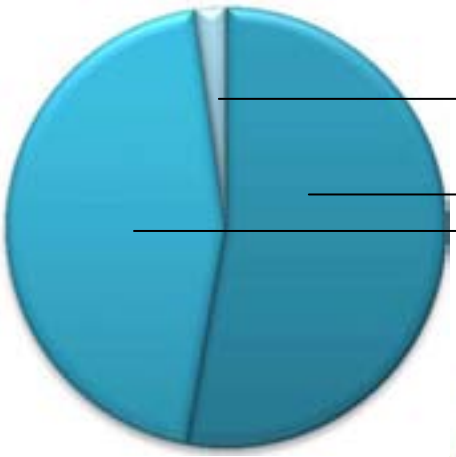
Corona	$	465,747
Eastvale	$	1,063,148
March JPA	$	0
Norco	$	140,236
Riverside	$	1,831,280
County of Riverside	$	1,477,999

Central Zone - $3,838,762



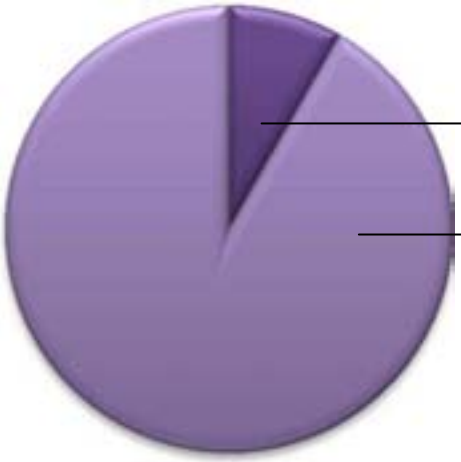
County of Riverside	$	80,900
Moreno Valley	$	917,815
Perris	$	447,361
Menifee	$	2,392,686

Hemet/San Jacinto Zone - $593,441



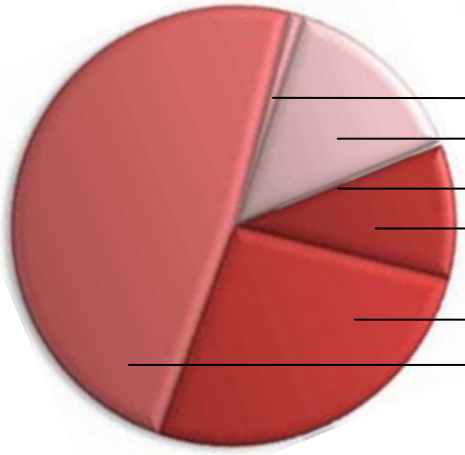
County of Riverside	$	13,627
Hemet	$	313,447
San Jacinto	$	266,367

Pass Zone - $54,003



Banning	$	4,437
Calimesa	$	49,566
County of Riverside	$	0

Southwest Zone - $5,737,286



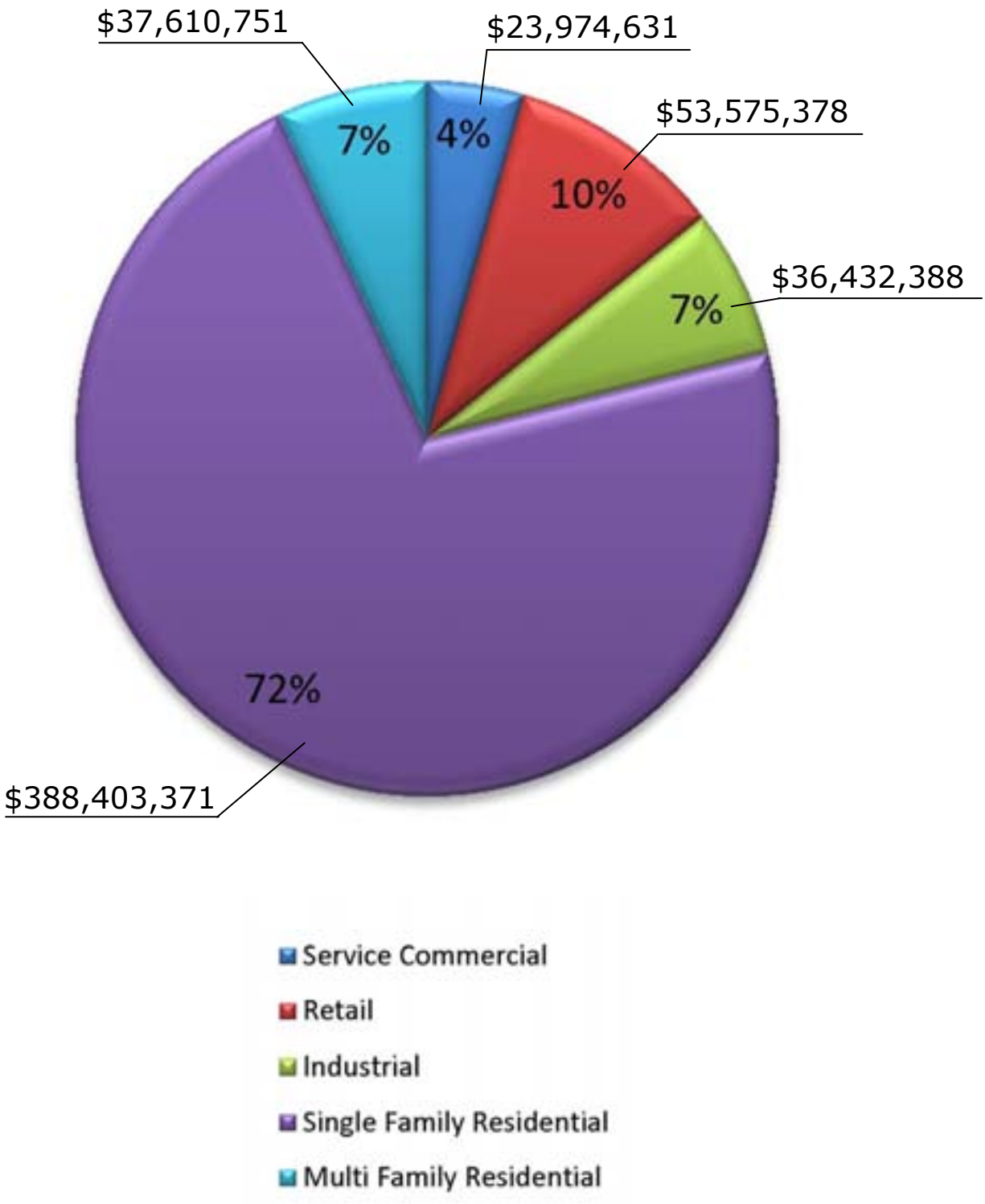
Wildomar	$	64,861
County of Riverside	$	793,392
Canyon Lake	$	13,310
Lake Elsinore	$	569,326
Murrieta	$	1,517,480
Temecula	$	2,778,917

Fiscal Year 2010/2011 Revenue Total $15,201,902

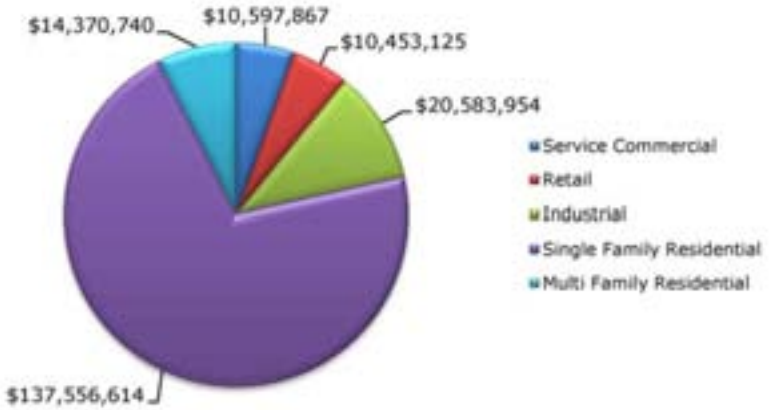
Actual jurisdiction revenues may vary by a dollar due to rounding.

TUMF Revenue by Land Use (2003-2011)

Total Revenue: $539,996,519



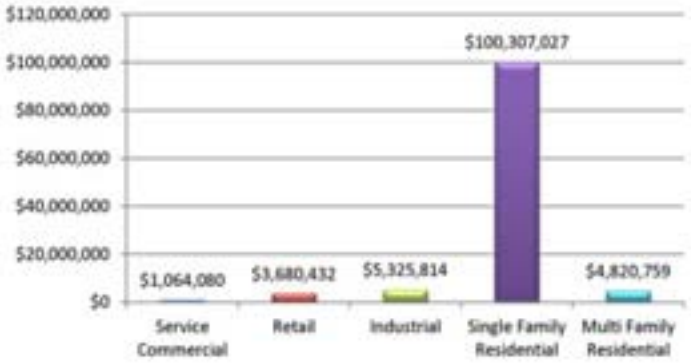
TUMF Revenue by Land Use (2003-2011)



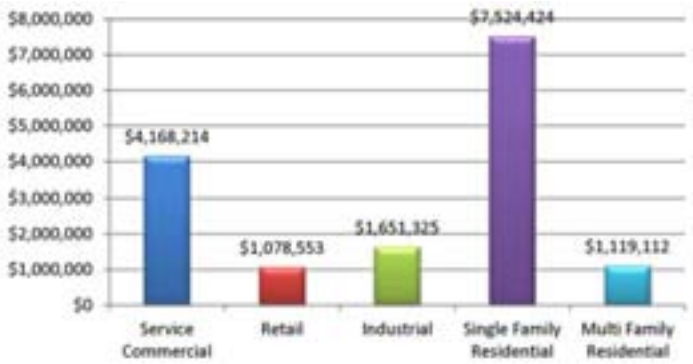
Northwest Zone

- County of Riverside unincorporated
- City of Corona
- City of Eastvale
- *City of Jurupa Valley
- City of Norco
- City of Riverside
- March Joint Powers Authority

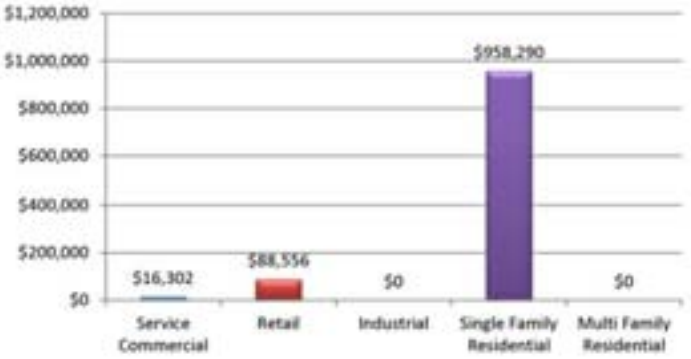
County of Riverside



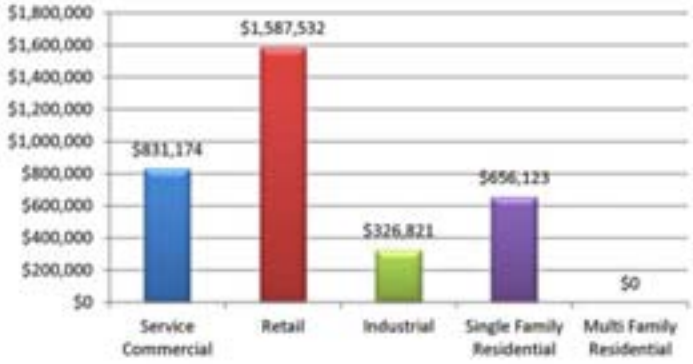
Corona



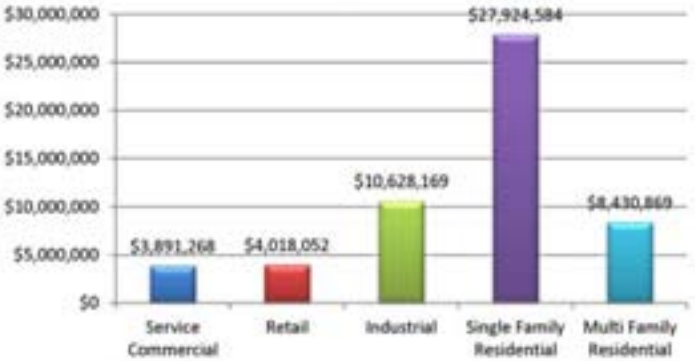
Eastvale



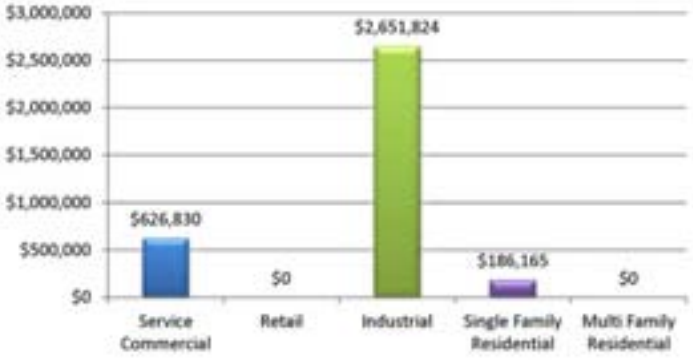
Norco



Riverside

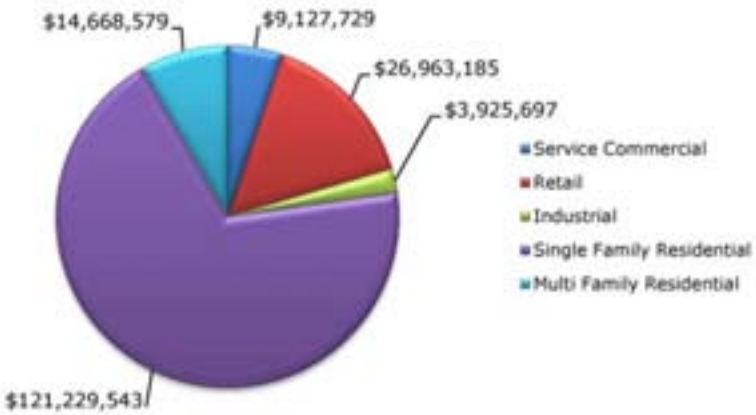


March JPA



*Financial information for the City of Jurupa Valley (incorporated on July 1, 2011) will be included in the 2012 Annual Report.
The County of Riverside and the Cities of Corona, Eastvale, Norco, and Riverside for all or part [illegible] educed the fee by 50%.
Actual jurisdiction revenues may vary by a dollar due to rounding.

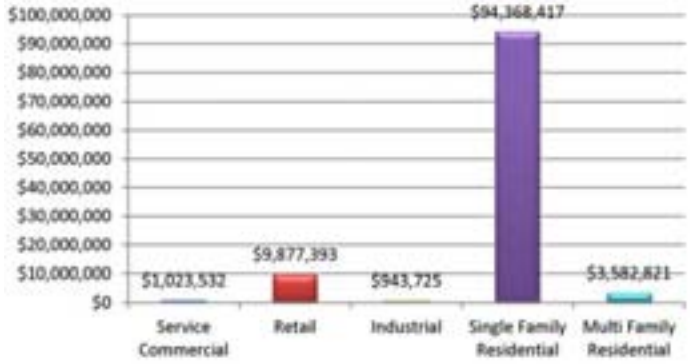
TUMF Revenue by Land Use (2003-2011)



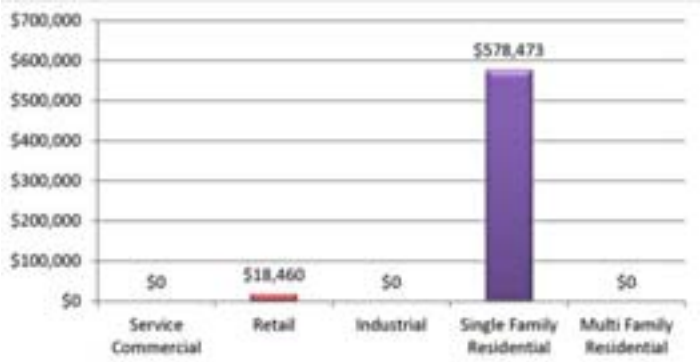
Southwest Zone

- County of Riverside unincorporated
- City of Canyon Lake
- City of Lake Elsinore
- City of Murrieta
- City of Temecula
- City of Wildomar

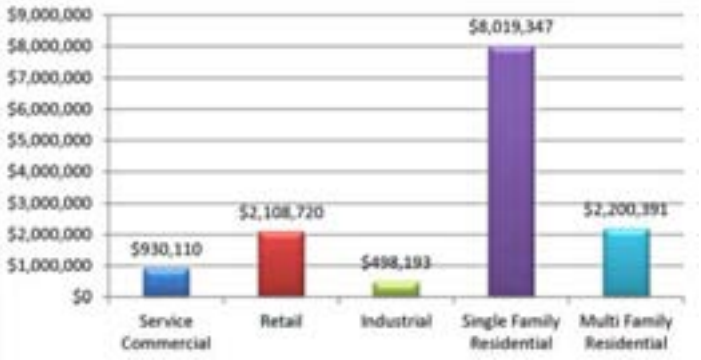
County of Riverside



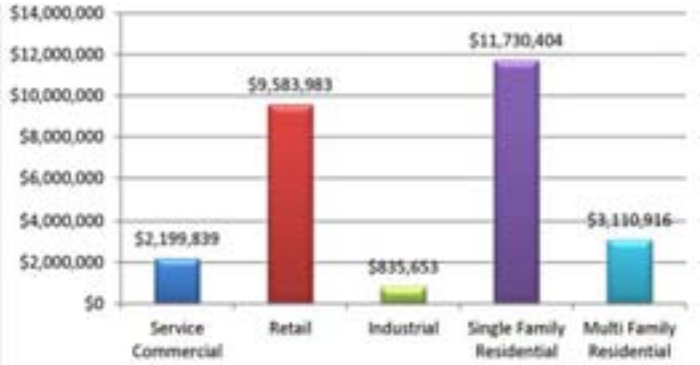
Canyon Lake



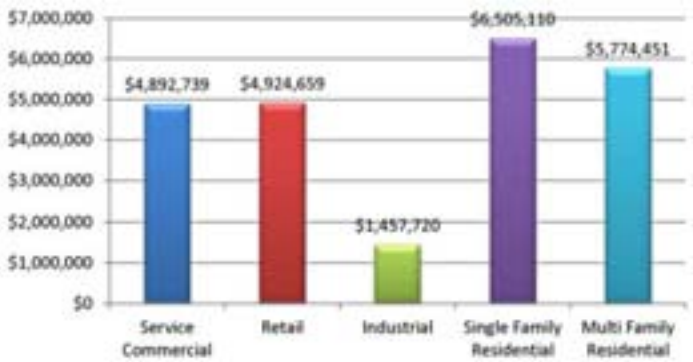
Lake Elsinore



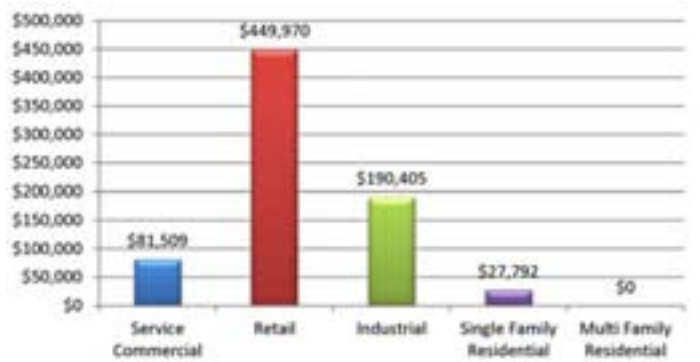
Murrieta



Temecula

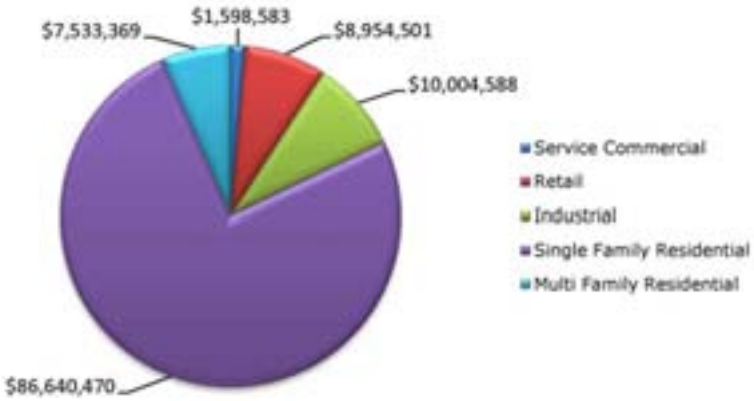


Wildomar



The County of Riverside for a part of this time reduced the fee by 50%.
Actual jurisdiction revenues may vary by a dollar due to rounding.

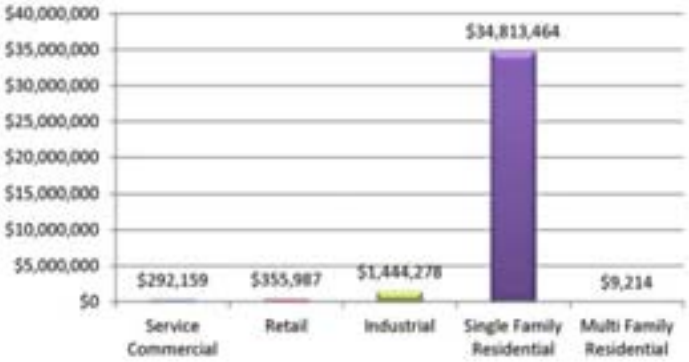
TUMF Revenue by Land Use (2003-2011)



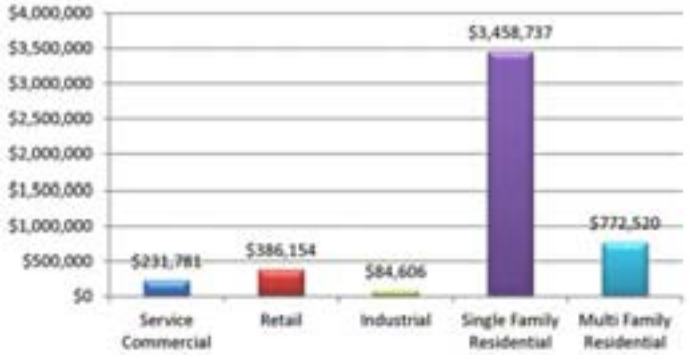
Central Zone

- County of Riverside unincorporated
- City of Menifee
- City of Moreno Valley
- City of Perris

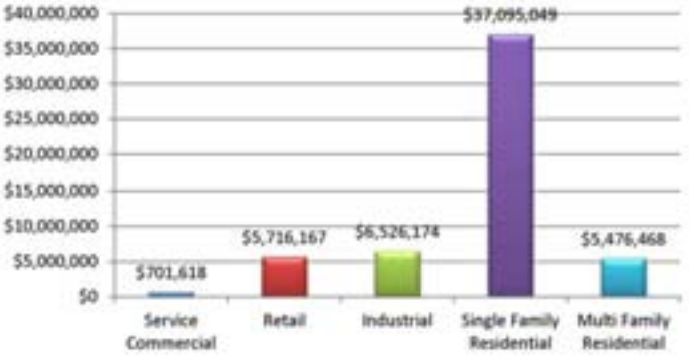
County of Riverside



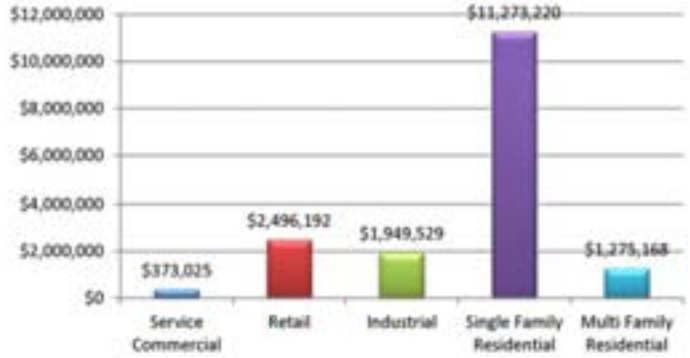
Menifee



Moreno Valley

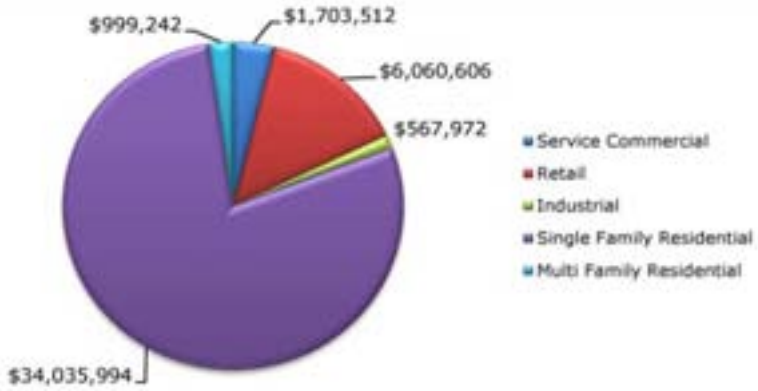


Perris



The County of Riverside and the Cities of Menifee, Moreno Valley, and Perris for all or part of this time reduced the fee by 50%.
Actual jurisdiction revenues may vary by a dollar due to rounding.

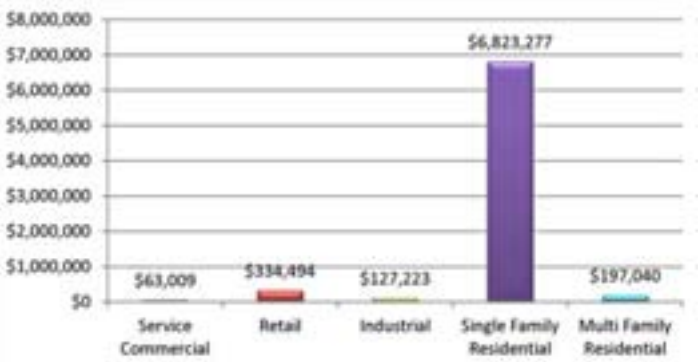
TUMF Revenue by Land Use (2003-2011)



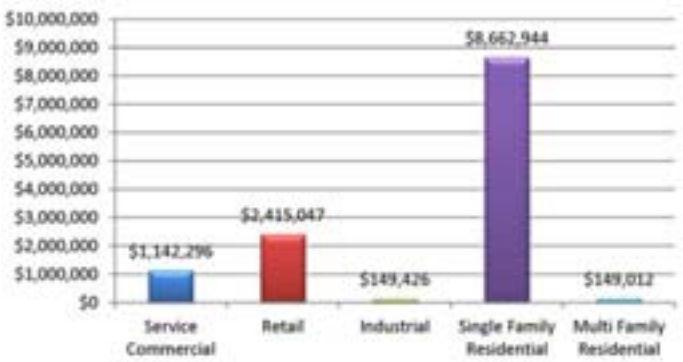
Hemet/San Jacinto Zone

- County of Riverside unincorporated
- City of Hemet
- City of San Jacinto

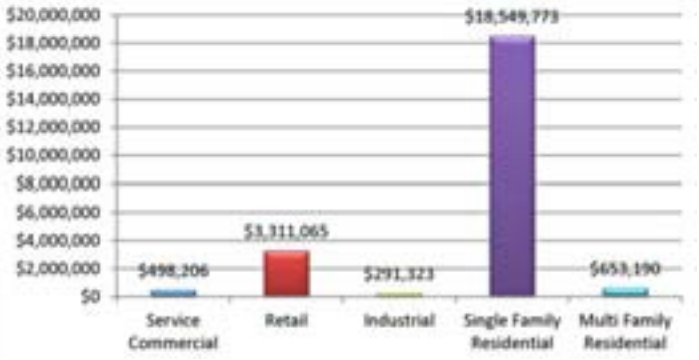
County of Riverside



Hemet

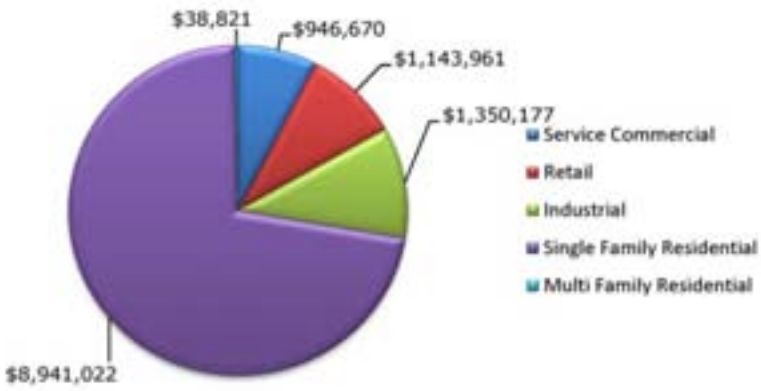


San Jacinto



The County of Riverside and the City of San Jacinto for all or part of this time reduced the fee by 50%.
Actual jurisdiction revenues may vary by a dollar due to rounding.

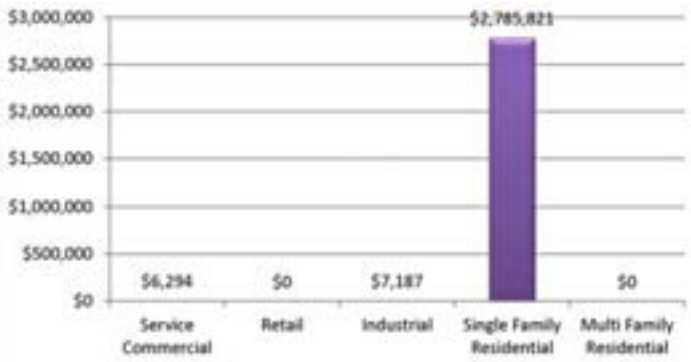
TUMF Revenue by Land Use (2003-2011)



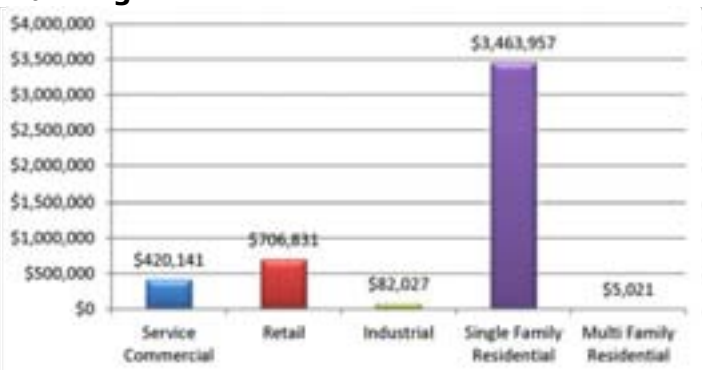
Pass Zone

- County of Riverside unincorporated
- City of Banning
- *City of Beaumont
- City of Calimesa

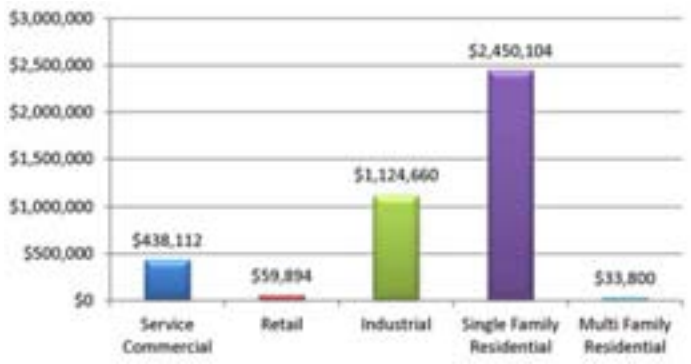
County of Riverside



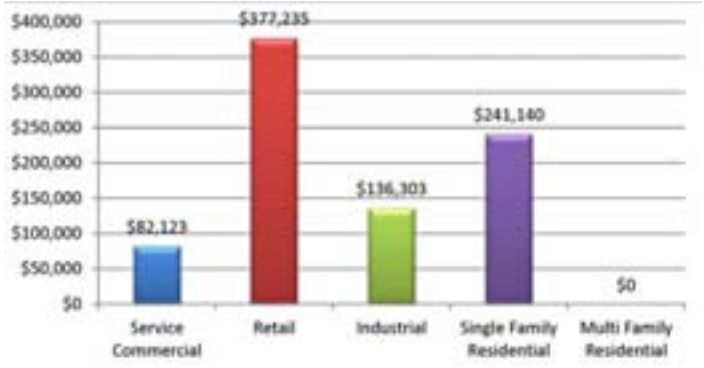
Banning



***Beaumont**



Calimesa

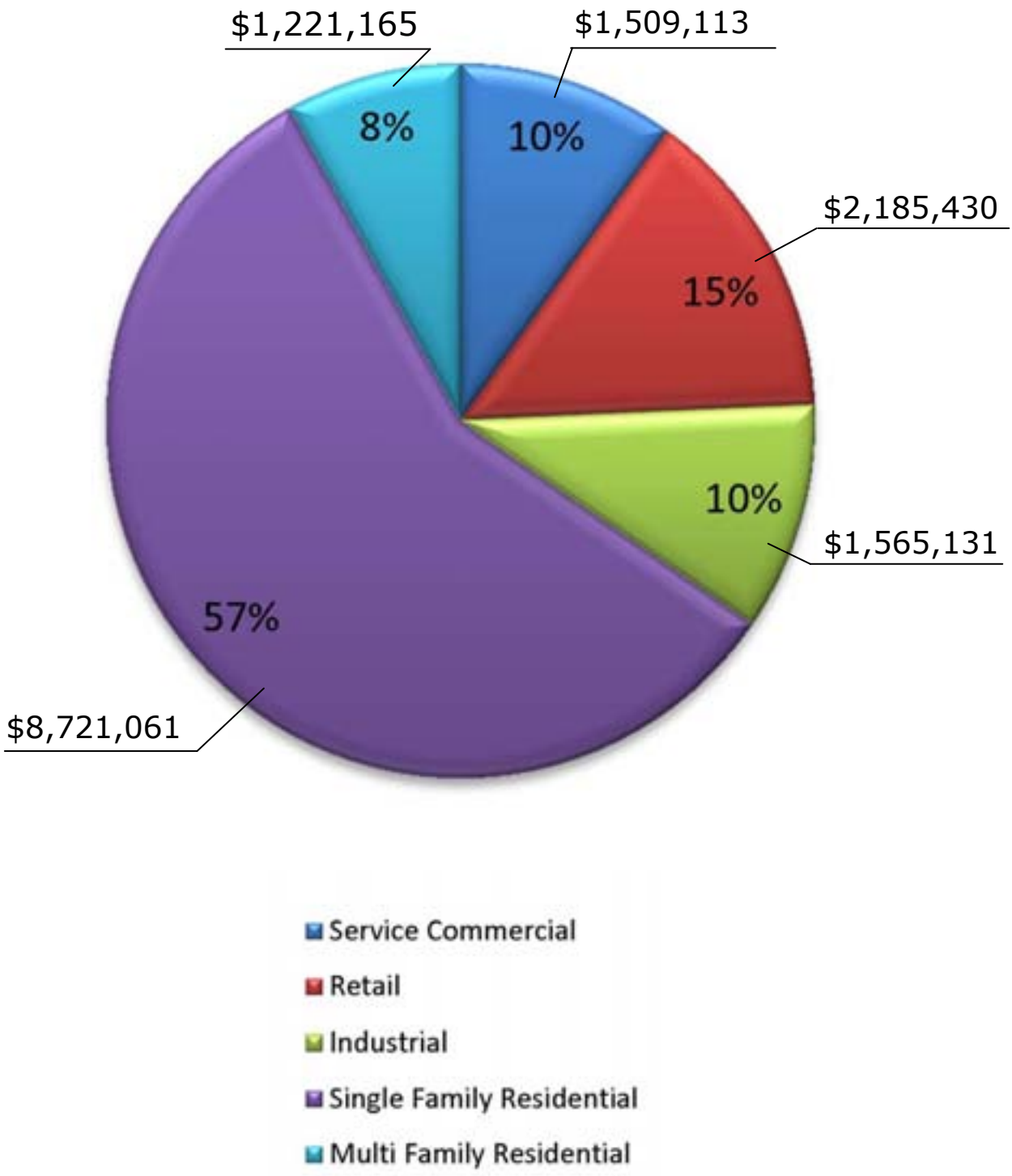


*The City of Beaumont is no longer participating in the TUMF Program.
The County of Riverside and the Cities of Banning and Calimesa for all or part of this time reduced the fee by 50%.
Actual jurisdiction revenues may vary by a dollar due to rounding.

TUMF Revenue by Land Use

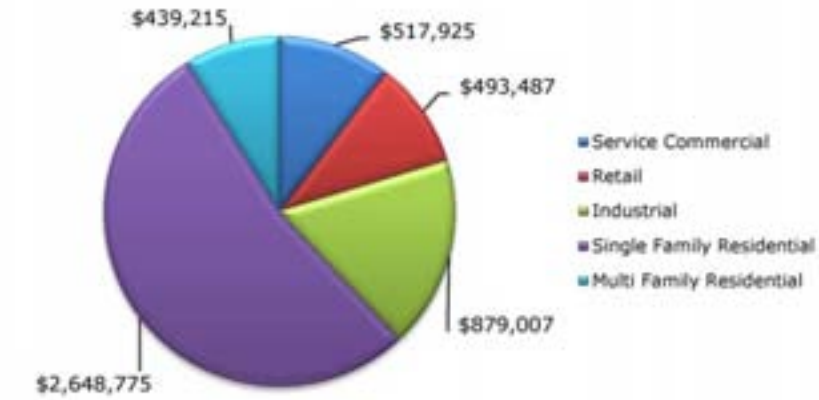
Fiscal Year 2010-2011 (July 1, 2010, to June 30, 2011)

Total Revenue: $15,201,902



Actual jurisdiction revenues may vary by a dollar due to rounding.

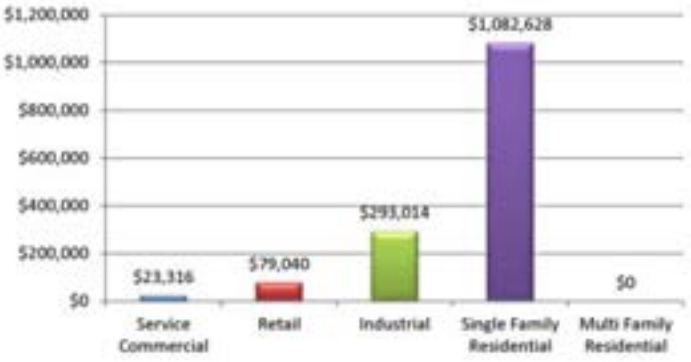
TUMF Revenue by Land Use (FY 2010/2011)



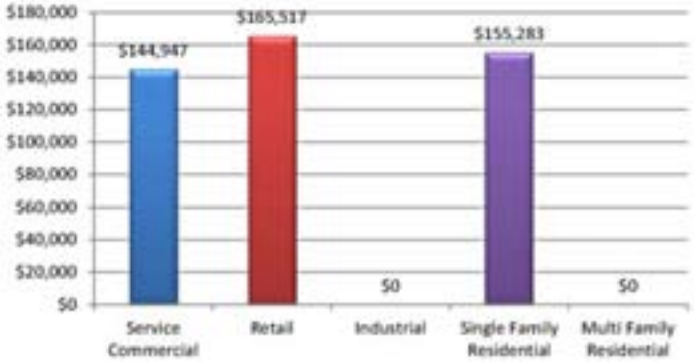
Northwest Zone

- County of Riverside unincorporated
- City of Corona
- City of Eastvale
- City of Jurupa Valley
- City of Norco
- City of Riverside
- March Joint Powers Authority

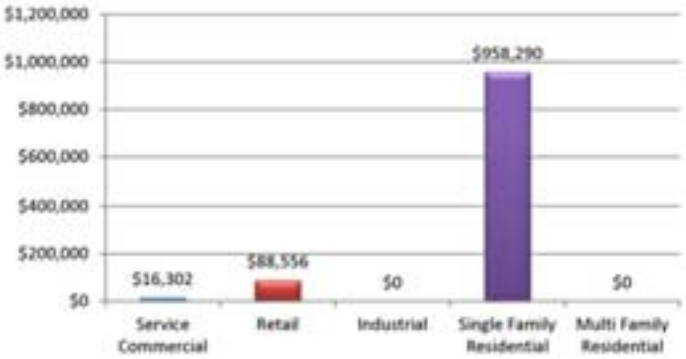
County of Riverside



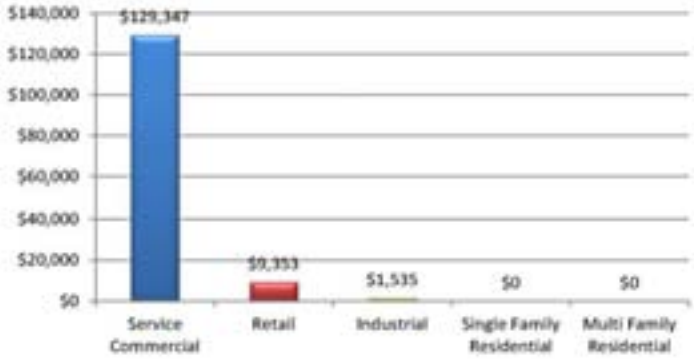
Corona



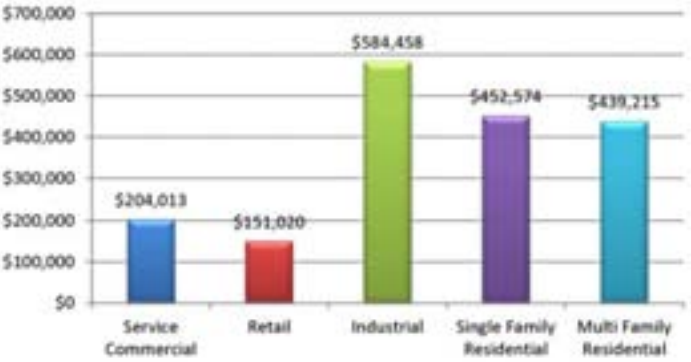
Eastvale



Norco



Riverside

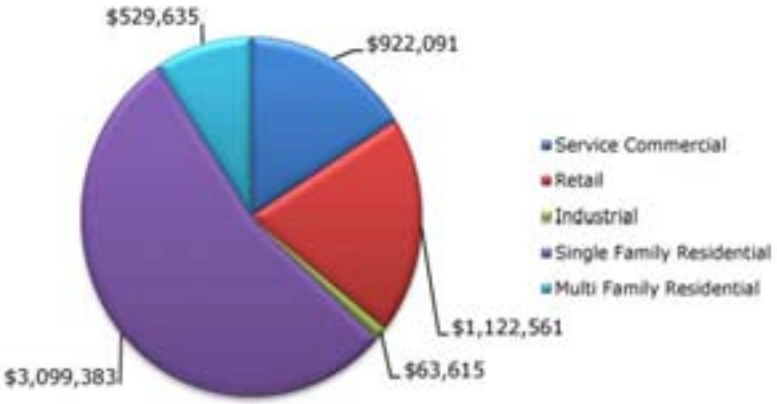


Financial information for the City of Jurupa Valley (incorporated on July 1, 2011) will be included in the 2012 Annual Report.

For Fiscal Year 2010/2011, the March JPA did not have any projects in final inspection and therefore did not collect or remit any TUMF dollars to WRCOG.

Actual jurisdiction revenues may vary by a dollar due to rounding.

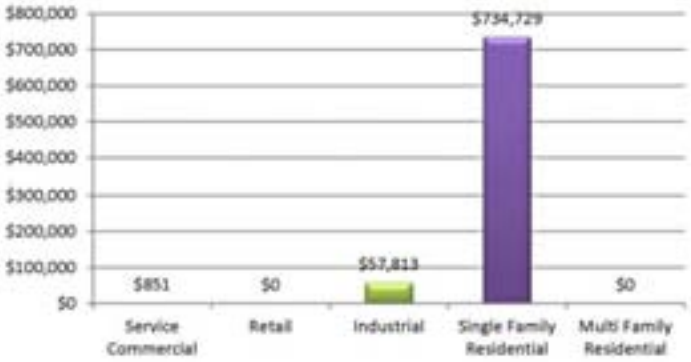
TUMF Revenue by Land Use (FY 2010/2011)



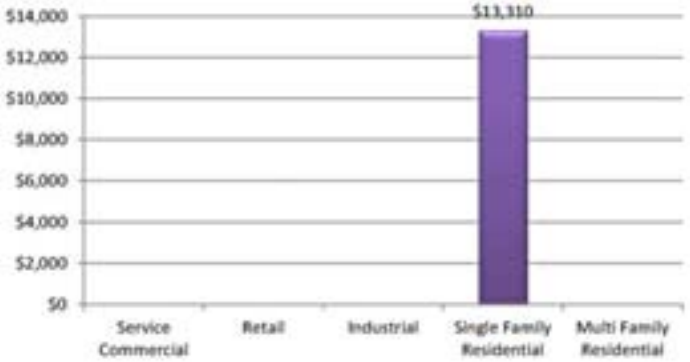
Southwest Zone

- County of Riverside unincorporated
- City of Canyon Lake
- City of Lake Elsinore
- City of Murrieta
- City of Temecula
- City of Wildomar

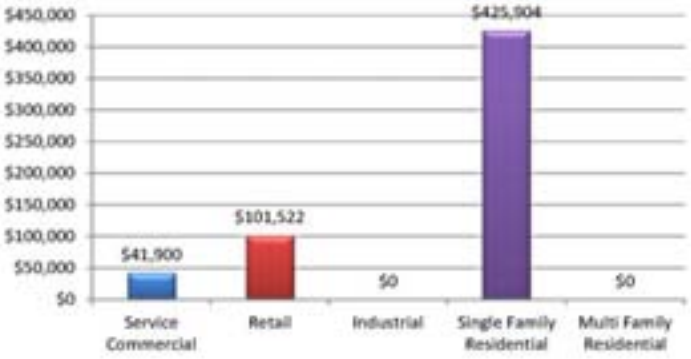
County of Riverside



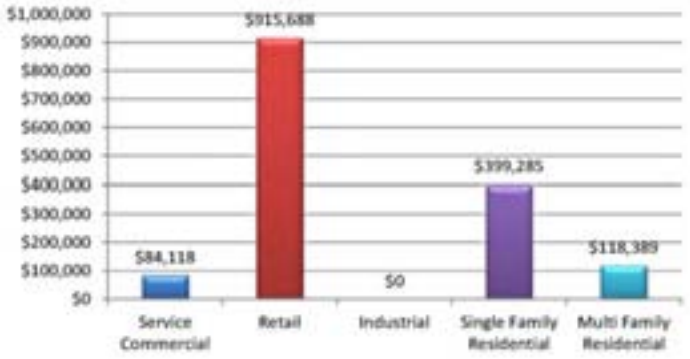
Canyon Lake



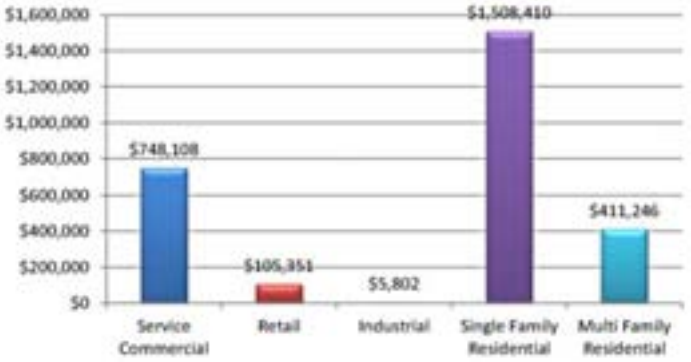
Lake Elsinore



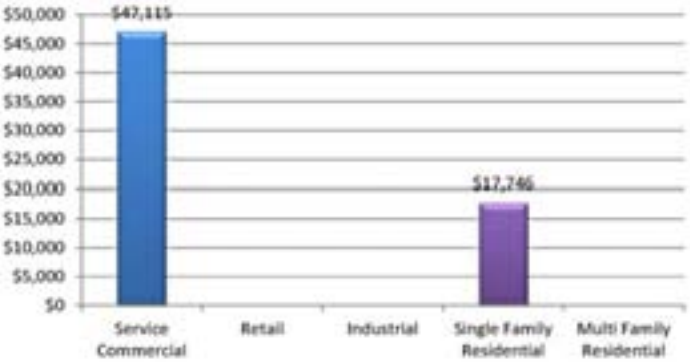
Murrieta



Temecula



Wildomar



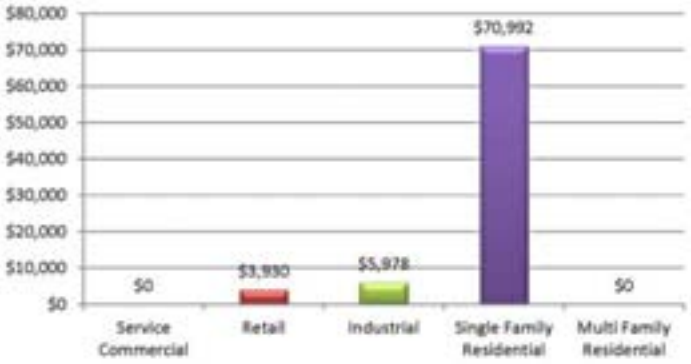
Actual jurisdiction revenues may vary by a dollar due to rounding.

TUMF Revenue by Land Use (FY 2010/2011)

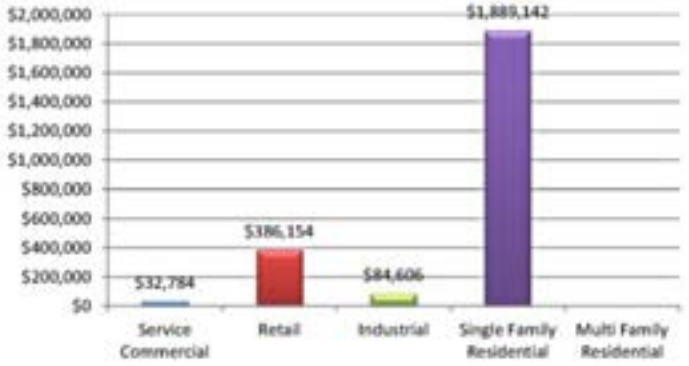
Central Zone

- County of Riverside unincorporated
- City of Menifee
- City of Moreno Valley
- City of Perris

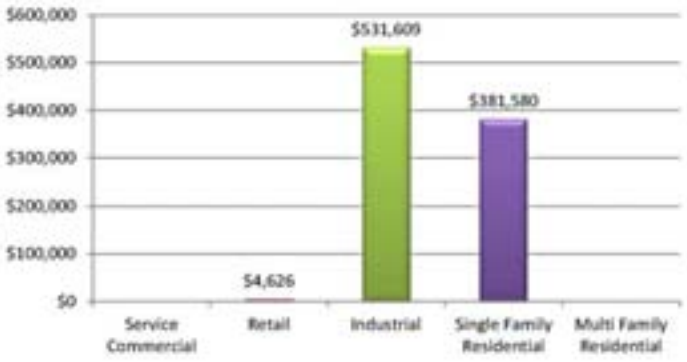
County of Riverside



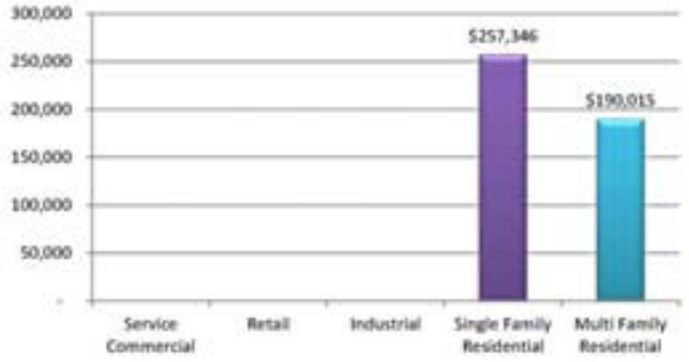
Menifee



Moreno Valley



Perris

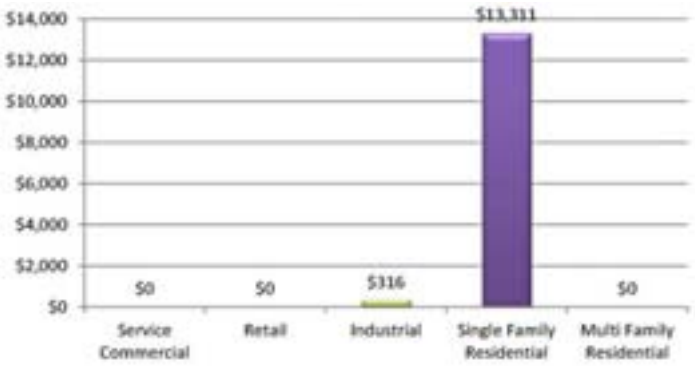


TUMF Revenue by Land Use (FY 2010/2011)

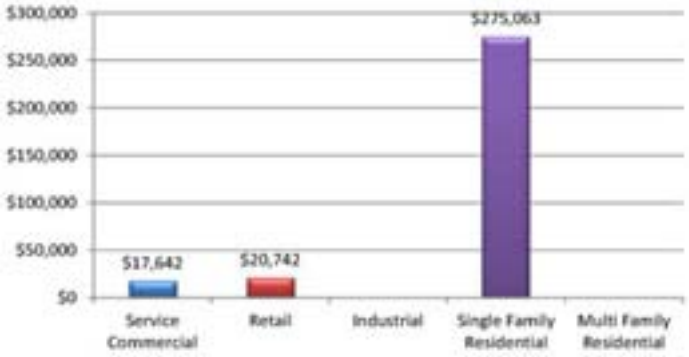
Hemet/San Jacinto Zone

- County of Riverside unincorporated
- City of Hemet
- City of San Jacinto

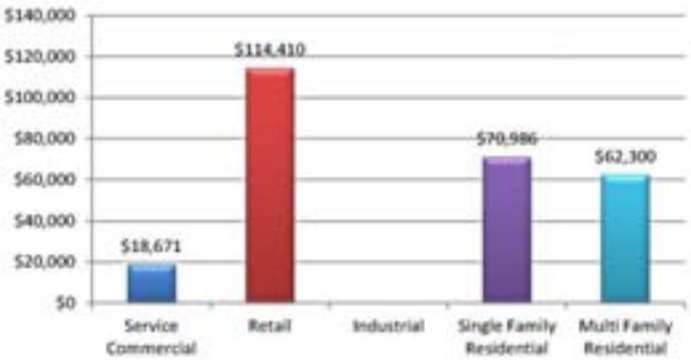
County of Riverside



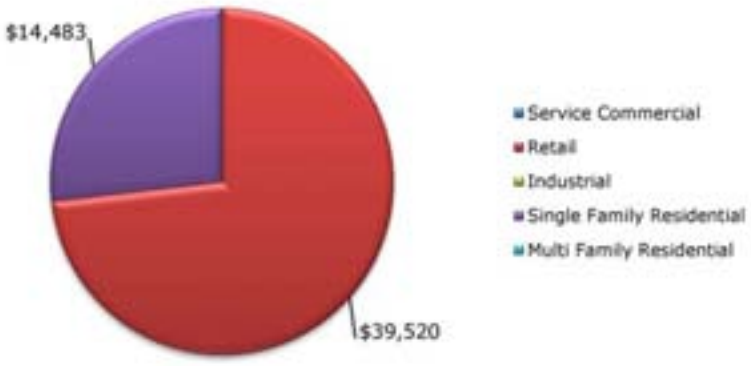
Hemet



San Jacinto



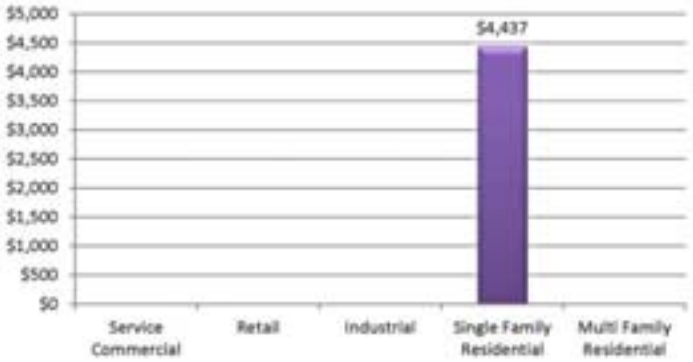
TUMF Revenue by Land Use (FY 2010/2011)



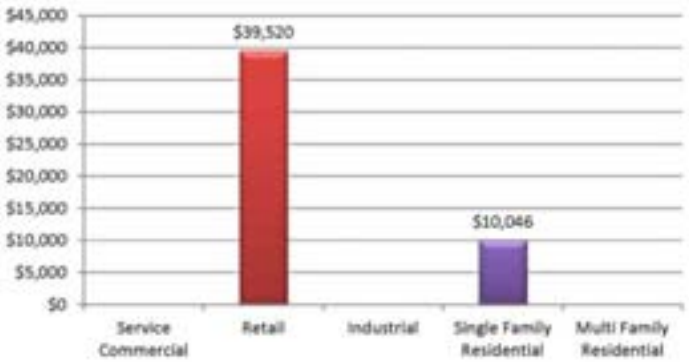
Pass Zone

- City of Banning
- City of Calimesa
- County of Riverside unincorporated

Banning

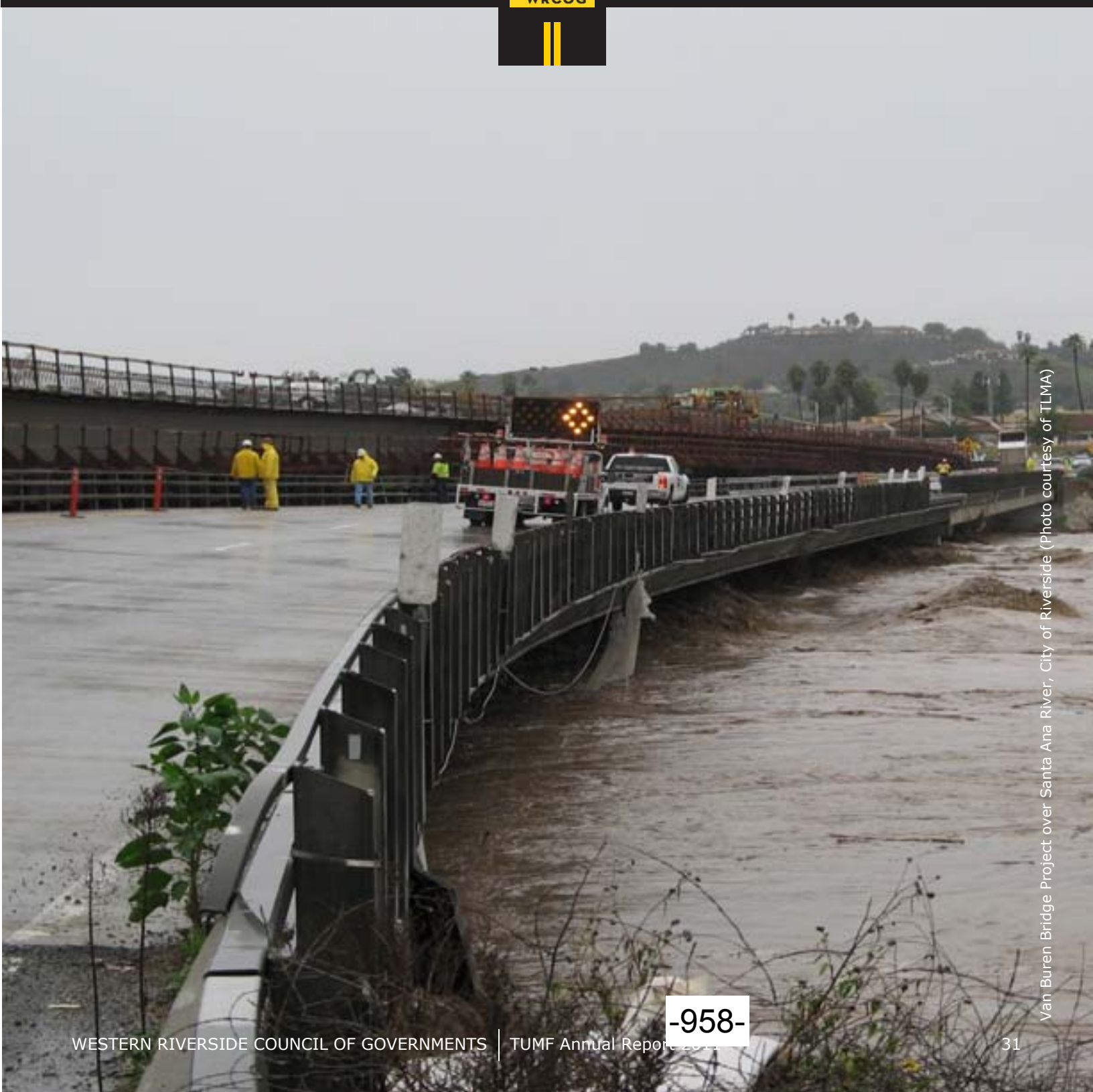


Calimesa



For Fiscal Year 2010/2011, the County of Riverside did not have any projects in final inspection and therefore did not collect or remit any TUMF dollars to WRCOG.

Projects



Van Buren Bridge Project over Santa Ana River, City of Riverside (Photo courtesy of TLMA)

WRCOG's TUMF Program is first and foremost an infrastructure program. It is about building infrastructure – not collecting a fee. Constructing TUMF improvements as quickly as possible is the Program's paramount objective.

WRCOG's partners in the TUMF Program, including 18 member jurisdictions, RCTC, RTA, the March JPA, and the development community have all placed the TUMF Program as a top priority. The results of our partners' commitment to the Program is evidenced on a number of fronts. All of the agencies and jurisdictions have developed and updated TUMF project expenditure plans called Transportation Improvement Programs (TIPs) that estimate revenues from TUMF and prioritize which project improvements will be made during a five-year period. Within six months of the initiation of the Program, TIPs were being approved and work was underway to implement the nation's largest multi-jurisdictional uniform development fee program.

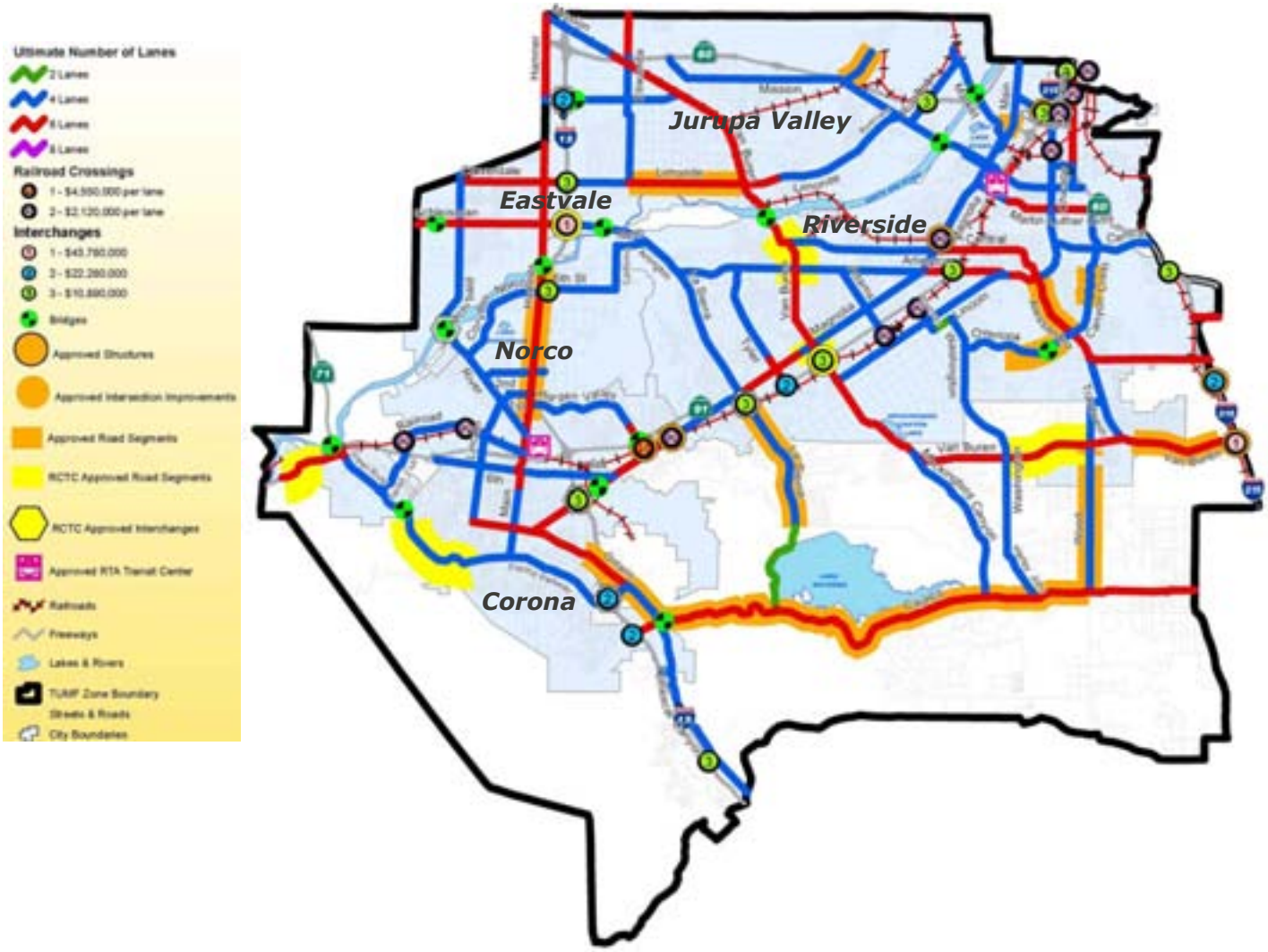
TUMF projects do not result just from the TIPs. Community Facilities Districts (CFDs) and Road and Bridge Benefit Districts (R&BBDs) are also used to construct TUMF improvements, and developers sometimes build TUMF facilities in lieu of paying TUMF fees. By being creative, WRCOG and its partners are working to find the fastest, most cost-effective ways to build the TUMF Network.

As of the end of Fiscal Year 2010/2011, 46 TUMF projects have been completed, 8 projects are under construction, 28 projects are in engineering or right-of-way (ROW) acquisition, and another 27 projects are in planning and environmental stages. The balance of the projects are in preliminary design and planning phases. Furthermore, of the currently programmed Zone-level TIP projects, over 40 percent of these are slated for construction during the five-year TIP period. Western Riverside County residents are seeing TUMF Program dollars at work in dozens of locations throughout the subregion.

The following pages highlight TUMF activities in each of the five zones, and for RTA and RCTC.

Sanderson Avenue, City of San Jacinto

Northwest Zone: Corona, Eastvale, Jurupa Valley, Norco, Riverside, County of Riverside and March JPA



The Northwest Zone is comprised of the unincorporated County and the Cities of Corona, Eastvale, Jurupa Valley, Norco, and Riverside. The Zone covers an estimated 332.8 square miles and has a population of approximately 710,226. The Northwest Zone has 12 projects on the adopted TIP, of which 1 project is under construction, 4 projects are in engineering, 5 projects are in planning and environmental stages, and 2 projects are complete. (Note: Project data for the City of Jurupa Valley will be included in the 2012 Annual Report.)

Following are examples of projects that WRCOG has participated in with local jurisdictions in the Northwest Zone that are underway and/or completed. These projects represent $15.3 million in TUMF investment.

Magnolia Avenue Grade Separation (City of Riverside)
This project will lower Magnolia Avenue under the Union Pacific Railroad tracks, and a two-track railroad bridge is being constructed over Magnolia Avenue. The project will also shift the alignment of Magnolia Avenue 50 feet to the west.

In addition, Beatty Drive will be widened from two to four lanes between Brockton and De Anza

Northwest Zone 5-Year Transportation Improvement Program

Planning	Environmental Study	Engineering	Construction		
■				County of Riverside	•Cajalco Road (La Sierra to Wood) - widen 2 to 4 lanes
■					•Cajalco Road (Temescal Canyon Road to La Sierra) widen 2 to 4 lanes
■	■				•Limonite Avenue (Etiwanda to Van Buren) - widen 2 to 4 lanes
■	■	■			•Magnolia Grade Separation at BNSF Railroad
■	■				•Wood Road (Cajalco to Krameria) - widen to 4 lanes
■	■	■		Corona	•Auto Center Underpass (Railroad to Pomona) - widen 2 to 4 lanes
■	■				•McKinley Rail Underpass and Bridge - widen to 6 lanes
■	■	■		City of Riverside	•Canyon Crest Drive (Country Club to Via Vista) - widen 2 to 4 lanes
■	■	■	■		•Magnolia Ave Grade Separation (Beatty to Elizabeth) - widen to 4 lanes
■	■	■	■	Norco	•Hamner Avenue (Santa Ana River to Parkridge) - widen 4 to 6 lanes
■	■	■		County of Riverside/March JPA	•Van Buren/I-215 Interchange

1 project currently on the TIP is completed and is listed under the Completed Projects list on Page 45.

Source: Information provided by each jurisdiction's Public Works Department

Avenues, and new traffic signals will be installed at the intersections of Beatty Drive and Brockton, Magnolia, and De Anza Avenues. Construction started in early 2010. The project is anticipated to be completed by in 2012. The estimated project cost is $53.1 million, of which TUMF will provide $12 million.

Magnolia Grade Separation Project, City of Riverside (Photo courtesy City of Riverside)

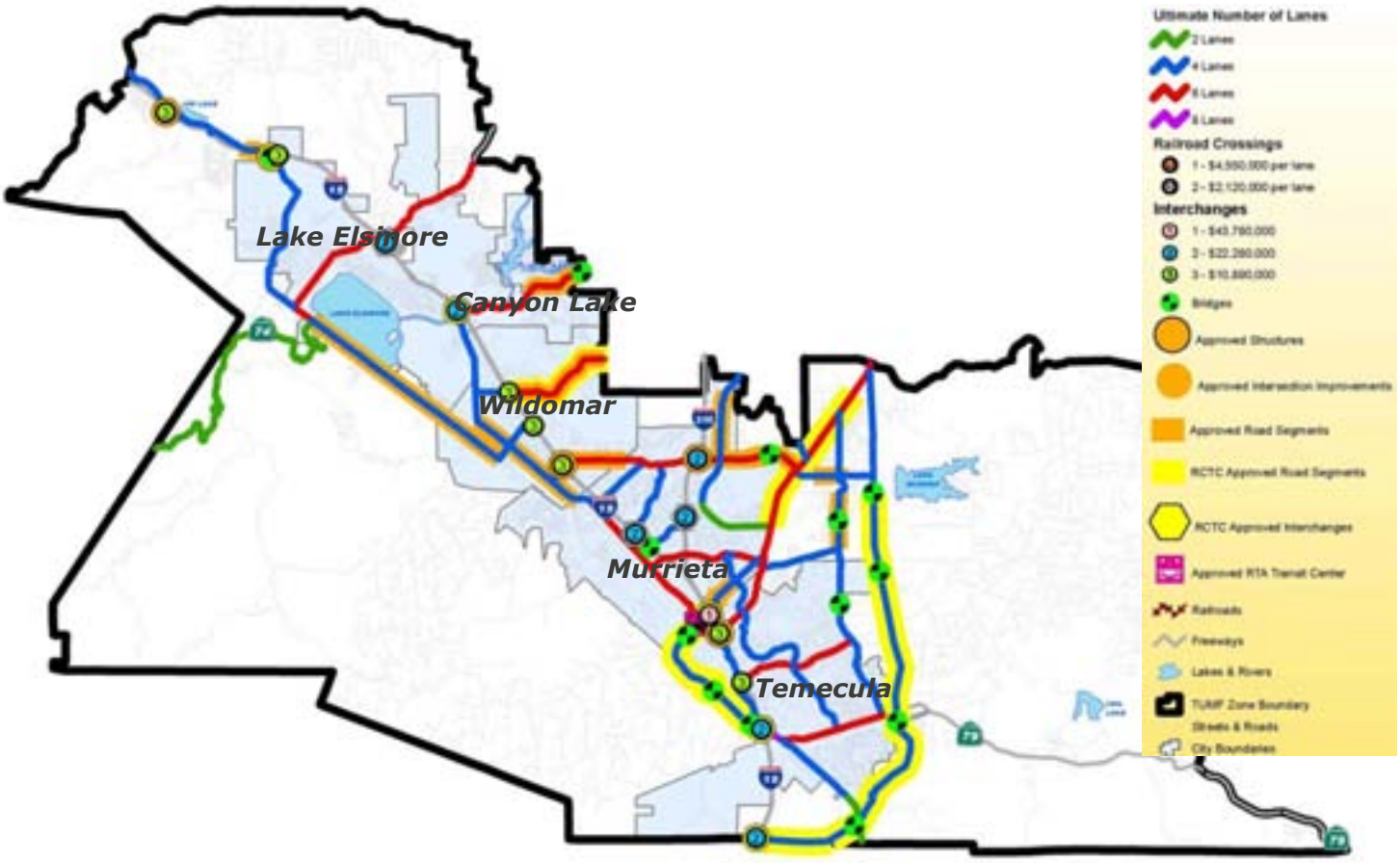
Hamner Avenue (City of Norco)

This project will widen a portion of Hamner Avenue between Santa Ana River to Parkridge Avenue from four to six lanes. The project is being completed in phases. The City recently widened Hamner Avenue from Sixth Street north to a few hundred feet south of Detroit Street.

The project's estimated cost is $8.6 million, of which TUMF has programmed $3.3 million.

Hamner Avenue widening Project from Sixth Street to Detroit Street, City of Norco tesy of City of Norco)

Southwest Zone: Canyon Lake, Lake Elsinore, Murrieta, Temecula, Wildomar, and County of Riverside



The Southwest Zone is comprised of the unincorporated County and the Cities of Canyon Lake, Lake Elsinore, Murrieta, Temecula, and Wildomar. The Zone covers an estimated 536.1 square miles and has a population of approximately 380,193.

The Southwest Zone has 16 projects on the adopted TIP, of which 1 project is under construction, 8 projects are in engineering, 3 projects are in planning and environmental stages, and 3 projects are completed. The remaining project is in the preliminary design and planning phase.

SR-74 / I-15 Interchange Project, City of Lake Elsinore (Photo courtesy of City of Lake Elsinore)

Following are examples of projects that WRCOG has participated in with local jurisdictions in the Southwest Zone that are underway and/or completed. These projects represent $56.8 million in TUMF investment.

Southwest Zone 5-Year Transportation Improvement Program

Planning	Environmental Study	Engineering	Construction		
■	■	■		County of Riverside	•Butterfield Stage Road (Auld to Murrieta Hot Springs) - widen 0 to 4 lanes
■	■	■			•Clinton Keith Road (SR-79 to I-215) - widen 2 to 4 lanes
■	■	■			•Indian Truck Trial/I-15 Interchange Improvements
■	■	■		Canyon Lake	•Railroad Canyon Road (Goetz to City Limits)
■	■	■	■	Murrieta	•California Oaks/I-15 Interchange and widen 2 to 4 lanes from Madison to Shop Center
■	■	■		Temecula	•SR-79 Western Bypass Bridge over Murrieta Creek - widen new to 4 lanes
■	■	■			•SR-79 Winchester/I-15 Interchange
■	■	■			•French Valley Parkway/I-15 Overcrossing and Interchange
■				Lake Elsinore/County of Riverside	•Temescal Canyon Road, Lake Elsinore City Limits to Lake with Bridge
■				Wildomar	•Clinton Keith Road (I-15 to Copper Craft) - widen 2 to 4 lanes
■					•Grand Avenue (SR-74/Ortega to Central) - widen 2 to 4 lanes
					•Palomar Street (Mission Trail to Jefferson) - widen 2 to 4 lanes
■	■	■		Wildomar/County of Riverside	•Clinton Keith/I-15 Interchange

3 projects currently on the TIP are completed and are listed under the Completed Projects list on Page 45.
Source: Information provided by each jurisdiction's Public Works Department

California Oaks/I-15 Interchange (City of Murrieta)

This project will widen California Oaks Road between Madison Avenue and Cal Oaks Plaza Drive to six lanes and add two loop on-ramps at the interchange. Construction is underway with an anticipated completion date of August 2012. The estimated project cost is $26 million, of which TUMF will provide $6 million.

Clinton Keith/I-15 Interchange (City of Wildomar)

The Clinton Keith Road/I-15 Interchange is a diamond configuration with Clinton Keith Road spanning the I-15 freeway. This project will widen the bridge structure to accommodate six through lanes plus dual median left-turn lanes in each direction. The freeway ramps will be reconstructed to connect with the widened cross section of Clinton Keith Road. The project has completed design and right-of-way acquisition. Construction is anticipated to begin in early 2012. The estimated project cost is $23 million, of which TUMF will provide $9.3 million.

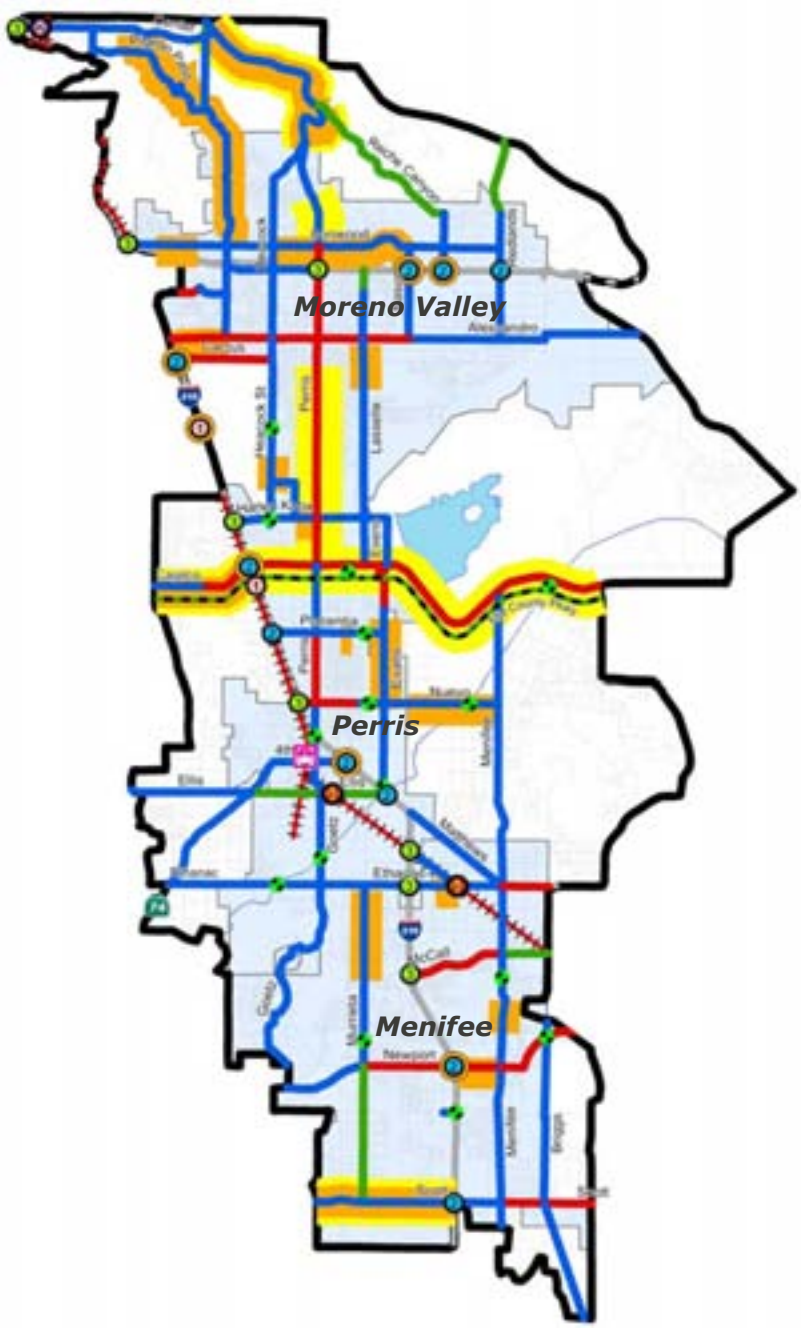
French Valley Parkway / I-15 Overcrossing and Interchange (City of Temecula)

This project provides for construction of a new interchange on the I-15 freeway between the existing Winchester Road interchange and the I-15/I-215 junction. The project will utilize a partial cloverleaf interchange at French Valley Parkway, with loop on-ramps and direct off-ramps in the northwest quadrants and direct on-ramps in the southwest and northwest quadrants.

Construction on Cal Oaks / I-15 Interchange Project, City of Murrieta

The project is in the design phase with construction anticipated to begin in 2012. The estimated project cost is $192 million, of which TUMF will provide $43

Central Zone: Menifee, Moreno Valley, Perris, and County of Riverside



The Central Zone is comprised of the unincorporated County and the Cities of Menifee, Moreno Valley and Perris. The Zone covers an estimated 222.2 square miles and has a population of approximately 376,638. The Central Zone has 18 projects on the adopted TIP, of which 4 projects are under construction, 5 projects are in engineering, 6 projects are in planning and environmental stages, and 2 projects are completed. The remaining project is in the preliminary design and planning phases.

Following are examples of projects that WRCOG has participated in with local jurisdictions in the Central Zone that are underway and/or completed. These projects represent $21.67 million in TUMF investment.

Central Zone 5-Year Transportation Improvement Program

Planning	Environmental Study	Engineering	Construction		
■	■			County of Riverside	•Cajalco Road (Alexander to I-215) - widen 2 to 4 lanes
■	■				•Pigeon Pass Road (Cantarini), Hidden Springs to Center - widen 0 to 4 lanes
■	■				•Reche Canyon/Reche Vista (Heacock to County Line) - widen 2 to 4 lanes
■	■			Menifee/County of Riverside	•Bundy Canyon Road/Scott Road, Sunset to I-215 - widen 2 to 4 lanes
■	■	■			•Murrieta Road (Ethanac to McCall) - widen 2 to 4 lanes
■	■	■			•Newport Road/I-215 Interchange
					•Menifee Road (Aldergate to Simpson) - widen 0 to 4 lanes
■	■			Moreno Valley	•Box Springs Road (500' east of Clark to Barclay) - widening 1 eastbound lane
■	■	■			•Ironwood Avenue (SEG A) (Heacock to Perris) - widen 2 to 4 lanes
■	■				•Ironwood Avenue (SEG B) (Perris to Nason) - widen 2 to 4 lanes
■	■	■			•Moreno Beach Drive/SR-60 Interchange
■	■	■	■		•Nason/SR-60 Interchange
■	■	■	■	Perris	•Evans Road (Placentia to Nuevo) - widen new to 4 lanes
■	■	■	■	Moreno Valley/March JPA	•Heacock Street (Perris Valley Drain to San Michele) - widen 2 to 4 lanes
■	■	■	■	RCTC/Perris	•SR-74/I-215 Interchange
■	■	■		Perris/County of Riverside	•Ramona Expressway/I-215 Interchange

2 projects currently on the TIP are completed and are listed under the Completed Projects list on Page 45.

Source: Information provided by each jurisdiction's Public Works Department

Nason/SR-60 Interchange (City of Moreno Valley)

The SR-60/Nason Street Overcrossing project consists of replacing the overcrossing structure, widening Nason Street overcrossing approaches and modifying the intersection.

Construction is underway with an anticipated completion date of August 2012. The estimated project cost is $43 million, of which TUMF has programmed $13.2 million.

Ramona Expressway - Completed (City of Perris)

This project widened Ramona Expressway between Perris Boulevard and I-215, a distance of 1.4 miles, from four to six lanes.

$2.47 million in TUMF is programmed for this project, of which over $2.1 million has been reimbursed to the City for work underway.

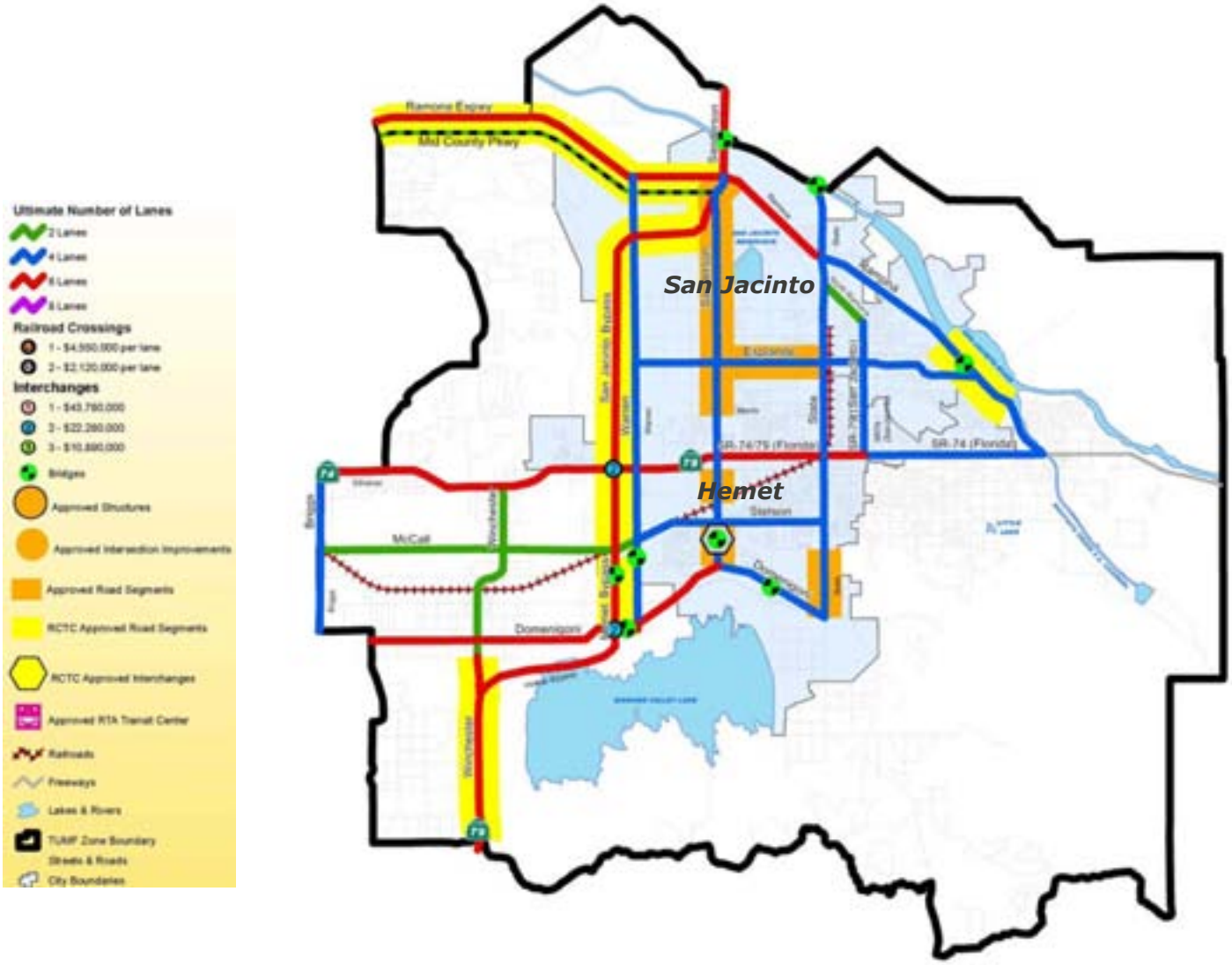
Moreno Beach/SR-60 Interchange (City of Moreno Valley)

This project will realign the SR-60/Moreno Beach Drive freeway ramps with auxiliary lanes at the eastbound off-ramp and the westbound on-ramps. It will also replace the SR-60/Moreno Beach Drive overcrossing structure.

Nason / SR-60 Interchange Project, City of Moreno Valley (Photo courtesy City of Moreno Valley)

Construction is underway with an anticipated completion date of August 2012. The estimated project cost is $43 million, of which TUMF has rogrammed $6 million.

Hemet/San Jacinto Zone: Hemet, San Jacinto and County of Riverside



The Hemet/San Jacinto Zone is comprised of the unincorporated County and the Cities of Hemet and San Jacinto. The Zone covers an estimated 209.9 square miles and has a population of approximately 171,245. The Hemet/San Jacinto Zone has 6 projects on the adopted TIP, 1 project is in engineering, 2 projects are in planning and environmental stages, and 3 projects are completed.

Following are examples of projects that WRCOG has participated in with local jurisdictions in the Hemet/San Jacinto Zone that are underway and/or completed. These projects represent $11.1 million in TUMF investment.

Sanderson Avenue - Completed (City of San Jacinto)

This Project widened Sanderson Avenue from two to four lanes from Esplanade Avenue to Ramona Expressway for a length of 3.6 miles. The project eases congestion at the intersection of Sanderson and Ramona Expressway. The ultimate configuration of this segment will be a six -lane facility with a raised median, curb and gutter, sidewalks and a landscaped parkway. The project's cost is $7.72 million, of which TUMF has paid $7 m

Hemet	•Sanderson Avenue (Menlo to Esplanade) - widen 2 to 4 lanes
San Jacinto	•Ramona Expressway (Sanderson to Main) - widen 2 to 4 lanes
San Jacinto/Hemet	•Esplanade Avenue (State to Sanderson) - widen 2 to 4 lanes

3 projects currently on the TIP are completed and are listed under the Completed Projects list on Page 45.
Source: Information provided by each jurisdiction's Public Works Department

Sanderson Avenue (City of Hemet)

The project will widen the west side of Sanderson Avenue from Acacia to Wentworth Avenue.

Sanderson Avenue will be widened from two to four lanes for a distance of 3,000 feet.

The project is currently in the engineering phase and is negotiating for additional right-of-way acquisition.

TUMF has programmed $1.23 million for this project, of which TUMF has reimbursed the City $1 million for work underway.

Ramona Expressway (City of San Jacinto)

This project will widen Ramona Expressway between Sanderson Avenue and Main Street in two phases. The entire project alignment from Sanderson Avenue to Main Street is currently a two-lane road.

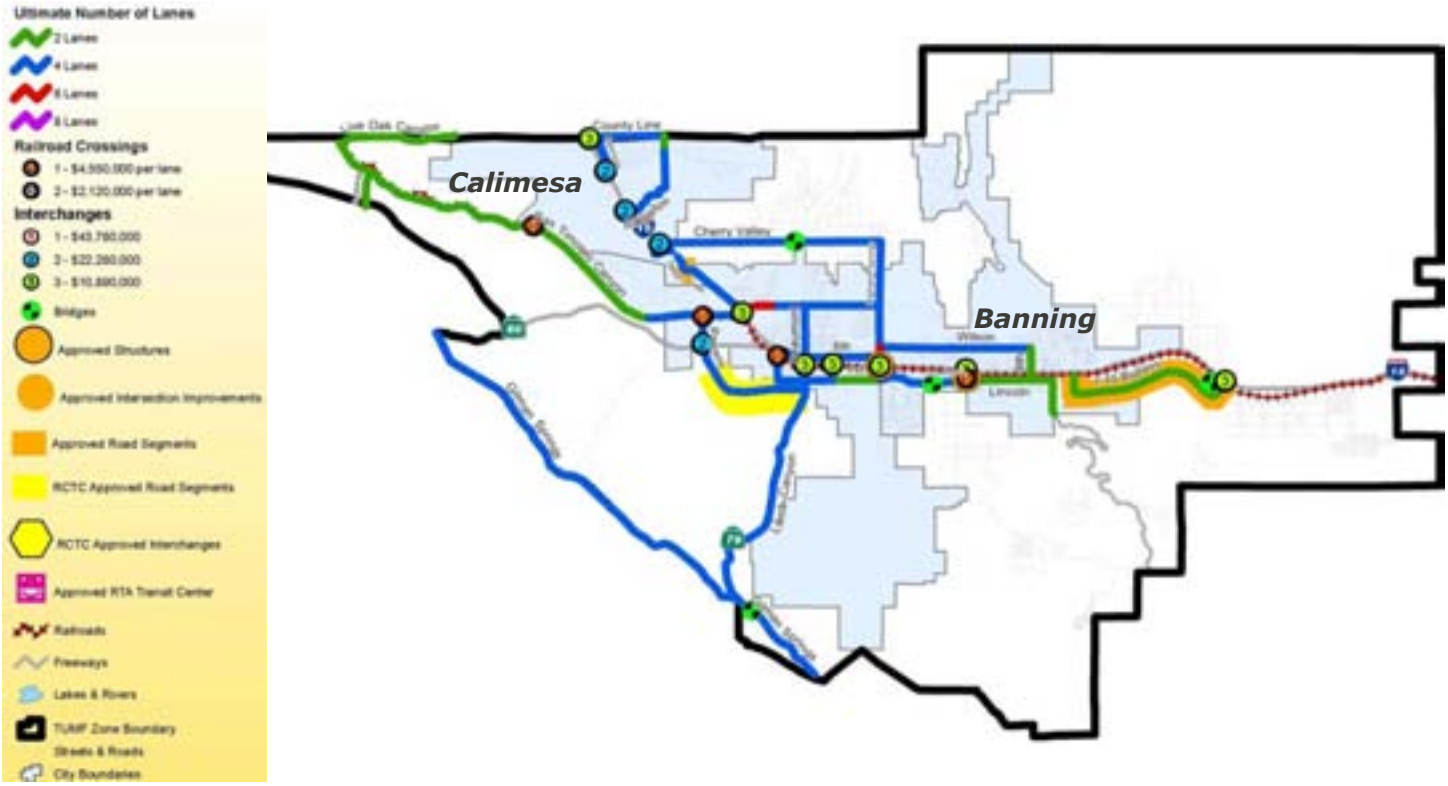
The first phase will widen Ramona Expressway from Sanderson Avenue to State Street. This portion will widen the existing two-lane alignment to six lanes for an approximate distance of 2.45 miles.

The second phase of work will widen Ramona Expressway from State Street to Main Street. This second segment will widen the existing two-lane alignment to four lanes for a distance of approximately 2.7 miles. Construction is anticipated to begin in late 2012.

The project is estimated to cost over $8.3 million, of which TUMF has programmed $4 million.

Sanderson Avenue Bridge Project over Salt Creek, City of Hemet (Photo courtesy of City of Hemet)

Pass Zone: Banning, Calimesa, and County of Riverside



Pass Zone 5-Year Transportation Improvement Program

Planning	Environmental Study	Engineering	Construction		
■	■	■		Banning	•Sunset Avenue Grade Separation
■					•Highland Springs/I-10 Interchange Improvements and Widening
■	■	■		County of Riverside/City of Banning	•I-10 Bypass South & 300' Bridge (Hathaway to Fields) - widen 0 to 4 lanes

1 project currently on the TIP is completed and is listed under the Completed Projects list on Page 45.
Source: Information provided by each jurisdiction's Public Works Department

The Pass Zone is comprised of the unincorporated County and the Cities of Banning and Calimesa. The Zone covers an estimated 260.9 square miles and has a population of approximately 86,840. The Pass Zone has 4 projects on the adopted TIP, of which 2 projects are in engineering, 1 project is in planning and 1 project is complete.

Following are examples of projects that WRCOG has participated in with local jurisdictions in the Pass Zone that are underway and/or completed. These projects represent $3.8 million in TUMF investment.

Sunset Avenue Grade Separation (City of Banning)

This project will lower Sunset Avenue by 20 feet to construct a new underpass at the UPRR tracks, modify Sunset Avenue, and replace the I-10 bridge and the on- and off-ramps.

The project is in design with construction anticipated to begin in winter 2012. The TUMF has programmed $2.1 million for this project.

Riverside Transit Agency

The Riverside Transit Agency (RTA) receives TUMF funds for capital transit improvements (1.7 percent) of the total collected. RTA has 6 projects on the adopted TIP, of which 1 project is under construction, 1 project is in engineering, 1 project is in planning and environmental and 1 project is complete. The remaining 2 projects are still in the preliminary design/planning phases.

Following are projects below provide examples of projects that WRCOG has participated in with RTA that are underway and/or completed. These projects represent $3.8 million in TUMF investment.

Planning	Environmental Study	Engineering	Construction	
				•Hemet Transit Center
				•Moreno Valley Transfer Center
■	■	■		•Riverside Multi-Modal Transit Station
■	■			•Murrieta/Temecula Transit Center
■	■	■	■	•Transit Service Enhancements

1 project currently on the TIP is completed and is listed under the Completed Projects list on Page 45.

Source: Information provided by the Riverside Transit Agency

I-10 Bypass Project (City of Banning) The project will construct two lanes of new roadway to support a future four-lane secondary highway between Banning and Cabazon. The scope also includes a new bridge crossing over the San Gorgonio River.

The project is in planning. The TUMF has programmed $1.7 million for this project.

Transit Service Enhancements This project will prepare plans and designs for enhancements of bus stops throughout the RTA service area in Western Riverside County. Enhancements include transit technology that will provide real-time customer information and amenities built into and around each stop for customer convenience, comfort and safety. State-of-the-art bus shelters, kiosks, and benches will be installed at selected stops within the service area.

The TUMF has programmed $3.7 million for this project.

Moreno Valley Transfer Center This project, located at Town Circle Centerpoint near Frederick Street, will expand and improve a key transfer and destination point for passengers traveling to Riverside and Perris from the Moreno Valley area.

Improvements include the addition of bus shelters, benches, RTA's Intelligent Transportation System program that relays real-time arrival information to kiosks to accommodate anticipated future growth. The TUMF has programmed $125,000 for this project.

SmartSTOP at the Corona Transit Center provides customers real-time arrival formation

Riverside County Transportation Commission

RCTC receives 46.9 percent of the TUMF fees collected and uses these revenues for regional TUMF projects. During fiscal year 2010/2011, WRCOG transmitted over $6.5 million and over $240 million since the TUMF Program commenced. RCTC has 22 projects on the TIP, of which 1 project is under construction, 7 projects are in engineering, 9 projects are in planning and environmental stages, and 5 projects are completed. Below is a summary description of selected projects completed, under construction, or in planning phases.

Planning	Environmental Study	Engineering	Construction		
■	■			Central Zone	•Reche Vista/Reche Canyon (Heacock to S.B.C.) - widen 2 to 4 lanes
■	■	■			•Perris Boulevard (Perris Valley Storm Drain to Cactus) - widen 2 to 4 lanes
■	■	■			•Perris Boulevard (Manzanita to Ironwood) - widen 2 to 4 lanes
■	■				•Perris Boulevard (Perris Valley Storm Drain to Ramona) - widen 2 to 4 lanes
■	■				•Ramona (Seventh to Cedar) - widen 0 to 4 lanes
■	■				•SR-79 San Jacinto Bypass (Domenigoni to Gilman Springs) - widen 0 to 6 lanes
■	■	■	■	Northwest Zone	•Van Buren Bridge over Santa Ana - widen 4 to 6 lanes
■	■				•Van Buren Boulevard (Washington to Wood) - widen 4 to 6 lanes
■	■				•Schleisman/I-15 Interchange Improvements
■	■	■			•Green River Road (Dominguez Ranch to SR-91 to Palisades) - widen 2 to 6 lanes
■	■	■			•Foothill Parkway (Paseo Grande to Lincoln) - widen new to 4 lanes
■	■			Southwest Zone	•Bundy Canyon/Scott Road (I-15 to I-215) - widen new to 4 lanes
■	■	■			•SR-79 Eastern Bypass/I-15 Interchange
■	■	■			•SR-79 Winchester (Thompson to Domenigoni) - widen to 4 lanes
■	■				•Railroad Canyon/I-15 Interchange
■	■				•SR-79 Western Bypass (I-15/French Valley to I-15/SR-79/Front Street) - widen o to 4 lanes
■	■	■			•French Valley Parkway/I-15 Interchange

5 projects currently on the TIP are completed and are listed under the Completed Projects list on Page 45.

Van Buren / SR-91 Interchange Project, City of Riverside (Photo courtesy of City of Riverside)

Van Buren/SR-91 Interchange Completed (City of Riverside) The SR-91/Van Buren Boulevard Interchange Project widened the existing four-lane overcrossing bridge to six lanes with dual left-turn lanes.

The westbound ramps were also widened to three lanes. A new eastbound onramp was constructed on Indiana Avenue. Construction started in March 2010 and lasted 15 months ending in June 2011. The project cost was $35 million, of which TUMF provided $10 million.

SR-79 Winchester Widening (County of Riverside) This project will improve State Route 79 between Thompson Road and Domenigoni Parkway by widening the 7.4-mile stretch from two to four lanes.

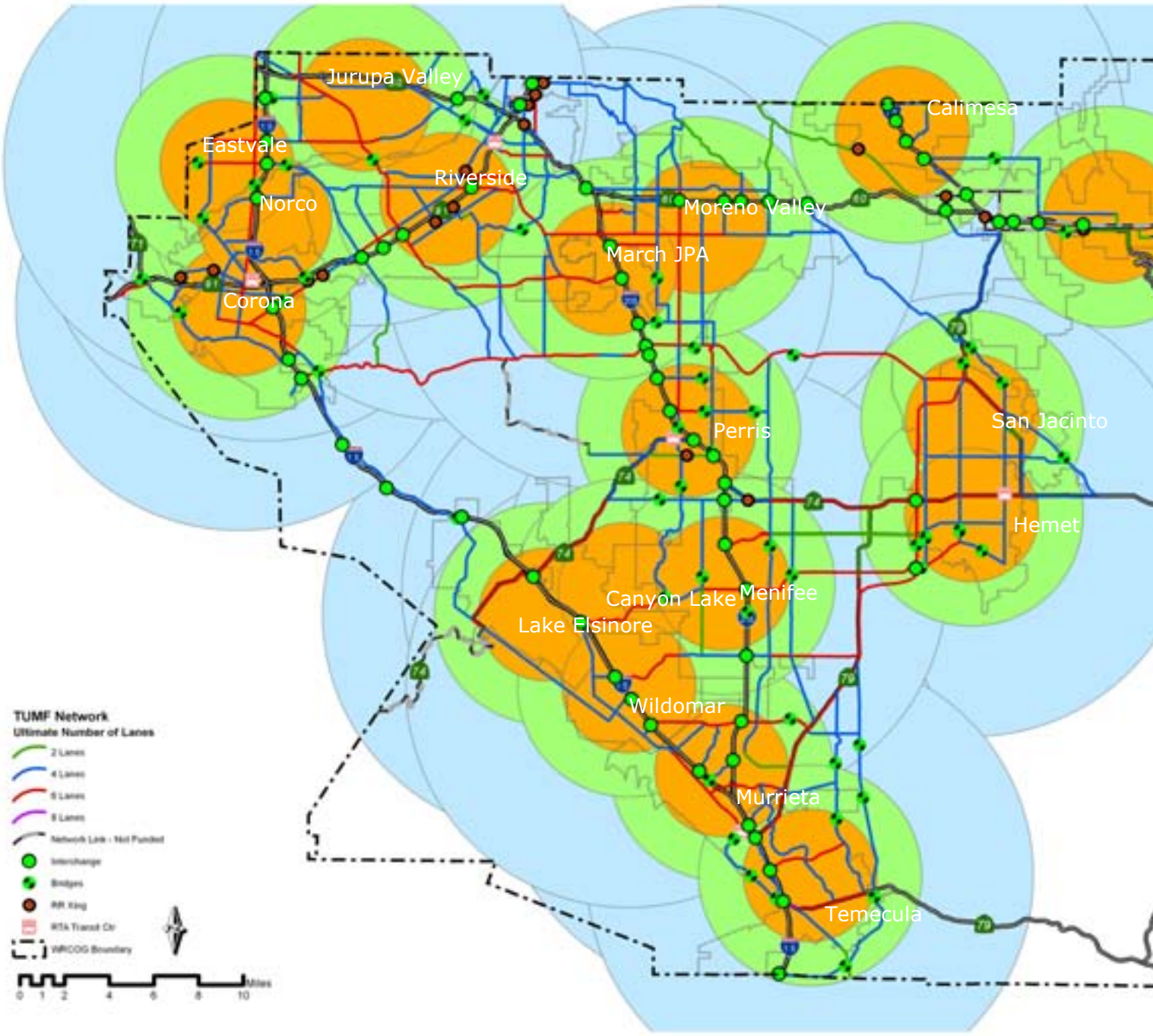
Construction is estimated to take 12 months and will occur in two stages. The first stage will be from Scott Road to Domenigoni Parkway and the second stage will be from Abelia Street to Scott Road. The project is estimated to cost over $33 million, of which TUMF has programmed $6 million.

46 Projects Completed Since 2003

Central Zone	
Menifee/County of Riverside	•Newport Road (Goetz to Murrieta) - widen 0 to 4 lanes
Moreno Valley	•Ironwood/Moreno Beach Intersection
	•Ironwood/Nason Intersection
	•Pigeon Pass Road (Climbing Rose to Hidden Springs) - widen 2 to 4 lanes
	•Lasselle Street (John F Kennedy to Alessandro) - widen an additional northbound lane
Perris	•Oleander Avenue (Perris to Indian) - widen new to 2 lanes
	•Placentia Avenue Gap Closure (Redlands to Wilson) - construct 2 new lanes
	•Ramona Expressway (I-215 to Perris) (Phase 1) - widen 4 to 6 lanes
	•Ramona Expressway (I-215 to Evans Road) - widen 2 to 4 lanes
March JPA/Moreno Valley	•Heacock Avenue (Perris Valley Drain to San Michele) - widen 2 to 4 lanes
Hemet/San Jacinto Zone	
Hemet	•Sanderson Avenue (Stetson to Domenigoni), Salt Creek Bridge - widen 2 to 4 lanes
	•Sanderson Avenue (Acacia to BNSF railroad tracks) - widen 2 to 4 lanes
	•Sanderson Avenue (Menlo to Esplanade) - widen 2 to 4 lanes
	•State Street (Chambers to Domenigoni) - widen 2 to 4 with center turn-lane
San Jacinto	•Sanderson Avenue (Esplanade to Ramona) - widen 2 to 4 lanes
San Jacinto/County of Riverside	•Sanderson Avenue/Ramona Expressway Intersection Improvements
County of Riverside	•Newport Road (Domenigoni Parkway) Leon to SR-79 - widen 0 to 6 lanes
Northwest Zone	
County of Riverside	•Cantu-Galleano/I-15 Interchange
	•Washington Street Improvements, William Lyon Homes
	•La Sierra Avenue (Cleveland to El Sobrante) - widen 2 to 4 lanes
	•Valley Way (Sierra to Mission) - widen 2 to 4 lanes
Corona	•Lincoln/SR-91 Interchange
	•Ontario Avenue (Compton to Rimpau) - widen 5 to 6 lanes
	•Railroad Street (Buena Vista to Grand) - widen 2 to 4 lanes
	•Magnolia Avenue, I-15 to Sherborn Street - widen 4 to 6 lanes
	•Magnolia Corridor/Magnolia/I-15 Interchange
Riverside	•La Sierra Avenue (Cleveland to Indiana) - widen 2 to 4 lanes
	•La Sierra/SR-91 Interchange
	•SR-60/Market Street Ramps - widen ramps and install traffic signal
	•Wood/Van Buren Intersection Improvements
	•Overlook Parkway except bridge (Chateau Ridge to Sandtrack) - widen 2 to 4 lanes
	•Alessandro Boulevard (Arlington to Trautwein) - widen 4 to 6 lanes
	•Columbia Avenue Grade Separation Overpass - widen to 4 lanes
Pass Zone	
Calimesa	•Desert Lawn Drive (Palmer to Cherry Valley) - widen 2 to 4 lanes
Southwest Zone	
Lake Elsinore	•SR-74 Ortega/SR-74 Grand Intersection
	•SR-74/I-15 Interchange
Murrieta	•Los Alamos/I-215 Interchange
	•Clinton Keith Road/I-215 Interchange
	•Meadowlark (Clinton Keith to Keller) - widen 2 to 4 lanes
Riverside Transit Agency	
	•Corona Multi-Modal Transit Terminal
	•Perris Transit Center
Riverside County Transportation Commission	
	•Ramona (SR-79/Sanderson to West City Limits) - widen 2 to 4 lanes
	•Foothill Parkway (El Cerrito)/I-15 Interchange
	•Van Buren Boulevard/SR-91 Interchange
	•Van Buren Boulevard (Andrew to Garfield) - widen 4 to 6 lanes
	•Green River Road/SR-91 Interchange - widen 2 to 6 lanes

The completed projects list includes projects that were completed during Fiscal Year 2010/2011 and are currently on the TIP.

3, 5, 10-Mile Value of TUMF Improvements from City Centers



This map identifies the value of TUMF improvements within a 3, 5, and 10-mile radius from each participating City's center. The purpose of this map is to graphically depict the benefits of TUMF Program improvements that residents in cities and the unincorporated County benefit from, even when the improvements are not located specifically within that jurisdiction. This map demonstrates the regional aspect of the program and how the WRCOG TUMF participants are knitted together with TUMF improvements over the next 25 years. Maps for individual WRCOG jurisdictions can be found at our website at http://www.wrcog.cog.ca.us/content/tumf_jurisdictional_map.asp.

March JPA

Value of Improvements (3 miles)	$78,446,000
Value of Improvements (5 miles)	$267,153,000
Value of Improvements (10	$723,784,477
Total Value of Improvements	$1,069,383,477

City of Banning

Value of Improvements (3 miles)	$68,821,000
Value of Improvements (5 miles)	$44,861,000
Value of Improvements (10 miles)	$162,828,000
Total Value of Improvements	$276,510,000

City of Calimesa

Value of Improvements (3 miles)	$123,987,000
Value of Improvements (5 miles)	$9,066,000
Value of Improvements (10 miles)	$233,405,000
Total Value of Improvements	$366,458,000

City of Canyon Lake

Value of Improvements (3 miles)	$50,836,000
Value of Improvements (5 miles)	$160,844,000
Value of Improvements (10 miles)	$751,189,000
Total Value of Improvements	$962,869,000

City of Corona

Value of Improvements (3 miles)	$100,498,377
Value of Improvements (5 miles)	$130,275,000
Value of Improvements (10 miles)	$366,483,600
Total Value of Improvements	$597,256,977

City of Eastvale

Value of Improvements (3 miles)	$217,187,000
Value of Improvements (5 miles)	$63,071,377
Value of Improvements (10 miles)	$238,628,600
Total Value of Improvements	$518,886,977

City of Hemet

Value of Improvements (3 miles)	$95,470,765
Value of Improvements (5 miles)	$120,732,000
Value of Improvements (10 miles)	$213,166,000
Total Value of Improvements	$429,368,765

City of Lake Elsinore

Value of Improvements (3 miles)	$102,607,000
Value of Improvements (5 miles)	$32,614,000
Value of Improvements (10 miles)	$345,378,000
Total Value of Improvements	$480,599,000

City of Jurupa Valley

Value of Improvements (3 miles)	$44,118,067
Value of Improvements (5 miles)	$94,179,000
Value of Improvements (10 miles)	$509,772,159
Total Value of Improvements	$648,069,226

City of Menifee

Value of Improvements (3 miles)	$101,192,000
Value of Improvements (5 miles)	$206,284,000
Value of Improvements (10 miles)	$787,635,000
Total Value of Improvements	$1,095,111,000

City of Moreno Valley

Value of Improvements (3 miles)	$115,584,000
Value of Improvements (5 miles)	$271,761,000
Value of Improvements (10 miles)	$541,708,065
Total Value of Improvements	$875,053,065

City of Murrieta

Value of Improvements (3 miles)	$252,477,869
Value of Improvements (5 miles)	$130,801,000
Value of Improvements (10 miles)	$444,238,000
Total Value of Improvements	$827,516,869

City of Norco

Value of Improvements (3 miles)	$191,552,377
Value of Improvements (5 miles)	$122,962,000
Value of Improvements (10 miles)	$296,472,067
Total Value of Improvements	$610,986,444

City of Perris

Value of Improvements (3 miles)	$178,386,000
Value of Improvements (5 miles)	$249,545,000
Value of Improvements (10 miles)	$535,907,200
Total Value of Improvements	$963,838,200

City of Riverside

Value of Improvements (3 miles)	$104,806,525
Value of Improvements (5 miles)	$136,409,540
Value of Improvements (10 miles)	$632,501,444
Total Value of Improvements	$873,717,509

City of San Jacinto

Value of Improvements (3 miles)	$176,414,000
Value of Improvements (5 miles)	$42,473,659
Value of Improvements (10 miles)	$197,959,000
Total Value of Improvements	$416,846,659

City of Temecula

Value of Improvements (3 miles)	$95,937,000
Value of Improvements (5 miles)	$153,859,869
Value of Improvements (10 miles)	$320,535,000
Total Value of Improvements	$570,331,869

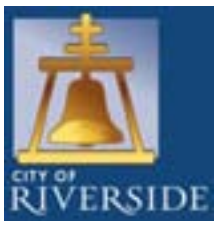
City of Wildomar

Value of Improvements (3 miles)	$116,577,000
Value of Improvements (5 miles)	$119,213,000
Value of Improvements (10 miles)	$588,424,869
Total Value of Improvements	$824,214,869

Newport Road facing west, City of Menifee (Photo courtesy of Skyview Imaging)

Program Participants

TUMF WRCOG



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County of Riverside

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Western Municipal Water District

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Superintendent
Riverside County Superintendent of Schools

"Respect Local Control... Provide Regional Perspective"

Contruction Noise Handbook

9.0 Construction Equipment Noise Levels and Ranges

9.1 Equipment Type Inventory and Related Emission Levels

Noise levels generated by individual pieces of construction equipment and specific construction operations form the basis for the prediction of construction-related noise levels. A variety of information exists related to sound emissions related to such equipment and operations. This data transcends the period beginning in the 1970s thru 2006. This information exists for both stationary and mobile sources and for steady, intermittent, and impulse type generators of noise.

Stationary equipment consists of equipment that generates noise from one general area and includes items such as pumps, generators, compressors, etc. These types of equipment operate at a constant noise level under normal operation and are classified as non-impact equipment. Other types of stationary equipment such as pile drivers, jackhammers, pavement breakers, blasting operations, etc., produce variable and sporadic noise levels and often produce impact-type noises. Impact equipment is equipment that generates impulsive noise, where impulsive noise is defined as noise of short duration (generally less than one second), high intensity, abrupt onset, rapid decay, and often rapidly changing spectral composition. For impact equipment, the noise is produced by the impact of a mass on a surface, typically repeating over time.

Mobile equipment such as dozers, scrapers, graders, etc., may operate in a cyclic fashion in which a period of full power is followed by a period of reduced power. Other equipment such as compressors, although generally considered to be stationary when operating, can be readily relocated to another location for the next operation.

9.2 Sources of Information

Construction-related equipment and operation noise level data may be provided by numerous sources, including suppliers, manufacturers, agencies, organizations, etc. Some information is included in this document, and many web-based links are given for equipment manufacturers.

9.3 Specifics of Construction Equipment and Operation Noise Inventories

Details included in each specific inventory of construction equipment and operation noise emission levels are often variable in terms of how data is represented. Some inventories include ranges of noise levels while others present single numbers for each equipment type. Others provide levels for specific models of each type of construction equipment. Often, different noise descriptors are used, such as L_{Aeq}, L_{max}, L_{10}, sound power level, etc. As such, the array of data does not readily lend itself to being combined into a single table or easily compared. As such, this Handbook attempts to summarize a variety of such inventories and provide links to each, thereby providing the reader with a variety of sources from which to choose the appropriate levels for use in his or her respective analysis.

9.4 Summaries of Referenced Inventories

Included below are examples of several inventories of construction-related noise emission values. These and additional inventories are included on the companion CD-ROM.

Equipment and operation noise levels in this inventory are expressed in terms of L_{max} noise levels and are accompanied by a usage factor value. They have been recently updated and are based on extensive measurements taken in conjunction with the Central Artery/Tunnel (CA/T) Project. Table 9.1 summarizes the equipment noise emissions database used by the CA/T Project. While these values represent the "default" values for use in the RCNM, user-defined equipment and corresponding noise levels can be added.

Table 9.1 RCNM Default Noise Emission Reference Levels and Usage Factors.

Equipment Description	Impact Device?	Acoustical Usage Factor (%)	Spec. 721.560 L_{max} @ 50 feet (dBA, slow)	Actual Measured L_{max} @ 50 feet (dBA, slow) (Samples Averaged)	Number of Actual Data Samples (Count)
All Other Equipment > 5 HP	No	50	85	N/A	0
Auger Drill Rig	No	20	85	84	36
Backhoe	No	40	80	78	372
Bar Bender	No	20	80	N/A	0
Blasting	Yes	N/A	94	N/A	0

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Boring Jack Power Unit	No	50	80	83	1
Chain Saw	No	20	85	84	46
Clam Shovel (dropping)	Yes	20	93	87	4
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Concrete Batch Plant	No	15	83	N/A	0
Concrete Mixer Truck	No	40	85	79	40
Concrete Pump Truck	No	20	82	81	30
Concrete Saw	No	20	90	90	55
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Drill Rig Truck	No	20	84	79	22
Drum Mixer	No	50	80	80	1
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flat Bed Truck	No	40	84	74	4
Front End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Generator (<25KVA, VMS Signs)	No	50	70	73	74
Gradall	No	40	85	83	70
Grader	No	40	85	N/A	0
Grapple (on backhoe)	No	40	85	87	1
Horizontal Boring Hydraulic Jack	No	25	80	82	6
Hydra Break Ram	Yes	10	90	N/A	0
Impact Pile Driver	Yes	20	95	101	11
Jackhammer	Yes	20	85	89	133
Man Lift	No	20	85	75	23
Mounted Impact Hammer (hoe ram)	Yes	20	90	90	212
Pavement Scarifier	No	20	85	90	2
Paver	No	50	85	77	9
Pickup Truck	No	40	55	75	1
Pneumatic Tools	No	50	85	85	90
Pumps	No	50	77	81	17
Refrigerator Unit	No	100	82	73	3
Rivit Buster/Chipping Gun	Yes	20	85	79	19

Rock Drill	No	20	85	81	3
Roller	No	20	85	80	16
Sand Blasting (single nozzle)	No	20	85	96	9
Scraper	No	40	85	84	12
Sheers (on backhoe)	No	40	85	96	5
Slurry Plant	No	100	78	78	1
Slurry Trenching Machine	No	50	82	80	75
Soil Mix Drill Rig	No	50	80	N/A	0
Tractor	No	40	84	N/A	0
Vacuum Excavator (Vac-Truck)	No	40	85	85	149
Vacuum Street Sweeper	No	10	80	82	19
Ventilation Fan	No	100	85	79	13
Vibrating Hopper	No	50	85	87	1
Vibratory Concrete Mixer	No	20	80	80	1
Vibratory Pile Driver	No	20	95	101	44
Warning Horn	No	5	85	83	12
Welder/Torch	No	40	73	74	5

For each generic type of equipment listed in Table 9.1, the following information is provided:

- an indication as to whether or not the equipment is an impact device;
- the acoustical usage factor to assume for modeling purposes;
- the specification "Spec" limit for each piece of equipment expressed as an L_{max} level in dBA "slow" at a reference distance of 50 foot from the loudest side of the equipment;
- the measured "Actual" emission level at 50 feet for each piece of equipment based on hundreds of emission measurements performed on CA/T work sites; and
- the number of samples that were averaged together to compute the "Actual" emission level.

A comparison of the "Spec" emission limits against the "Actual" emission levels reveals that the Spec limits were set, in general, to realistically obtainable noise levels based on the equipment used by contractors on the CA/T Project. When measured in the field, some equipment such as pile drivers, sand blasting, demolition shears, and pumps tended to exceed their applicable emission limit. As such, these noisy devices needed to have some form of noise mitigation in place in order to comply with the Spec emission limits. Other equipment, such as clamshell shovels, concrete mixer trucks, truck-mounted drill rigs, man-lifts, chipping guns, ventilation fans, pavers, dump trucks, and flatbed trucks, easily complied. Therefore, the Spec emission limits for these devices could have been reduced somewhat further. It is recommended that the user review the RCNM User's Guide contained in Appendix A for detailed guidance regarding application of values contained in Table 9.1.

Appendix A of the 1977 Handbook provides tables of construction equipment noise levels and ranges. The majority of the data were provided by the American Road Builders Association. These data were taken during a 1973 survey in which member contractors were asked to secure readings of noise exposure to operators of various types of equipment. Additionally, the contractors were asked to take readings at 50 feet from the machinery. These 50-foot peak readings are provided in Tables 9.2 through 9.8. Though the data were produced under varying conditions and degrees of expertise, the values are relatively consistent.

Table 9.2 Construction Equipment Noise Levels Based on Limited Data Samples - Cranes.

Manufacturer	Type or Model	Peak Noise Level (dBA)	Remarks
Northwestern	80D	77	Within 15m 1958 mod
Northwestern	8	84	Within 15m 1940 mod
Northwestern	6	72	Within 15m 1965 mod
American	7260	82	Within 15m 1967 mod

American	599	76	Within 15m 1969 mod
American	5299	70	Within 15m 1972 mod
American	4210	82	Within 15m 1968 mod
Buck Eye	45C	79	Within 15m 1972 mod
Buck Eye	308	74	Within 15m 1968 mod
Buck Eye	30B	73	Within 15m 1965 mod
Buck Eye	30B	70	Within 15m 1959 mod
Link Belt	LS98	76	Within 15m 1956 mod
Manitowoc	4000	94	Within 15m 1956 mod
Grove	RF59	82	Within 15m 1973 mod
Koehr	605	76	Within 15m 1967 mod
Koehr	435	86	Within 15m 1969 mod
Koehr	405	84	Within 15m 1969 mod

Table 9.3 Construction Equipment Noise Levels Based on Limited Data Samples - Backhoes.

Manufacturer	Type or Model	Peak Noise Level (dBA)	Remarks
Link Belt	4000	92	Within 15m 1971 mod
John Deere	609A	85	Within 15m 1971 mod
Case	680C	74	Within 15m 1973 mod
Drott	40 yr.	82	Within 15m 1971 mod
Koehr	1066	81 & 84	Within 15m 2 tested

Table 9.4 Construction Equipment Noise Levels Based on Limited Data Samples - Front Loaders.

Manufacturer	Type or Model	Peak Noise Level (dBA)	Remarks
Caterpillar	980	84	Within 15m 1972 mod
Caterpillar	977K	79	Within 15m 1969 mod
Caterpillar	977	87	Within 15m 1971 mod
Caterpillar	977	94	Within 15m 1967 mod
Caterpillar	966C	84	Within 15m 1973 mod
Caterpillar	966C	85	Within 15m 1972 mod
Caterpillar	966	81	Within 15m 1972 mod
Caterpillar	966	77	Within 15m 1972 mod
Caterpillar	966	85	Within 15m 1966 mod
Caterpillar	955L	90	Within 15m ;1973 mod
Caterpillar	955K	79	Within 15m 1969 mod
Caterpillar	955H	94	Within 15m 1963 mod
Caterpillar	950	78 & 80	Within 15m 1972 mod
Caterpillar	950	75	Within 15m 1968 mod
Caterpillar	950	88	Within 15m 1967 mod
Caterpillar	950	86	Within 15m 1965 mod
Caterpillar	944A	80	Within 15m 1965 mod
Caterpillar	850	82	Within 15m 1968 mod
Michigan	75B	90	Within 15m 1960 mod

Michigan	475A	96	Within 15m 1967 mod
Michigan	275	85	Within 15m 1971 mod
Michigan	125	87	Within 15m 1967 mod
Hough	65	82	Within 15m 1971 mod
Hough	60	91	Within 15m 1961 mod
Hough	400B	94	Within 15m 1961 mod
Hough	H90	86	Within 15m 1961 mod
Trojan	3000	85	Within 15m 1956 mod
Trojan	RT	82	Within 15m 1965 mod
Payloader	H50	85	Within 15m 1963 mod

Table 9.5 Construction Equipment Noise Levels Based on Limited Data Samples - Dozers.

Manufacturer	Type or Model	Peak Noise Level (dBA)	Remarks
Caterpillar	D5	83	Within 15m 1967 mod
Caterpillar	D6	85	Within 15m 1967 mod
Caterpillar	D6	86	Within 15m 1964 mod
Caterpillar	D6	81	Within 15m 1967 mod
Caterpillar	D6B	83	Within 15m 1967 mod
Caterpillar	D6C	82	Within 15m 1962 mod
Caterpillar	D7	85	Within 15m 1956 mod
Caterpillar	D7	86	Within 15m 1969 mod
Caterpillar	D7	84	Within 15m 1969 mod
Caterpillar	D7	78	Within 15m 1970 mod
Caterpillar	D7	78	Within 15m 1972 mod
Caterpillar	D7E	86	Within 15m 1965 mod
Caterpillar	D7E	78	Within 15m 1970 mod
Caterpillar	D7E	84	Within 15m 1973 mod
Caterpillar	D7F	80	Within 15m 1972 mod
Caterpillar	D8	92	Within 15m 1954 mod
Caterpillar	D8	95	Within 15m 1968 mod
Caterpillar	D8	86	Within 15m 1972 mod
Caterpillar	D8H	88	Within 15m 1966 mod
Caterpillar	D8H	82	Within 15m 1972 mod
Caterpillar	D9	85	Within 15m 1972 mod
Caterpillar	D9	94	Within 15m 1972 mod
Caterpillar	D9	90	Within 15m 1963 mod
Caterpillar	D9	87	Within 15m 1965 mod
Caterpillar	D9	90	Within 15m 1965 mod
Caterpillar	D9	88	Within 15m 1968 mod
Caterpillar	D9	92	Within 15m 1972 mod
Caterpillar	D9G	85	Within 15m 1965 mod
Allis Chambers	HD41	93	Within 15m 1970 mod

International	TD15	79	Within 15m 1970 mod
International	TD20	87	Within 15m 1970 mod
International	TD25	90	Within 15m 1972 mod
International	TD8	83	Within 15m 1970 mod
Case	1150	82	Within 15m 1972 mod
John Deer	350B	77	Within 15m 1971 mod
John Deer	450B	65	Within 15m 1972 mod
Terex	8230	70	Within 15m 1972 mod
Terex	8240	93	Within 15m 1969 mod
Michigan	280	85	Within 15m 1961 mod
Michigan	280	90	Within 15m 1962 mod
Caterpillar	824	90	Within 15m 1968 mod

Table 9.6 Construction Equipment Noise Levels Based on Limited Data Samples - Graders.

Manufacturer	Type or Model	Peak Noise Level (dBA)	Remarks
Caterpillar	16	91	Within 15m 1969 mod
Caterpillar	16	86	Within 15m 1968 mod
Caterpillar	140	83	Within 15m 1970 mod
Caterpillar	14E	84	Within 15m 1972 mod
Caterpillar	14E	85	Within 15m 1971 mod
Caterpillar	14C	85	Within 15m 1971 mod
Caterpillar	14B	84	Within 15m 1967 mod
Caterpillar	12F	82	Within 15m 1961-72 mod
Caterpillar	12F	72-92	Within 15m 1961-72 mod
Caterpillar	12E	81.3	Within 15m 1959-67 mod
Caterpillar	12E	80-83	Within 15m 1959-67 mod
Caterpillar	12	84.7	Within 15m 1960-67 mod
Caterpillar	12	82-88	Within 15m 1960-67 mod
Gallon	T500	84	Within 15m 1964 mod
Allis Chambers		87	Within 15m 1964 mod

Table 9.7 Construction Equipment Noise Levels Based on Limited Data Samples - Scrapers.

Manufacturer	Type or Model	Peak Noise Level (dBA)	Remarks
Caterpillar	660	92	Within 15m
Caterpillar	641B	85	Within 15m 1972 mod
Caterpillar	641B	86	Within 15m 1972 mod
Caterpillar	641	80 & 84	Within 15m 1972 mod
Caterpillar	641	83 & 89	Within 15m 1965 mod
Caterpillar	637	87	Within 15m 1971 mod
Caterpillar	633	87	Within 15m 1972 mod
Caterpillar	631C	89	Within 15m 1973 mod
Caterpillar	631C	83	Within 15m 1972 mod
Caterpillar	631B	84	Within 15m 1960 mod

Caterpillar	631B	84-87	Within 15m 1968 mod
Caterpillar		85 avg.	Within 15m 1968 mod
Caterpillar	621	90	Within 15m 1970 mod
Caterpillar	621	86	Within 15m 1967 mod
Caterpillar	613	76	Within 15m 1972 mod
Terex	TS24	87	Within 15m 1972 mod
Terex	TS24	84-91	
Terex	TS24	82	Within 15m 1971 mod
Terex	TS24	81-83	Within 15m 1971 mod
Terex	TS24	94	Within 15m 1966 mod
Terex	TS24	92-98	Within 15m 1966 mod
Terex	TS24	94.7	Within 15m 1963 mod
Terex	TS24	94-95	Within 15m 1963 mod
Terex	TS14	82	Within 15m 1969 mod
Terex	S35E	84	Within 15m 1971 mod

Table 9.8 Noise Levels of Standard Compressors.

Manufacturer	Model	Silenced or Standard	Type Eng.	Type Comp.	Test Avg. Cond. (cfm.psi)	Avg. Cond. Noise Lev. (cfm.psi) (dBA) at 7m*
Atlas	ST-48	Standard	Diesel	Reciprocal	160,100	83.6
Atlas	ST-95	Standard	Diesel	Reciprocal	330,105	80.2
Atlas	VSS-170Dd	Silenced	Diesel	Reciprocal	170,850	70.2
Atlas	VT-85M	Standard	Gas	Reciprocal	85,100	81.4
Atlas	VS-85Dd	Silenced	Gas	Reciprocal	85,100	75.5
Atlas	VSS-125Dd	Silenced	Diesel	Reciprocal	125,100	70.1
Atlas	STS-35Dd	Silenced	Diesel	Reciprocal	125,100	73.5
Atlas	VSS-170Dd	Silenced	Diesel	Reciprocal	170,100	
Gardner-Denver	SPWDA/2	Silenced	Diesel	Rotary-Screw	1200,000	73.3
Gardner-Denver	SPQDA/2	Silenced	Diesel	Rotary-Screw	750,000	78.2
Gardner-Denver	SPHGC	Silenced	Gas	Rotary-Screw	185,000	77.1
Ingersoll-Rand	DXL 1200	Standard	Diesel	Rotary-Screw	1200,125	92.6
Ingersoll-Rand	DXL 1200 (doors open)	Standard	Diesel	Rotary-Screw	1200,125	
Ingersoll-Rand	DXL 900S	Silenced	Diesel	Rotary-Screw	900,125	76.0
Ingersoll-Rand	DXL 900S	Silenced	Diesel	Rotary-Screw	900,125	75.1
Ingersoll-Rand	DXLCU1050	Standard	Diesel	Rotary-Screw	1050,125	90.2
Ingersoll-Rand	DXL 900S	Silenced	Diesel	Rotary-Screw	900,125	75.3
Ingersoll-Rand	DXL 900S	Silenced	Diesel	Rotary-Screw	900,125	75.0
Ingersoll-Rand	DXL 900	Standard	Diesel	Rotary-Screw	900,125	89.9
Ingersoll-Rand	DXL 750	Standard	Diesel	Rotary-Screw	750,125	87.7
Jaeger	A	Standard	Gas	Rotary-Screw	175,100	88.2

Jaeger	A(doors open)	Standard	Gas	Rotary-Screw	175,100	
Jaeger	E	Standard	Gas	Vane	85,100	81.5
Jaeger	E(doors open)	Standard	Gas	Vane	85,100	
Worthington	60 G/2Qt	Silenced	Gas	Vane	160,100	74.2
Worthington	750-QTEX	Silenced	Diesel	Rotary-Screw	750,100	74.7

*Data taken from EPA Report - EPA 550/9-76-004.

9.4.3 FTA Noise and Vibration Assessment Procedure

Chapter 12 of the FTA Transit Noise and Vibration Guidance Handbook discusses construction noise evaluation methodology and contains the noise emission levels for construction equipment displayed in Table 9.9.

Table 9.9 FTA Construction Equipment Noise Emission Levels.

Equipment	Typical Noise Level (dBA) 50 ft from Source*
Air Compressor	81
Backhoe	80
Ballast Equalizer	82
Ballast Tamper	83
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane Derrick	88
Crane Mobile	83
Dozer	85
Generator	81
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	85
Paver	89
Pile Driver (Impact)	101
Pile Driver (Sonic)	96
Pneumatic Tool	85
Pump	76
Rail Saw	90
Rock Drill	98
Roller	74
Saw	76
Scarifier	83
Scraper	89
Shovel	82
Spike Driver	77
Tie Cutter	84

Tie Handler	80
Tie Inserter	85
Truck	88

*Table based on EPA Report, measured data from railroad construction equipment taken during Northeast Corridor improvement project and other measured data.

9.5 Links to Equipment Manufacturers

Table 9.10 contains web-based links to manufacturers of construction equipment. While few of these links contain noise-related data associated with the equipment, they provide descriptions and/or specifications related to the equipment, as well as sources for possibly obtaining additional information related to the equipment. Information in this table is by no means all-inclusive and does not represent any type of endorsement of the manufacturers, suppliers, or equipment. Users are hereby advised that the referenced websites may have certain restrictions, copyrights, etc., associated with any use of data contained therein.

Table 9.10 Equipment Manufacturers and Websites.

Equipment	Manufacturer	Website Address
Arrow Boards		
	North Star	http://northstar-traffic.com/index.cfm?SC=14&PT=1
	Trafcom	http://www.trafcon.com
	Allmand	http://www.allmand.com/MB%20AB%20page.htm
Articulated Trucks		
	Case	http://www.casece.com/products/products.asp?RL=NAE&id=196
	Hitachi	http://www.hitachi-c-m.com/global/products/articulate/index.html
	Terex	http://www.terex.com/main.php
	Caterpillar	http://www.cat.com/cda/layout?m=37840&x=7
	Volvo	http://www.volvo.com/constructionequipment/na/en-us/products/articulatedhaulers/
Asphalt Saws		
	Allied	http://www.alliedcp.com/products/rotocut.asp
Augers - See Drills / Augers		
Backhoes - See Loaders/Backhoes		
Boring Equipment - See Pile Drivers/Boring Equipment		
Compaction Equipment		
	Allied	http://www.alliedcp.com/products/compactor.asp
Compressors		
	Sullair	http://www.sullair.com/corp/details/0,10294,CLI1_DIV61_ETI5714,00.html
	Compair	http://www.compair.com/Products/Portable_Compressors.aspx
Concrete and Asphalt Batch/Mixing Plants and Equipment		
	Con-E-Co	http://www.con-e-co.com/products.cfm
	Terex	http://www.terex.com/main.php
	Gunter & Zimmerman	http://www.guntert.com/concrete_mobilebatching.asp
	Rex Con	http://www.rexcon.com
Concrete Breakers/ Hydraulic Hammers/Hydraulic Breakers		
	Drillman	http://www.drillmanindia.com/concrete-breaker.html
	Hydro Khan	http:/www.sangi.co.kr/english/e_product1_2.php
	Stanley	http://www.stanley-hydraulic-tools.com/Hand%20Held/NoAmbreakers.htm

	Lynx	http://www.stanley-hydraulic-tools.com/Lynx/breakers.htm
Concrete Chain Saws		
	Lynx	http://www.stanley-hydraulic-tools.com/Lynx/concrete-saws.htm
Concrete Core Drilling Machines		
	Multiquip	http://www.multiquip.com/multiquip/318_ENU_HTML.htm
Concrete Cutters		
	Vermeer	http://www.vermeermfg.com/vcom/TrenchingEquipment/Line.jsp?PrdlnID=3618
Concrete/Material Pumps		
	Multiquip	http://www.multiquip.com/multiquip/309_ENU_HTML.htm
	Reed	http://www.reedpumps.com/
Concrete Mixer Trucks		
	Oshkosh	http://www.oshkoshtruck.com/concrete/products~overview~home.cfm
	London	http://www.lmi.ca/mixers.cfm
	Terex/Advance	http://www.advancemixer.com
Concrete Saws		
	Multiquip	http://www.multiquip.com/multiquip/315_ENU_HTML.htm
	Diamond Core Cut	http://www.diamondproducts.com/dp_home.htm
Concrete Screeds		
	Multiquip	http://www.multiquip.com/multiquip/317_ENU_HTML.htm
Concrete Vibrators		
	Multiquip	http://www.multiquip.com/multiquip/313_ENU_HTML.htm
	Sullair	http://www.sullair.com/corp/details/0,10294,CLI1_DIV61_ETI5722,00.html
Cranes		
	Malcolm Drilling	www.malcolmdrilling.com
	Link-Belt	http://www.linkbelt.com/lit/products/frameproducthome.htm
	Casagrande	http://www.casagrandegroup.com
	Liebherr	http://www.liebherr.com/em/en/35381.asp
	Terex	http://www.terex.com/main.php
Crawler Tractors - See Dozers/Crawler Tractors		
Crushing and Screening Equipment		
	Cedarapids	http://www.cedarapids.com/crushscr.htm
	Hitachi	http://www.hitachi-c-m.com/
	Komatsu	http://www.komatsu.com/ce/products/mobile_crushers.html
	Terex	http://www.terex.com/main.php
Crushers/Pulverizers		
	Hydro Khan	http://www.sangi.co.kr/english/e_product3.php
Cutoff Saws		
	Multiquip	http://www.multiquip.com/multiquip/309_ENU_HTML.htm
	Lynx	http://www.stanley-hydraulic-tools.com/Lynx/cutoff%20saw.htm
Dozers/CrawlerTractors		

	John Deere	http://www.deere.com/en_US/cfd/construction/deere_const/crawlers/deere_dozer_selection.html
	Caterpillar	http://www.cat.com/cda/layout?m=37840&x=7
	Case	http://www.casece.com/products/products.asp?RL=NAE&id=2
	Komatsu	http://www.komatsu.com/ce/products/crawler_dozers.html
Dewatering Pumps		
	Multiquip	http://www.multiquip.com/multiquip/371_ENU_HTML.htm
Drills / Augers		
	Malcolm Drilling	www.malcolmdrilling.com
	Casagrande	www.casagrandegroup.com
	Soilmec	http://www.soilmec.com/_vti_g1_techno.aspx?rpstry=4_
	Terex	http://www.terex.com/main.php
Excavators		
	Hitachi	http://www.hitachi-c-m.com/global/products/excavator/index.html
	Caterpiller	http://www.cat.com/cda/layout?m=37840&x=7
	Volvo	http://www.volvo.com/constructionequipment/na/en-us/products/compactexcavators/
		http://www.volvo.com/constructionequipment/na/en-us/products/wheeledexcavators/
		http://www.volvo.com/constructionequipment/na/en-us/products/crawlerexcavators/
	John Deere	http://www.deere.com/en_US/cfd/construction/deere_const/excavators/deere_excavator_selection.html
	Liebherr	http://www.liebherr.com/em/en/18891.asp
	Soilmec	http://www.soilmec.com/_vti_g1_t02.aspx?rpstry=29_
	Gehl	http://www.gehl.com
	Case	http://www.casece.com/products/products.asp?RL=NAE&id=216
	Komatsu	http://www.komatsu.com/ce/products/crawler_excavators.html
		http://www.komatsu.com/ce/products/wheel_excavators.html
	Terex	http://www.terex.com/main.php
	Link-Belt	http://www.lbxco.com/lx_series.asp
	Gradall	http://www.gradall.com/
	Badger Daylighting	http://www.badgerinc.com/
Fork Lifts - See Lifts / Variable Reach Fork Lifts/ Material Handlers		
Generators		
	Terex	http://www.terex.com/main.php
	Multiquip	http://www.multiquip.com/multiquip/212_ENU_HTML.htm
	Sullair	http://www.sullair.com/corp/details/0,10294,CLI1_DIV61_ETI5714,00.html
	Baldor	http://www.baldor.com/products/generators/ts.asp
Graders		
	Case	http://www.casece.com/products/products.asp?RL=NAE&id=190
	Volvo	http://www.volvo.com/constructionequipment/na/en-us/products/MotorGraders/
	Komatsu	http://www.komatsu.com/ce/products/motor_graders.html
	Terex	htt

Hand Compaction Equipment		
	Terex	http://www.terex.com/main.php
	Multiquip	http://www.multiquip.com/multiquip/56_ENU_HTML.htm
Hydraulic Hammers/Hydraulic Breakers - See Concrete Breakers/ Hydraulic Hammers/Hydraulic Breakers		
Jackhammers - See Rock Drilling Equipment/Jackhammers		
Lifts / Variable Reach Fork Lifts/ Material Handlers		
	Genie Lift	www.genielift.com
	Sky Track	www.kirby-smith.com/
	Ingersol-Rand	www.ingersollrand.com
	Terex	http://www.terex.com/main.php
	Roadtec	http://www.roadtec.com/www/docs/102/mtv-material-transfer-vehicle/
Light Towers		
	Baldor	http://www.baldor.com/products/generators/mlt.asp
	Multiquip	http://www.multiquip.com/multiquip/293_ENU_HTML.htm
	Allmand	http://www.allmand.com/Night%20Lite%20Pro%20page.htm
Loaders/Backhoes		
	Case	http://www.casece.com/products/products.asp?RL=NAE&id=54
	Caterpillar	http://www.cat.com/cda/layout?m=37840&x=7
	Volvo	http://www.volvo.com/constructionequipment/na/en-us/products/backhoeloaders/
	John Deere	http://www.deere.com/en_US/cfd/construction/deere_const/backhoes/deere_backhoe_selection.html
	Komatsu	http://www.komatsu.com/ce/products/backhoe_loaders.html
Material Handlers - See Lifts / Variable Reach Fork Lifts/ Material Handlers		
Milling Machines		
	Wirtgen	http://www.wirtgenamerica.com/us/
Mining Trucks - See Rigid Dump Trucks/Mining Trucks		
Pans - See Scrapers/Pans		
Pavers/Paving Equipment		
	Caterpillar/ Barber Greene	http://www.cat.com/cda/layout?m=37840&x=7
	Rosco	http://www.leeboy.com/rosco/
	Bomag	http://www.bomag.com/americas/index.aspx?&Lang=478
	Gehl	http://www.gehl.com/const/prodpg_ap.html
	Leeboy	http://www.leeboy.com/leeboy/
	Terex	http://www.terex.com/main.php
	Ingersoll-Rand	http://www.road-development.irco.com/Default.aspx?MenuItemID=12
	Vogele	http://www.vogeleamerica.com/noflash.html
	GOMACO	http://www.gomaco.com/index.html
	Roadtec	http://www.roadtec.com
Pile Drivers/Boring Equipment		
	Soilmec	http://www.soilmec.com/_vti_g1_t09.aspx?rpstry=29_
	Leffer	http://www.leffer.com/bme.html

	Bauer	http://www.bauer.de/en/maschinenbau/produkte/drehbohrgeraete/bg_reihe/usbg15h.htm
Pipelayers/Trenchers		
	Liebherr	http://www.liebherr.com/em/en/18908.asp
	Caterpillar	http://www.cat.com/cda/layout?m=37840&x=7
	Case	http://www.casece.com/products/products.asp?RL=NAE&id=28&archived=1
	Vermeer	http://www.vermeermfg.com/vcom/TrenchingEquipment/trenching-equipment.htm
	Ditchwitch	http://www.ditchwitch.com/dwcom/Product/ProductView/115
	Eagle	http://www.guntert.com/trenchers_home.asp
Profilers - See Roadway Planers/Profilers		
Rammers		
	Multiquip	http://www.multiquip.com/multiquip/56_ENU_HTML.htm
Rebar Benders/Cutters		
	Multiquip	http://www.multiquip.com/multiquip/1316_ENU_HTML.htm
Recyclers - See Stabilizers/Recyclers		
Rigid Dump Trucks/Mining Trucks		
	Hitachi	http://www.hitachi-c-m.com/global/products/rigid/index.html
	Caterpillar	http://www.cat.com/cda/layout?m=37840&x=7
	Liebherr	http://www.liebherr.com/em/en/18898.asp
	Komatsu	http://www.komatsu.com/ce/products/dump_trucks.html
	Terex	http://www.terex.com/main.php
Roadway Planers/Profilers		
	Terex	http://www.terex.com/main.php
	Roadtec	http://www.roadtec.com/products/cold_planers/default.htm
Rock Drilling Equipment/Jackhammers		
	Drillman	http://www.drillmanindia.com/rock-drilling-machine.html
	Whaker	http://www.wackergroup.com/webapp/wcs/stores/servlet/
	Sullair	http://www.sullair.com/corp/details/0,10294,CLI1_DIV61_ETI5721,00.html
	Allied	http://www.alliedcp.com/products/hammers.asp
Rollers - See Tampers/Rollers		
Scrapers/Pans		
	Terex	http://www.terex.com/main.php
Screening Equipment - See Crushing and Screening Equipment		
Slabbuster		
	Allied	http://www.alliedcp.com/products/slabbuster.asp
Slip Form Pavers		
	Huron	http://www.huronmanufacturing.com/
	Guntert & Zimmerman	http://www.guntert.com/concreteSlipformPavers.asp
Stabilizers/Recyclers		
	Bomag	http://www.bomag.com/americas/index.aspx?&Lang=478

	Komatsu	http://www.komatsu.com/ce/products/mobile_crushers.html
	Terex	http://www.terex.com/main.php
	Wirtgen	http://www.wirtgenamerica.com/us/
	Roadtec	http://www.roadtec.com
Sweepers		
	Elgin	http://www.elginsweeper.com
	Johnston	http://www.johnstonsweepers.com/
Tampers/ Rollers		
	Bomag	http://www.bomag.com/americas/index.aspx?&Lang=478
	Komatsu	http://www.komatsu.com/ce/products/vibratory_rollers.html
	Whaker	http://www.wackergroup.com/webapp/wcs/stores/servlet/
	Lynx	http://www.stanley-hydraulic-tools.com/Lynx/tamper.htm
	Multiquip	http://www.multiquip.com/multiquip/181_ENU_HTML.htm
	Ingersoll-Rand	http://www.road-development.irco.com/Default.aspx?MenuItemID=15
Trenchers - See Pipelayers/Trenchers		
Trucks - See Articulated Trucks, Concrete Mixer Trucks, Rigid Dump Trucks/Mining Trucks		
Vacuum Units		
	Advanced Recycling Systems	www.arsrecycling.com/
	Vacmasters	http://www.vacmasters.com/airsystm.htm
	Vector	http://www.vector-vacuums.com/
Variable Message Signs		
	Allmand	http://www.allmand.com/MB%20only%20page.htm
	North Star	http://northstar-traffic.com/index.cfm?SC=13&PT=1
	Trafcom	http://www.trafcon.com
	Daktronics	http://www.daktronics.com/vms_prod/dak_vms_products.cfm
Vibratory Rammers		
	Whaker	http://www.wackergroup.com/webapp/wcs/stores/servlet/
Welders/Welding Equipment		
	Airgas	www.airgas.com
	Multiquip	http://www.multiquip.com/multiquip/408_ENU_HTML.htm
	Miller	http://www.millerwelds.com/products/
	Lincoln	http://www.mylincolnelectric.com/Catalog /equipmentseries.asp?browse=101|400|
Wheel Loaders		
	Hitachi	http://www.hitachi-c-m.com/global/products/loader/index.html
	Case	http://www.casece.com/products/products.asp?RL=NAE&id=30
	Caterpillar	http://www.cat.com/cda/layout?m=37840&x=7
	Volvo	http://www.volvo.com/constructionequipment/na/en-us/products /wheelloaders/
	Terex	http://www.terex.com/main.php
	Komatsu	http://www.komatsu.com/ce/products/wheel_loaders.html
	TCM	http://www.tcmglobal.net/products/main02.html

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FHWA

United States Department of Transportation - **Federal Highway Administration**

Construction noise levels may be evaluated in terms of human response and considered in the assessment of effects on wildlife and other non-human species. Noise levels and criteria are expressed in English, metric, or both conventions, depending upon the geographic area or the policies of the controlling agency. Typically, the English convention is used mostly in the United States, with the metric convention used in Canada and other countries.

While the issue of construction noise must be addressed as part of the planning of any transportation project, there are no standardized criteria on the federal level for assessing construction noise impacts related to transportation projects. Where project-specific construction noise criteria have been developed by individual agencies or municipalities, they typically consider the following factors which form the fundamentals for defining construction noise impact:

- Difference between existing noise levels prior to construction startup and expected noise levels during construction: This takes into account specific construction operations and/or individual pieces of equipment.
- Absolute level of expected construction noise: This may constitute the combined levels of all equipment and operations at a given time or be specifically related to the absolute noise level of a specific operation and/or piece of equipment.
- Adjacent land uses: Consideration of this factor provides an indicator of the degree of sensitivity that may be expected and will likely have a major effect on the operational time restraints and the noise level increases tolerated. For example, residential areas may typically have a restriction on night operations and possibly a noise level restriction during the day. Industrial areas may have no restrictions at all, and offices may or may not have a restriction on the noise levels during the day, with possibly no restriction for night operations. Examples of absolute and relative construction noise level criteria are provided in Table 7.1.
- Duration of construction/operation: The duration of high noise levels may play a significant role in how a noise impact is perceived and/or mitigated. If the levels are of a brief nature, possibly only occurring once or twice during the project, the perceived impact could be quite different than that associated with a constant noise source. Similarly, any related noise mitigation techniques employed could be substantially different in terms of type and/or duration of application.

4.1.1.1 United States

While noise impact and abatement criteria have been established for the operation of transportation facilities in the United States, standardized criteria have not yet been established related to noise associated with the construction of such facilities. However, since the publication of the original 1977 Report[ref001], additional guidance has been disseminated (through agencies such as FHWA and FTA) and analysis tools developed to better address construction noise. For example, the FTA Transit Noise and Vibration Impact Assessment document[ref014] presents guidelines that "can be considered reasonable criteria for assessment" of construction noise impacts. In addition, a number of agencies, municipalities, and other entities have developed procedures for addressing construction noise impacts and implementing related noise mitigation for their areas of jurisdiction or on a project-specific basis.

In some instances, local entities may have developed noise ordinances that contain restrictions associated with construction noise levels. Noise practitioners and others involved in the project development process are encouraged to become familiar with such ordinances and their relationship to other State and/or municipal ordinances. In certain instances, the State jurisdiction may supersede any local noise ordinances.

Figure 4.1 Local noise ordinance (Photo #214)

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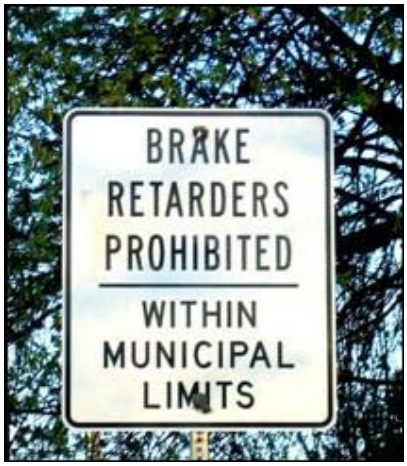

Figure 4.2 Local noise restrictions (Photo #1206)

Noise restrictions may also be imposed by local and/or State authorities to deal with specific activities or operations. An example is the growing practice of restricting the use of engine compression brakes on heavy trucks in residential areas.

Noise restrictions may also be applied within the workplace associated with employee/worker exposure to noise levels over varying durations. These criteria have been established by OSHA. However, such criteria are typically not relevant or applicable to the transportation-related project construction noise levels experienced by people residing or working in areas adjacent to such projects. As such, they are not discussed within this Handbook.

Construction noise criteria within the United States vary considerably in terms of both scope and specificity and can be broadly categorized as follows, in order of complexity:

No criteria specified;

Qualitative criteria, e.g. "Noise levels shall not cause a disturbance";

- Relative criteria, e.g. "Noise levels shall not exceed existing (or ambient, or background) noise levels by more than x dB";
- Absolute criteria, e.g. "Maximum noise levels shall not exceed xx dB";
- Criteria containing a combination absolute and relative noise level limits; and
- Combinations of the above criteria elements with additional restrictions placed on time periods and types of land uses or activities.

An example of more complex criteria is that associated with the Central Artery/Tunnel Project in Boston, MA. Data related to these criteria are discussed in Reference 023 and illustrated in Table 7.1 of this Handbook. This project established criteria that include both L_{10} and L_{max} absolute noise level limits for defined noise sensitive locations (residences, institutions, hotels, etc.) for daytime, evening, and nighttime periods. In addition, the criteria established maximum noise level increases relative to established baseline noise levels. Relative and absolute noise level limits were also established for commercial and industrial areas.

From the standpoint of construction noise criteria, the intent of this Handbook is not to address all State and local noise ordinances and/or criteria, but rather, to address the approaches and techniques that may be contained in such criteria. As such, the discussions contained within this Handbook are meant to provide a summary of considerations related to all aspects of construction noise. The reader is encouraged to refer to specific references in Table 10.1 for more detailed information on noise criteria and other factors related to construction noise.

4.1.1.2 Canada

Similar to the United States, no standardized Canadian criteria exist related to transportation project construction noise. Where project-specific analysis techniques have been employed to address and/or mitigate construction-related noise and its impacts, such methods have been similar to those employed in the United States. Examples of such efforts may be found in References 010 and 019.

4.1.1.3 Other International

While an exhaustive survey of international criteria was not conducted, several criteria are discussed here for informational use only. More specifics may be found by accessing the relative links found in the Reference Database in Chapter 10.

- The Official Journal of the European Communities' Directive 2000/14/EC of the European Parliament and of the Council of 8 May 2000[ref017] establishes legislation dictating specific noise levels for individual pieces of construction equipment. It also contains specifics related to the measurement locations and equipment operating conditions relative to the testing of individual pieces of equipment.
- The Australian EPA's Environmental Noise Control Manual[ref015] establishes the following criteria which officers may specify related to construction noise:
  - For a construction period of four (4) weeks or less, the maximum L_{10} noise level measured over a period of not less than 15 minutes when the construction site is operating must not exceed the background noise level by more than 20 dBA;
  - For a construction period greater than four (4) weeks, the maximum L_{10} noise level measured over a period of not less than 15 minutes when the construction site is operating must not exceed the background noise level by more than 10 dBA;
  - Construction limited to 0700 to 1800 time period on Monday through Friday;
  - Construction limited on Saturdays to 0700 to 1300 time period if inaudible on residential premises; otherwise, 0800 to 1300;
  - No construction work may take place on Sundays or public holidays; and
  - All possible steps should be taken to silence construction site equipment. It is particularly important that silenced equipment should be used on road or rail works where 24-hour operation is necessary.

4.2 Descriptors

While it is not the intent of this Handbook to establish criteria for evaluating construction noise impacts, it is important to stress that reasonable and defensible noise descriptors must be used to describe construction noise levels. The following are important elements related to selecting a workable noise descriptor for use in measuring and analyzing construction noise:

- Suitable for practical measuring methods;
- Accounts for temporal variations in equipm
- Accounts for temporal variations in overall s

- Suitable for prediction modeling;
- Suitable for combining noise levels from various source types; and
- Relative to subjective responses.

The descriptor most commonly chosen for use is the A-weighted equivalent sound level (energy basis), L_{Aeq}. In many cases, the time average period applied to the L_{Aeq} value is one hour (designated L_{Aeq1h}). For certain projects and operations, the time period over which the L_{Aeq} is applied may need to be examined on a case-by-case basis. For several major construction projects in the United States and Canada, the L_{10} (applied generally during daytime periods) and L_{max} (applied for specific equipment and/or nighttime operations) descriptors have been used over varying time periods.

The L_{dn} descriptor has been used to assess annoyance and community reaction to construction noise. L_{dn} is an L_{Aeq}-based descriptor that applies a 10 dBA penalty to nighttime noise levels.

The L_{Aeq}-based and L_{10}-based descriptors satisfy the first four elements listed above. The L_{Aeq} satisfies the fifth element and may also satisfy the sixth element (relative to subjective responses). However, the L_{Aeq}, L_{10}, and L_{max} descriptors may not be suited for determining responses by some aquatic wildlife (where using an un-weighted sound pressure level may be more suitable) or for owls (where use of a different weighting category such as dBO or a descriptor such as SEL may be more suitable to account for effects such as air blasts associated with blasting). More detailed information related to these specific conditions might be found in documents listed in Section 3.2.6 of this document.

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Figure 3.1 Construction in residential area (Photo #924)

Figure 3.2 Construction in business district (Photo #714)

Figure 3.3 Construction in vicinity of sporting event venue (Photo #718)

-1000-

Figure 3.4 Construction in paradise (Photo #1033)

While construction noise can be unwelcome during nighttime periods in residential areas when people are trying to sleep, it can be equally unwelcome during the daytime in commercial areas if it interferes with peoples' ability to conduct business. In short, construction noise has the potential to disturb people 24 hours a day, 7 days a week. If not properly addressed, specific public concerns related to a project could result in actions affecting the progress and/or cost of a project.

There is nothing particularly unique about construction noise - it's a fluctuation in air pressure oscillating above and below atmospheric pressure that is produced by construction equipment or activities with sufficient magnitude (loudness) and within a certain frequency range (audible spectrum) such that human beings can hear it - just like any other noise. Being a physical parameter, it can be measured, quantified, modeled, predicted, and in certain instances, abated to some degree.

Noise from construction-related activities can also affect non-human species such as aquatic life and land and airborne animals in a variety of ways. The non-human category includes domestic, farm-based, and creatures living in the wild. In assessing the effects of noise on non-humans, it is essential that noise analysts closely coordinate with qualified biologists in the assessment and mitigation of noise impacts.

Issues related to vibration may also be raised during project development. This is particularly true when blasting operations occur. There are no FHWA requirements directed specifically to traffic-induced or construction-related vibration. Most studies that State DOTs have done to assess the impact of operational traffic-induced vibrations have shown that both measured and predicted vibration levels are less than any known criteria for structural damage to buildings, although levels may be such as to cause various degrees of annoyance. Analysis of construction-related vibration effects is beyond the scope of this Handbook.

The intent of this Handbook is not to provide det
information regarding specific effects of constru

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3.2 Types of Effects

Physical effects related to humans are probably most applicable to the operators of construction equipment as opposed to people residing adjacent to construction projects. An exception to this would be unique situations such as scuba diving or swimming activities occurring in the vicinity of a water-based pile driving or blasting operation. The potential for hearing loss or physical damage to the human hearing mechanism is protected by Occupational Safety and Health Administration (OSHA) criteria, and as such, is not discussed herein. While resulting in the potential to annoy or disturb humans, construction noise is typically not a danger to people's hearing.

Knowledge related to the physical effects of construction noise on non-human species such as land-based animals, birds, and owls is limited. It is recognized that aquatic mammals and fish can be physically damaged by water-born sound and vibration waves caused by construction activities such as underwater blasting and pile driving. In lieu of detailed discussions within this Handbook of the variety of specialized studies related to the physical effects of construction noise on such species, references to such studies are provided in a list at the end of this chapter.

Loud noises from construction activities can create situations where people cannot effectively communicate, as documented in Tables 3.1 and 3.2. While such situations may be merely an annoyance or inconvenience in certain situations, they could be construed as a safety issue if such noises prevent people from hearing important local noises such as approaching traffic, emergency warning devices, alerts from other people, etc.

Noise from construction activities can affect humans, land-based animals, aquatic wildlife, and airborne wildlife in a variety of ways. Humans are most affected in terms of sleep deprivation and the carrying on of normal daily activities such as watching television, listening to the radio, recreational activities, and activities requiring concentration, such as reading. Special activities such as those associated with churches, schools, and libraries can also be negatively affected by construction noise. Water-based activities such as scuba diving, swimming, and boating can also be affected.

While non-humans are most likely annoyed by construction noise, there is little known about the related effects. However, the annoyance of noise on humans has been studied for some time and is documented in a 1974 EPA report commonly referred to as the "Levels Document"[ref033]. It is complementary to the 1979 EPA document, "Protective Noise Levels"[ref052].

A variety of studies have attempted to quantify the effects of noise on humans. An example is provided in the following table contained in the "Levels Document" referred to above. Note that all noise levels referred to in the "Levels Document" are A-weighted.

Table 3.1 Summary of Human Effects in Terms of Speech Communication, Community Reactions, Annoyance, and Attitude toward Area Associated with an Outdoor Day/Night Sound Level of 55 dB re 20 Micropascals.

Type of Effect	Magnitude of Effect
Speech - Indoors	100% sentence intelligibility (average) with a 5 dB margin of safety
Speech - Outdoors	100% sentence intelligibility (average) at 0.35 meters
	99% sentence intelligibility (average) at 1.0 meters
	95% sentence intelligibility (average) at 3.5 meters
Average Community Reaction	None evident; 7 dB below level of significant "complaints and threats of legal action" and at least 16 dB below "vigorous action" (attitudes and other non-level related factors may affect this result)
Complaints	1% dependent on attitude and other non-level related factors
Annoyance	1% dependent on attitude and other non-level related factors
Attitude Toward Area	Noise essentially the least important of various factors

Table 3.2. Steady A-weighted Sound Levels that Allow Communication with 95 Percent Sentence Intelligibility over Various Distances Outdoors for Different Voice Levels.

Communication Distance (meters)	0.5	1	2	3	4	5
Normal Voice (dB)	72	66	60	56	54	52
Raised Voice (dB)	78	72	66	62	60	58

The effects of construction-related noise on non-humans are less understood and probably most related to mating, nesting, migration, and feeding activities. While data on such effects is limited as compared with information on humans, some research is available[ref031 and ref032].

For a more detailed discussion of the general effects of noise on wildlife and other non-human species, the reader is directed to references dealing with the following:

- Effects on wildlife and other animals: ref031 and ref032;
- Effects on marine mammals: ref102;
- Effects on fish: ref030, ref036, ref046, ref054, ref060, and ref061; and
- Effects on owls: research underway as of the publication date of this Handbook by Washington State DOT (WSDOT); when available, any published reports will be available through the WSDOT webpage (see Table 10.1).

In determining noise impacts and possible mitigation measures for construction projects involving non-human species, noise analysts should closely coordinate with qualified biologists.

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APPENDIX B

OVERVIEW OF LEGAL RESTRAINTS ON AGRICULTURAL LAND MITIGATION PROGRAMS

OVERVIEW OF LEGAL RESTRAINTS ON AGRICULTURAL LAND MITIGATION PROGRAMS*

Prepared for Department of Conservation
Division of Land Resource Protection
Brown Bag Discussion on CEQA and Mitigation as a Tool for Preserving Farmland and Our Agricultural Economy

February 16, 2011

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* Disclaimer: These materials are for informational purposes only and do not substitute for legal advice regarding the particular facts of a given matter.

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I. INTRODUCTION

This paper explores the possible legal impediments to in-kind and fee-based agricultural mitigation programs that may be adopted by local agencies. A review of applicable legal restraints on such programs indicates that they are generally permissible when properly drafted. In light of the high rate of conversion of agricultural lands in California, local agencies that have not yet adopted such programs should consider doing so. In the interim, review of projects under the California Environmental Quality Act ("CEQA"),[1] can also lead to the adoption of legally defensible mitigation requirements, though mitigation may not always be required.

II. LEGISLATIVE POLICIES REGARDING PROTECTION OF AGRICULTURAL LAND

The California Legislature has directly addressed conservation of agricultural land in legislative policy statements. In CEQA, the Williamson Act,[2] and the California Farmland Conservancy Program Act,[3] the Legislature emphasizes the importance of agricultural land to the State. Moreover, the Williamson Act and the California Farmland Conservancy Program are specifically dedicated to preserving farmland throughout California.[4] The statutes indicate that the State of California values agricultural land, and the protection of farmland is a statewide priority.

A. CEQA

In 1993, the California State Legislature added a requirement to CEQA that the Resources Agency create an appendix to the CEQA Guidelines ("CEQA Guidelines").[5] The Legislature required that this appendix propose methods to analyze significant effects on the environment from conversion of agricultural land.[6] The findings for this statutory requirement state that:

> (a) Agriculture is the State's leading industry and is important to the State's economy.

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[1]/ Pub. Resources Code, § 21000 et seq.
[2]/ Gov. Code, § 51200 et seq.
[3]/ Pub. Resources Code, § 10200 et seq.
[4]/ Pub. Resources Code, § 21000 et seq., Gov. Code, § 51200 et seq., Pub. Resources Code, § 10200 et seq.
[5]/ Pub. Resources Code, § 21095.
[6]/ *Ibid.*

(b) The continued productivity of agricultural lands in California is important in maintaining a healthy agricultural economy.

(c) The conversion of agricultural lands to nonagricultural use threatens the long-term health of the State's agricultural industry.[7]

In response to this mandate, the Resources Agency added Appendix G to the CEQA Guidelines.[8] Appendix G suggests that when analyzing impacts on agricultural resources, an agency might assess the type of farmland that a project would convert (i.e. "prime" farmland or farmland of statewide importance).[9] It also recommends that an agency consider whether a proposed project would involve other changes in the environment that could result in the conversion of farmland to non-agricultural use.[10]

B. Williamson Act

In its findings for the Williamson Act, the California Legislature stated:

> That the preservation of a maximum amount of the limited supply of agricultural land is necessary to the conservation of the state's economic resources, and is necessary not only to the maintenance of the agricultural economy of the state, but also for the assurance of adequate, healthful and nutritious food for future residents of this state and nation.[11]

The Legislature further asserted:

> That in a rapidly urbanizing society, agricultural lands have a definite public value as open space, and the preservation in agricultural production of such lands, the use of which may be limited under the provisions of this chapter, constitutes an important physical, social, esthetic and economic asset to existing or pending urban or metropolitan developments.[12]

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[7]/ Section 1 of Stats. 1993, c. 812 (SB 850).
[8]/ 14 CCR, § 15000 et seq.
[9]/ *Id*. at Appendix G.
[10]/ *Ibid.*
[11]/ Gov. Code, § 51220, subd. (a).
[12]/ Gov. Code, § 51220, subd. (d).

C. California Farmland Conservancy Program Act

In the California Farmland Conservancy Program Act, the California Legislature again emphasized the importance of agricultural land to the State:

> The agricultural lands of the state contribute substantially to the state, national, and world food supply and are a vital part of the state's economy. Agricultural lands near urban areas that are maintained in productive agricultural use are a significant part of California's agricultural heritage. These lands contribute to the economic betterment of local areas and the entire state and are an important source of food, fiber, and other agricultural products. Conserving these lands is necessary due to increasing development pressures and the effects of urbanization on farmlands close to cities. The long-term conservation of agricultural land is necessary to safeguard an adequate supply of agricultural land and to balance the increasing development pressures around urban areas.[13]

III. STATUS OF AGRICULTURAL MITIGATION REQUIREMENTS IN THE CENTRAL VALLEY

A handful of local jurisdictions presently require some form of mitigation for the loss of agricultural land. For example, the City of Davis has instituted a 2:1 mitigation requirement for changes to farmland.[14] Developers may satisfy this requirement either through the dedication of a farmland conservation easement or payment of in-lieu fees. [15]

Yolo County, San Joaquin County, the City of Stockton, and City of Brentwood have also established similar programs.[16] These ordinances generally allow developers to satisfy farmland mitigation requirements by granting a farmland conservation easement, or by paying in-lieu fees sufficient to purchase an easement and pay for administrative costs.[17] These ordinances require 1:1 mitigation for the loss of agricultural land. [18] The

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[13]/ Pub. Resources Code, § 10201, subds. (a)-(d).
[14]/ City of Davis Mun. Code, § 40A.03.030: www.cityofdavis.org/cmo/citycode/ (as of July 19, 2007).
[15]/ *Id*. at subd. (b)(1).
[16]/ Yolo County Code, § 8-2.2416: http://www.yolocounty.org/CountyCode/Title08.pdf (as of July 19, 2007); City of Stockton Administrative Guidelines, § I.A.6; Ordinance Code of San Joaquin County, § 9-1080 et seq.; Brentwood Mun. Code, §§ 17.730.010 et seq.: http://www.ci.brentwood.ca.us/boards/aarg/enterprise/ord683.cfm (as of February 11, 2011).
[17]/ The applicable mitigation fees were calculated according to nexus studies.
[18]/ *Ibid.*

Brentwood ordinance also allows for transfer of agricultural credits from certain areas to satisfy the mitigation requirement.[19]

The Cities of Lathrop, Manteca, and Tracy have also adopted agricultural mitigation fee programs in their Municipal Codes.[20] These programs, rather than specify the amount of the fee to be charged, authorize each respective City Council to "calculate the amount of the fee in an implementing resolution."[21] Moreover, the regulations require the Cities to enact such fees by resolution, and to identify specific findings to satisfy the requirements of the Mitigation Fee Act.[22]

Furthermore, some settlement agreements entered into during the CEQA and project approval process have resulted in imposition of mitigation for agricultural land conversion. For example, two CEQA-related settlement agreements in the City of Lodi included farmland mitigation requirements for major development projects despite the lack of a local mitigation ordinance.[23] In these agreements, the developer agreed to obtain permanent agricultural easements, at a minimum 1:1 ratio.[24] One of the agreements specified that the compensatory easement(s) must be located within 15 miles of the project site, while the other agreement required only that the mitigation property be located within San Joaquin County.

In another example, developers entered into a settlement agreement with the Sierra Club after a CEQA lawsuit was filed.[25] In this agreement, the developers agreed to contribute funds to assist in creating a land trust organization.[26] Moreover, the developer agreed to provide 1:1 mitigation of all lands removed from agricultural use through development fees.[27]

[19/] Brentwood Mun. Code, §§ 17.730.040, 17.730.070.

[20]/ City of Lathrop Mun. Code, Chapter 3.40; City of Manteca Mun. Code, Chapter 13.42, City of Tracy Mun. Code, Chapter 13.26.

[21]/ City of Lathrop Mun. Code, § 3.40.060; City of Manteca Mun. Code, § 13.42.060; City of Tracy Mun. Code, § 13.28.060; see also City of Brentwood Mun. Code, § 17.730.040, subd. (2) (providing option of payment of in-lieu fee).

[22]/ *Id*. Gov. Code, § 66000 et seq.

[23]/ These agreements pertained to (1) the Reynolds Ranch project, a mixed use project proposed by the San Joaquin Valley Land Company and, (2) two large residential subdivisions proposed by FCB Homes ("Westside" and "Southwest Gateway").

[24]/ Westside Agreement at p. 2; Southwest Gateway Agreement at p. 2; Reynolds Ranch Agreement at p. 2.

[25]/ Agreement to Settle Litigation Regarding River Islands at Lathrop (2003).

[26]/ *Ibid.*

[27]/ *Ibid.*

Finally, there have been legal challenges related to agricultural mitigation programs. On May 25, 2007, the Building Industry Association of the Delta ("BIA") filed a lawsuit against the City of Stockton in the Superior Court of California for the County of San Joaquin.[28] The lawsuit challenged the City of Stockton's agricultural land mitigation program and in-lieu fees, which were adopted in 2007. BIA's complaint included a number of the potential arguments challenging in-lieu fees and agricultural land mitigation. BIA alleged that the City of Stockton's in-lieu fee was facially invalid because, among other claims, it: (1) was excessive and violates the California Mitigation Fee Act; (2) constituted an invalid requirement for payment of a fee or dedication of easement prior to the final map under Government Code sections 66007 and 66410 et seq.; (3) constituted an invalid exaction both under constitutional nexus and rough proportionality tests, and due to its failure to comply with CEQA; (4) was an authorized special tax in violation of Propositions 13 and 218; and (5) violated equal protection and due process rights under the United States and California Constitutions.

A decision was issued in February 2009, upholding the City's agricultural mitigation program. The court's ruling noted that the City had adopted detailed findings in support of the in-lieu fee program, which were consistent with the studies and analyses in the record of decision for the program. The court also found that the City had the authority to adopt the fee program under its plenary police power. Moreover, the program was entitled to a presumption of constitutionality. With respect to the Mitigation Fee Act claims, the court found: (1) that the in-lieu easement requirement was not a fee within the meaning of the Act; (2) the in-lieu fee is selected at certain developers' option, and is not imposed; (3) no "public facilities" would be funded; (4) the challenge to the fee was not ripe prior to having been applied to a particular project; and (5) even if the act applied it would survive challenge under the applcable deferential standard. With respect to the Proposition 13 and 218 claims, the court found that the in-lieu fees were not taxes because they are voluntarily chosen by developers. Moreover, the fees do not exceed the cost of mitigating the impacts caused by the project. The court also found that the restrictions in Civil Code section 815.3, subdivision (b) were inapplicable and that the 1:1 mitigation ratio was amply supported in the record.

The events described above indicate that mitigation for agricultural land is becoming more prevalent in the Central Valley. Where lead agencies do not directly require agricultural mitigation through their development codes or through the CEQA process, mitigation for farmland conversion may occur as a result of settlement negotiations between community groups, developers and local agencies. These

[28]/ *BIA v. City of Stockton* (Super. Court San Joaquin County, 2007, No. CV032651).

developments show both that preserving agricultural land is important to California communities and that agricultural mitigation is feasible for developers.

IV. POTENTIAL LEGAL ISSUES RELATED TO AGRICULTURAL MITIGATION REQUREMENTS

In many instances, courts have upheld in-lieu fees and other exactions.[29] However, for an exaction to be valid: (1) the public agency must have the legal authority to impose the exaction; (2) the agency must properly exercise its authority when imposing the exaction; and (3) a reasonable relationship must exist between the imposed exaction and the public needs created by the development.[30] In addition, there may be other limitations that the agency must overcome.[31]

A. Authority to Impose Exactions – The Police Power

Cities and counties may impose exactions under the general police power granted in Article XI, Section 7 of the California Constitution.[32] The police power is the right of a local government to protect the public health, safety, and welfare of its residents.[33] Land use regulations, including exactions, are within an agency's police power as long as they are reasonably related to the public welfare.[34] This authority is "as broad as the

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[29]/ 2 Longtin, Longtin's California Land Use (2nd ed. 1987), § 8.02[2], p. 722 (hereafter 2 Longtin).

[30]/ See 2 Longtin at § 8.04, p. 780.

[31]/ Potential limitations include statutory restrictions, such as Propositions 13, 62, and 218, and the Mitigation Fee Act. Recently filed lawsuits, including *A.G. Spanos Construction, Inc. v. City of Stockton* and *BIA v. City of Stockton*, have alleged that agricultural mitigation fees did not comply with the Subdivision Map Act. Although these claims may be valid in specific situations, they likely will not arise often in relation to agricultural mitigation programs. Thus, though agencies must ensure that the requirements of the Subdivision Map Act are met, this issue is not addressed further in this memorandum.

[32]/ See, e.g., *Candid Enters., Inc. v. Grossmont Union High School Dist.* (1985) 39 Cal.3d 878, 885 (*Candid Enters.*); *Griffin Development Co. v. City of Oxnard* (1985) 39 Cal.3d 256; *Trent Meredith, Inc. v. City of Oxnard* (1981) 114 Cal.App.3d 317, 325; *Scroging v. Kovatch* (1976) 64 Cal.App.3d 54, 57; *Associated Homebuilders, Inc. v. City of Livermore* (1976) 18 Cal.3d 582. The California Constitution confers on local governments the power to "make and enforce within [their] limits all local police, sanitary and other ordinances and regulations not in conflict with general laws."

[33]/ See *Berman v. Parker* (1954) 348 U.S. 26, 32-33.

[34]/ See *Associated Home Builders, Inc. v. City of Livermore* (1976) 18 Cal.3d 582, 600-601.

police power exercisable by the Legislature itself."[35] Thus, cities and counties have broad authority to impose exactions on development.

Though public agencies have general authority to impose exactions, many potential limitations exist that may limit the imposition of agricultural mitigation fees. Such exactions must: (1) meet nexus and rough proportionality tests and comply with equal protection and due process requirements under the United States Constitution; (2) be exempt from or comply with the requirements of Propositions 13, 62, and 218; (3) meet the requirements under the Mitigation Fee Act; and (4) be consistent with local General and Specific Plans. These requirements are described in detail below.

B. United States Constitution

1. Nexus and Rough Proportionality

Known as the "Takings Clause," the Fifth Amendment of the United States Constitution prohibits the taking of private land for public use without just compensation.[36] According to the Court in *Armstrong v. United States* (1960) 364 U.S. 40, as quoted in *Dolan v. City of Tigard* (1994) 512 U.S. 374, 384 (Dolan), the principal purpose of the Takings Clause is "to bar Government from forcing some people alone to bear public burdens which, in all fairness and justice, should be borne by the public as a whole." Exactions may be considered unconstitutional takings if they do not meet the "reasonable relationship nexus" test, as set out in *Dolan* and *Nollan v. California Coastal Commission* (1987) 483 U.S. 825 (Nollan). In order for an exaction to be valid: (1) the legislation must serve a legitimate governmental purpose, and (2) the means used to achieve the objective must substantially advance the intended purpose.[37]

a) *Nollan v. California Coastal Commission*

The *Nollan* case described the "nexus" requirement for exactions. In *Nollan*, the California Coastal Commission ("Commission") granted a permit to the Nollan family to construct a home on their coastal property, on the condition that they grant an access easement for the public to use their beach.[38] The Supreme Court found the requirement unconstitutional because of the insufficient nexus between the public burden created by

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[35]/ *Candid Enters., supra*, 39 Cal.3d at p. 885.
[36]/ "[N]or shall private property be taken for public use, without just compensation." U.S. Const., 5th Amend.
[37]/ See 2 Longtin, Longtin's California Land Use (2007 Update), § 8.22, p. 652 (hereafter 2 Longtin Update).
[38]/ *Nollan, supra*, 483 U.S. at p. 828.

the proposed construction and the permit condition required by the Commission.[39] According to the Court, "unless the permit condition serves the same governmental purpose as the development ban, the building restriction is not a valid regulation of land use but an out-and-out plan of extortion."[40] Thus, in order for an exaction to be valid, the type of condition imposed must address the same type of impact caused by the new development.[41]

b) *Dolan v. City of Tigard*

In *Dolan*, the Supreme Court further clarified the *Nollan* nexus test for an unconstitutional taking. The City of Tigard approved a building permit for Dolan to redevelop a retail site, on the condition that she donates a portion of her property for flood control and traffic improvements.[42] The Court found that there was a legitimate public purpose in flood control and traffic improvements.[43] Unlike in *Nollan*, the Court also found a nexus between the public purpose and the permit requirement that Dolan donate a portion of her property.[44] However, the Court established an additional step to Takings Clause analysis, and analyzed whether the "required dedication [was] related both in nature and extent to the impact of the proposed development."[45] Known as the "rough proportionality" test, the public agency imposing the requirement must make an individualized determination that this element is met.[46] In *Dolan*, the Court found that the City did not make such a determination, and therefore remanded the matter to the City for further proceedings.[47]

c) *Ehrlich v. City of Culver City*

The Supreme Court of California addressed the validity of development or impact fee conditions in *Ehrlich v. City of Culver City* (1996) 12 Cal.4th 854 (*Ehrlich*). In *Ehrlich*, the court decided whether the requirement to pay a monetary fee as a condition of a permit triggers the application of the nexus and rough proportionality tests in *Nollan* and *Dolan*. The court held that:

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[39]/ *Id*. at p. 841.
[40]/ *Id*. at p. 837.
[41]/ See 2 Longtin Update, § 8.22[2], p. 654.
[42]/ *Dolan* at p. 377.
[43]/ *Id*. at p. 387.
[44]/ *Ibid.*
[45]/ *Id*. at p. 391.
[46]/ *Ibid*.
[47]/ *Id*. at p. 396.

> If a condition is imposed pursuant to an ordinance or rule of general applicability . . . the condition is constitutionally permissible unless the landowner meets his or her burden of proving that the condition either does not substantially advance a legitimate governmental purpose or deprives the landowner of any economically viable use of the land.[48]

Thus, if a condition is adjudicatively imposed on an individual basis, the government must meet the heightened requirements of *Nollan* and *Dolan*.[49] To the extent an agricultural mitigation program proposal is imposed legislatively, however, it would not need to meet the nexus and rough proportionality tests of *Nollan* and *Dolan*.[50]

2. Equal Protection and Due Process

The Fourteenth Amendment of the United States Constitution ("Fourteenth Amendment") requires that a local government regulation may not deprive a person of equal protection of the laws.[51] In the context of land use, equal protection does not necessarily require uniform treatment. Instead, an agency must be able to demonstrate that a regulation has a rational relationship to a legitimate government interest.[52] The agency need only demonstrate some plausible reason for the classification in the regulation.[53] It is relatively simple for agencies to meet this test, and courts have generally rejected equal protection claims in the land use context.[54]

The Fourteenth Amendment also requires that a local government regulation or action may not deprive a person of life, liberty or property without due process of law.[55] Under Fourteenth Amendment case law, an agency's exercise of power must: (1) bear a rational relationship to a legitimate government interest, and (2) not be unreasonable or

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[48]/ *Ehrlich*, *supra*, 12 Cal. 4th at p. 906.

[49]/ *Id.* For example, conditions in individual land use agreements created between local agencies and developers generally constitute "ad hoc" requirements, and therefore must meet the tests of *Nollan* and *Dolan*.

[50]/ Adjudicative determinations are those that are decided on an individual basis. Legislative determinations, on the other hand, apply to large classes of people

[51]/ See also Cal. Const., art. I, § 7.

[52]/ See 1 Longtin, Longtin's California Land Use (2007 Update), § 1.32[2], p. 35 (hereafter "1 Longtin Update"); see also, *Nordlinger v. Hahn* (1992) 505 U.S. 1.

[53]/ See *Id*.

[54]/ See 1 Longtin Update, § 1.32[2], p. 36.

[55]/ See also Cal. Const., art. I, § 7.

arbitrary.[56] Like with equal protection, courts almost always rule in favor of public agencies in due process challenges.[57]

3. Effect of the United States Constitution on Mitigation Programs

Though the nexus and rough proportionality tests from *Nollan* and *Dolan* may apply to fee exactions, farmland mitigation fees that are imposed through legislation rather than adjudication likely will not be subject to scrutiny under these standards. "It is clear that . . . so long as cities base development conditions on general legislative determinations, the conditions will almost always be within the police power."[58] However, it is important to note that regardless of whether a fee is imposed legislatively or adjudicatively, such exactions must meet nexus requirements under the Mitigation Fee Act. (See section IV.D.1, *post*.)

Similarly, equal protection and due process claims under the Constitution likely do not provide barriers to mitigation programs. The agency must be able to demonstrate that a regulation bears a rational relationship to a legitimate governmental interest, and that the regulation is not arbitrary. In the land use context, these requirements are straightforward, and courts generally defer to the discretion of public agencies.

C. California Constitution

1. Proposition 13, Proposition 62, and Proposition 218

Proposition 13 ("Prop 13"), passed in 1978, added Article XIII A to the California Constitution.[59] Article XIII A requires a two-thirds vote of the electorate for implementation of any local special tax. In 1986, voters approved Proposition 62 ("Prop 62"), which "close[d] loopholes" in Prop 13. This measure established that all taxes must be classified as either "special taxes" or "general taxes."[60]

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[56]/ See 1 Longtin Update, § 1.31[1], p. 27. Note that the "rational relationship" test is easy to satisfy; where a rational relationship is at least fairly debatable, the court must uphold the action. *Nelson v. City of Selma* (9th Cir. 1989) 881 F.2d 836, 839.

[57]/ See 1 Longtin Update, § 1.31[2], p. 27.

[58]/ See Curtin & Talbert, Curtin's California Land Use and Planning Law (21st ed. 2001) Exactions, pp. 252-255 (hereafter "Curtin").

[59]/ See *Howard Jarvis Taxpayers Ass'n v. City of Riverside* (1999) 73 Cal.App.4th 679 (overview of Prop 13).

[60]/ See Longtin Update at § 8.25[2], p. 663.

Development fees exacted in return for building permits or other governmental privileges are generally not "special taxes" under Article XIII A. A fee is not a special tax when it does not exceed the reasonable cost of providing the service for which the fee is charged, and it is not reasonably related to the type of activity on which it is based. Thus, so long as a fee meets these requirements, it is not subject to the requirements of Prop 13.[61] Moreover, Prop 62 did not impose any additional limitations on local government's authority to implement "special assessments," "fees," or "charges." Thus, Prop 62 does not typically affect development fees.

Proposition 218 ("Prop 218"), approved by voters in 1996, added Articles XIII C and D to the California Constitution. Prop 218 requires voter approval of all new increases in local general taxes, assessments, and certain fees and charges.[62] Under Prop 218, "fees" or "charges" are defined as "any levy other than an ad valorem tax, a special assessment, or an assessment, imposed by an agency on a parcel or a person as an incident of property ownership, including user fees or charges for a property related service."[63] "Property related service" is defined as "a public service having a direct relationship to property ownership." However, "incident of property ownership" is not defined.

Prop 218 states that it does not affect laws existing prior to July 1, 1997, related to the imposition of fees or charges as a condition of property development. Furthermore, development fees that do not fall under the definition of "fees" or "charges" under Prop 218 generally need not meet the requirements of the Proposition.[64]

2. Effect of California Constitution on Agricultural Mitigation Requirements

Mitigation requirements likely do not need to meet the requirements of Props 13 and 62. So long as an agency's fee requirement does not exceed the reasonable cost of

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[61]/ See, e.g., *Sinclair Paint Co. v. State Board of Equalization* (1997) 64 Cal.Rptr.2d 447; *Shapell Industries, Inc. v. Governing Board* (1992) 1 Cal.App.4th 218, 240; *California Bldg. Industry Assn. v. Governing Bd*. (1988) 206 Cal.App.3d 212, 235-237; *Beaumont Investors v. Beaumont-Cherry Valley Water Dist*. (1985) 165 Cal.App.3d 227, 235-238; *Trent Meredith, Inc. v. City of Oxnard* (1981) 114 Cal.App.3d 317, 325-328; *Mills v. County of Trinity* (1980) 108 Cal.App.3d 656, 661-663; *Ehrlich v. City of Culver City* (1996) 12 Cal.4th 854, 898.

[62]/ See Longtin Update at § 8.25[3], p. 664.

[63]/ Cal. Const., art. XIIID, § 2(e).

[64]/ For example, in a 1997 opinion, the Attorney General ruled that water charges were not subject to Prop 218 because they were based on water usage, and not imposed as an "incident of property ownership." (80 Ops.Cal.Atty.Gen. 183 (1997).)

providing the service or facility for which the fee is imposed, and it is reasonably related to the type of activity on which it is based, the fee will not be subject to these requirements.[65]

Although Prop 218 clearly does not apply to fee impositions existing prior to July 1, 1997, the law may apply to new development fee exactions that are related to property ownership. Under Prop 218, such regulations must be approved by a majority vote of the local electorate.[66] Agricultural mitigation fees are typically based on development, and are not an incident of property ownership. Thus, such exactions would not be subject to the requirements of Prop 218.[67]

D. State Laws

1. Mitigation Fee Act

The Mitigation Fee Act, passed by California voters in 1987, establishes requirements for the imposition of fees on a project.[68] The Mitigation Fee Act would not apply to in-kind mitigation requirements.[69] Thus, the Mitigation Fee Act would only apply to in-lieu fee programs.

The agency imposing a fee as a condition of approval of a development project must comply with four specific requirements:

(1) Identify the purpose of the fee;
(2) Identify the use to which the fee is to be put;

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[65]/ Mitigation requirements for the development of farmland to implement agricultural easements may not constitute a "service" or "facility" in the first place. If this is the case, Propositions 13 and 62 may not apply at all to such exactions.
[66]/ See Curtin, at p. 272.
[67]/ For example, in *Richmond v. Shasta Community Services District* (2004) 32 Cal.4th 409, 426, the California Supreme Court held that an increase of a water service connection fee charged to new users is not subject to Proposition 218 because it is not a property-related fee. The court stated that the water connection charges were not imposed simply by virtue of property ownership, but instead, as an incident of the voluntary act of the property owner in applying for a water service connection. The fees for connection to the system therefore were not imposed as "an incident of property ownership" and were not subject to Proposition 218.
[68]/ Gov. Code, § 66000 et. seq.
[69]/ "'Fee' means a monetary exaction other than a tax or special assessment…that is charged by a local agency to the applicant in connection with approval of a development project." Gov. Code, § 66000, subd. (b) (italics added).

(3) Determine how there is a reasonable relationship between the fee's use and the type of development project on which the fee is imposed; and

(4) Determine how there is a reasonable relationship between the need for the public facility and the type of development project on which the fee is imposed.

Moreover, the agency must be able to demonstrate a reasonable relationship between the amount of the fee and the cost of the public facility attributable to the development.[70] The fee cannot include costs attributable to existing deficiencies in public facilities.[71] Fees or exactions "shall not exceed the estimated reasonable cost of providing the service or facility for which the fee or exaction is imposed."[72] A local agency cannot require the payment of fees until the final inspection of the development.[73] And finally, "the fee shall not be levied, collected, or imposed for general revenue purposes."[74]

An agricultural mitigation fee that meets these requirements would not violate the Mitigation Fee Act.[75]

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[70]/ Mitigation Fee Act, § 66001, subd. (b). Note that it is unclear whether an agricultural easement would be considered a "public facility" under the Mitigation Fee Act. Mitigation Fee Act, § 66000, subd. (a) defines "public facilities" as including: "public improvements, public services, and community amenities." Agricultural conservation easements typically do not provide public access, though they do provide a benefit to the public.

[71]/ *Id*. at subd. (g).

[72]/ *Id*. at § 66005.

[73]/ *Id*. at § 66007. According to the trial court ruling in the *Stockton* case, the adopted mitgation program did not violate this provision (nor § 66001) because fundamentally it was not a fee program. Instead, the program was "a land use regulation that requires developers of agricultural lands to obtain an in-kind easement preserving an equal amount of other agricultural lands." Payment of the fee is not required; rather, developers were provided an option of paying a fee in certain limited circumstances. (See Statement of Decision dated March 5, 2009 in *BIA v. City of Stockton* (Super. Court San Joaquin County, 2007, No. CV032651). No appeal was filed in this case.

[74]/ *Id*. at § 66008.

[75] / See also *San Mateo County Coastal Landowners' Ass'n v. County of San Mateo* (1995) 38 Cal. App. 4th 523, 551 ("Clearly, the county has ample authority to require dedication of agricultural and open space easements under several provisions of law.").

2. CEQA

CEQA requires that significant impacts must be mitigated through feasible mitigation measures. According to CEQA, such mitigation includes:

(a) Avoiding the impact altogether by not taking a certain action or parts of an action.
(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
(c) Rectifying the impact by repairing, rehabilitating, or restoring the impacted environment.
(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the line of the action.
(e) Compensating for the impact by replacing or providing substitute resources or environments.

(CEQA Guidelines, § 15370.)

To date, the issue of whether a city or county may impose mitigation under CEQA for the loss of agricultural land is not discussed in a published appellate opinion. However, case law demonstrates that courts and agencies alike have assumed that cities and counties have such authority. Moreover, only a handful of California appellate decisions have addressed whether a city or county must impose such measures under certain circumstances. These cases generally indicate that mitigation for agricultural loss, under the specific circumstances, was not a requirement under CEQA.

a) Published Case Law

Defend the Bay v. City of Irvine (2004) 119 Cal.App.4th 1261 (*Defend the Bay*) is one of only two published decisions to address the issue of mitigation for the loss of agricultural lands. The Fourth District Court of Appeal considered both offsite and onsite preservation as a means for mitigation for the loss of farmland in the context of an Environmental Impact Report ("EIR") prepared for a mixed use development project. The court ultimately agreed with the defendant agency that it was not feasible to mitigate the impact of developing agricultural land.[76] Because agriculture in the area was not feasible in the long-term, and because on-site preservation would reduce development and therefore "impede the City from achieving its General Plan goals and objectives," the court ruled that the City did not need to require mitigation for the project.[77]

[76]/ *Id*. at p. 1269-1270.
[77]/ *Ibid.*

Also from the Fourth District Court of Appeal, *Cherry Valley Pass Acres and Neighbors v. City of Beaumont* (2010) 190 Cal.App.4th 316 (*Cherry Valley*) concerned a challenge to an EIR for a project that would convert agricultural land to residential uses. Though recognizing the potential for mitigation in the form of agricultural "*conservation easements, Williamson Act preserve status, or temporary protection or conservation plans*," the EIR noted the long-term trend in agricultural land conversion in the region and concluded that mitigation was not feasible.[78] The court upheld the City's determination regarding the feasibility of mitigation on the grounds it was supported by substantial evidence in the record.[79] The court also examined the City and County General Plans, which acknowledged that development pressures were constraining the continued viability of agriculture and included the expansion of housing, commercial and industrial land uses.[80] The court then determined that the project was compatible with these planning documents.[81]

Notably, the opinions in both *Defend the Bay* and *Cherry Valley* did not conclude that, as a matter of law, agricultural easements are never a feasible form of mitigation for the loss of farmland. Instead, these cases concluded that in the particular circumstances surrounding the project, such mitigation was infeasible and therefore was not required to be adopted.

b) Unpublished Case Law

Opinions of any California Court of Appeal or superior court appellate division that are not certified for publication or ordered published cannot be cited or relied on by a court or a party in any other action.[82] There are three unpublished cases addressing agricultural impacts; these cases cannot be relied upon as legal precedent. However, they do provide some insight into potential arguments that may arise in relation to mitigation for the loss of agricultural land, and possible reasoning of the courts.

In *County of Santa Cruz v. City of San Jose* (2003) WL No. 1566913 (*County of Santa Cruz*), the Appellate Court for the Sixth District ruled that CEQA does not require the adoption of mitigation measures for the loss of agricultural land in every Environmental Impact Report ("EIR"). The appellants argued that the EIR for a large-scale development project was insufficient because the City of San Jose ("City") failed to

[78] / *Id*. at pp. 349-350.
[79] / *Id*. at p. 350.
[80]/ *Id. at p. 353.*
[81]/ *Ibid.*
[82]/ Cal. Rules of Court, rule 8.1115(a).

require mitigation for the project's significant impact on the loss of open space and agricultural lands.[83] However, the City argued and the court agreed that the purchase of easements or fee title over off-site agricultural lands would not offset the loss of agricultural land caused by the project. According to the City, there would still be a net reduction in the total amount of land suitable for agricultural use that is available for such use.[84] Further, the court recognized that the City's General Plan did not recognize the protection of agricultural land, and instead stated that "it is the City's policy that land designated for development in the General Plan should be developed in the General Plan."[85] Thus, the court ruled that San Jose had acted within its prerogative in deciding not to require agricultural mitigation measures.[86]

In *Friends of the Kangaroo Rat v. California Department of Corrections* (2003) WL No. F040956 (*Kangaroo Rat*) the Fifth District Court of Appeal ruled similarly to the court in County of Santa Cruz.[87] The court held that a subsequent EIR for a prison construction project was adequate even though it did not require any mitigation for the loss of farmland due to the project. As in County of Santa Cruz, the court agreed with the defendants that the loss of farmland could not be mitigated because any attempts at mitigation would not create new farmland, nor would they compensate for the loss of farmland incurred by the project.[88] The court discussed the definition of "mitigation" from the CEQA Guidelines, and stated that "the creation of an agricultural easement does not appear to fall into any of these five categories."[89]

In a 2004 decision, the Third District Court of Appeal explicitly disagreed with *Kangaroo Rat* and supported the theory that, in the context of CEQA, measures should be applied to mitigate for the loss of agricultural land due to development. In *South County Citizens for Responsible Growth v. City of Elk Grove* (2004) WL No. 219789 (Cal.App.3 Dist.) (*South County Citizens*), also unpublished, the court ruled that mitigation of agricultural losses must be addressed in CEQA documents, and conservation fees and easements can potentially mitigate for the loss of agricultural land.

The court decided whether the City of Elk Grove ("City") was required to include mitigation measures in its EIR for the Lent Ranch Marketplace Development Project

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[83]/ *County of Santa Cruz*, at p. 29.
[84]/ *Id*. at p. *30.
[85]/ *Id*. at p. *31.
[86]/ *Id*. at p. *31.
[87]/ Note that *Kangaroo Rat* was initially published, but the California Supreme Court later de-published the decision.
[88]/ *Id*. at p. 565.
[89]/ *Id*. at p. 566.

("Project").[90] In its EIR, the City concluded that the conversion of farmland from the Project constituted a significant environmental effect.[91] However, the City also concluded in the EIR that no feasible mitigation measure to offset the loss of farmland existed.[92] The City argued that because it was not possible to create or manufacture new farmland, or to reduce the specific loss of farmland converted to urban use through the project, it did not need to impose mitigation measures to offset these losses.[93] Further, the City argued that because it had not conducted a nexus study and did not have a City or County ordinance imposing agricultural mitigation fees, it could not impose such requirements at all.[94]

The Third District Court of Appeal ruled against the City and held that conservation fees can in fact mitigate for the loss of agricultural lands.[95] According to the court, conservation fees and easements can diminish development pressures created by the conversion of farmland, and can help to preserve against the danger of the domino effect created by projects.[96] Thus, the City prepared an addendum to its EIR addressing mitigation for the loss of agricultural land.

3. Conservation Easement Act

The Conservation Easement Act enables a city, county, district, or nonprofit organization to acquire perpetual easements for the conservation of agricultural land and open space, or for historic preservation. (Civ. Code, §§ 815-816.) Under Civil Code section 815.3, a local government entity may not "condition the issuance of an entitlement for use on the applicant's granting of a conservation easement."

Building Industry Association of Central California v. County of Stanislaus, et al. (2010) 190 Cal. App. 4th 582 (*County of Stanislaus*) addresses whether Civil Code section 815.3, subdivision (b) applies to agricultural conservation easements mandated by a city or county's General Plan policies. In the *County of Stanislaus* case, the BIA challenged the Farmland Mitigation Program ("FMP") adopted as an update to the Agricultural Element of the County's General Plan. The General Plan update included specific mitigation requirements for the conversion of agricultural land to residential development via the FMP. Specifically, the FMP required the County to condition

[90]/ *Id*. at p. *1.
[91]/ *Id*. at p. *3.
[92]/ *Ibid.*
[93]/ *Ibid.*
[94]/ *Id*. at p. *4.
[95]/ *Id*. at p. *8.
[96]/ *Id*. at p. *8.

discretionary projects converting agricultural land to residential development with the requirement that the agricultural land be replaced at a 1:1 ratio with agricultural land of equal quality located within the County. FMP Guidelines were also considered and adopted. The FMP Guidelines furthermore specified that for a project of 20 acres or more, farmland mitigation must be satisfied by direct acquisition of a permanent agricultural conservation easement, but for a project of less than 20 acres, the County can authorize the payment of an in-lieu mitigation fee.

The BIA challenged the FMP on the grounds that: (1) the County failed to identify its legal authority for mandating the dedication of permanent conservation easements pursuant to its General Plan; (2) there is no reasonable relationship between the requirements of the FMP and the adverse public impacts resulting from agricultural conversion (police power argument); and (3) conservation easements must be voluntary and thus, cannot be required by policies like the FMP.

With respect to the police power argument, the Court held that the BIA had the burden at trial of demonstrating the invalidity of the FMP (not the County's burden to prove the FMP valid), which it did not sufficiently do. Additionally, the court held that the FMP requirements clearly bear a reasonable relationship to the loss of farmland to residential development citing to the goals and policies in the County's agricultural element. The court clarified that "to meet the reasonable relationship standard it is not necessary to fully offset the loss." Reasoning that land use regulation is a function of local government pursuant to the police power, the court also held that, "the trial court [] erred in concluding that the FMP was not authorized by the County's police power."

Finally, and most importantly, the Court held that Civil Code section 815.3, subdivision (b) did not invalidate the FMP. In considering this issue of first impression, the court sided with the County reasoning that the FMP did not violate the statute's prohibition against conditioning the issuance of an approval on the grant of a conservation easement because the applicant and/or developer was not required to grant the easement. "Rather, the FMP allows the applicant to arrange for a third party to voluntarily convey an easement to a land trust or the County." The court's reasoning appeared to be that a developer has a choice to develop or not, and if the developer chooses to develop, that voluntary choice may come with a price (e.g., the permanent protection of one acre of farmland for every acre of farmland developed).

4. Effect of State Laws on Agricultural Mitigation Requirements

The Mitigation Fee Act, CEQA and the Conservation Easement Act do not preclude a jurisdiction from requiring mitigation for impacts to agricultural land. Where

local governments impose in-kind mitigation requirements rather than fee requirements, the Mitigation Fee Act does not apply. However, when the Mitigation Fee Act is applicable, such as when agencies impose fee requirements to mitigate for the loss of agricultural land, regulations must comply with the requirements of the Act.

Under CEQA, local governments generally have the authority to require mitigation for significant impacts to agricultural lands.[97] As outlined above, courts that have addressed agricultural mitigation programs under CEQA have considered whether such mitigation is necessary, and not whether it is permissible. Furthermore, no challenge of the imposition of agricultural mitigation in the CEQA context has resulted in a published opinion. Moreover, CEQA case law demonstrates that where there is a solid basis in local planning documents, including General and Specific Plans, the courts are more likely to uphold agricultural mitigation programs.

Last, the purpose of the Conservation Easement Act is to voluntarily convey conservation easements to qualified entities to conserve open spaces and other environmental values. Civil Code section 815.3 prohibits jurisdictions from requiring an involuntary conveyance of a conservation easement. Where a landowner chooses to develop a property within a jurisdiction that requires converted farmland to be mitigated with placement of easements on other property, however, this requirement not run afoul of this prohibition.

E. Local Laws

1. Planning and Zoning Law

City and county zoning ordinances and land use decisions must be consistent with General and Specific Plans.[98] Thus, local jurisdictions can justify exactions on the basis that they are necessary to assure consistency with adopted General and Specific Plans.[99] Thus, when development fees and dedication requirements are judicially attacked, many local governments now rely on General and Specific Plans to support their decisions.[100]

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[97]/ Under CEQA, mitigation measures must meet the essential nexus and rough proportionality tests of *Nollan* and *Dolan*. (CEQA Guidelines, § 15126.4, subd. (a)(4).)

[98]/ Gov. Code, §§ 65860 and 65910; see also, *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 570.

[99]/ See, e.g., 58 Ops.Cal.Atty.Gen. 41 (1975), as cited in Longtin § 8.14, p. 787; see also, *J.W. Jones Cos. v. City of San Diego* (1984) 157 Cal.App.3d 745.

[100]/ See *Curtin, supra*, at pp. 27, 259.

2. Effect of Local Laws on Agricultural Mitigation Requirements

Planning and zoning law provides jurisdictions an opportunity to implement mitigation programs to protect agricultural land. If cities and counties clearly emphasize the importance of farmland in their General and Specific Plans, and include specific programs to protect agricultural land, subsequent regulations to preserve agricultural land should be defensible.

IV. CONCLUSIONS AND RECOMMENDATIONS

A. Legality of Fee and In-Kind Mitigation Requirements

Local agencies have the general authority to implement in-kind and fee mitigation requirements under the police power of the California Constitution.[101] Moreover, the California Legislature's support of and emphasis on agricultural preservation provides a backdrop by which agencies can implement these regulations. However, it is necessary for agencies to ensure compliance with requirements under the United States and California Constitutions, the Mitigation Fee Act, CEQA, the Conservation Easement Act and planning and zoning laws.

1. In-Kind Mitigation Requirements

Because in-kind mitigation requirements do not involve monetary fees, they generally will not trigger Propositions 13, 62 or 218, or the Mitigation Fee Act. Moreover, so long as they are applied legislatively, in-kind mitigation requirements need not meet the nexus and rough proportionality tests under Nollan and Dolan. To comply with Civil Code section 815.3, though a particular landowner may be required to *arrange* for the grant of compensatory easements, the landowner may not be required to actually *grant* a conservation easement.

Under the Equal Protection and Due Process clauses of the United States and California Constitutions, mitigation requirements must bear a rational relationship to a legitimate government interest. Such regulations also cannot be arbitrary. To support the assertion that the protection of agricultural land is a legitimate interest, agencies can also point to their own General and Specific Plans and the State Legislature's statements. As outlined above, courts generally hold in favor of local agencies on this issue in the land use context. As long as in-kind mitigation programs satisfy these requirements, agencies have the legal authority to impose such regulations.

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[101]/ Cal. Const., art. XI, § 7.

2. In-Lieu Fee Mitigation Requirements

In-lieu fee requirements, in addition to meeting the requirements under Due Process and Equal Protection as outlined above, must either be exempt from or comply with Props 13, 62 and 218. They also must comply with the Mitigation Fee Act.

In order to qualify as exempt from Propositions 13 and 62, a development fee must not exceed the reasonable cost of providing the service for which the fee is charged. Furthermore, the fee must be reasonably related to the type of activity on which it is based. Also, because mitigation fees are not imposed incident of property ownership, such exactions need not meet the requirements under Prop 218.

Under the Mitigation Fee Act, an agency imposing a fee must: (1) identify the purpose of the fee; (2) identify the use to which the fee is to be put; (3) determine that there is a reasonable relationship between the fee's use and the type of development project on which the fee is imposed; (4) determine that there is a reasonable relationship between the need for the public facility and type of development project on which the fee is imposed; and (5) determine that there is a reasonable relationship between the amount of the fee and the cost of the public facility attributable to development.

B. Recommendations to Provide a Foundation for and Implement Fee and In-Kind Mitigation Requirements

1. Incorporate Policies and Programs Related to Preservation of Agricultural Land in General and Specific Plans

As demonstrated in the CEQA cases outlined above, courts generally defer to city and county General Plans. Moreover, the General Plan is considered the "constitution for development," and all land use approvals must be consistent with such plans.[102] Thus, agencies can use policies in their General Plans to support implementation of dedication and fee requirements for preserving agricultural land. Jurisdictions should incorporate policies into General and Specific Plans that emphasize the need for permanent preservation of agricultural land. Such policies should specifically support the use of conservation easements for mitigation for the loss of farmland.

[102]/ See *J.W. Jones Cos. v. City of San Diego* (1984) 157 Cal.App.3d 745, 749.

2. Conduct Nexus Studies

Particularly if implementing a fee program, local agencies should conduct nexus studies. Such studies should analyze and demonstrate an adequate nexus between the mitigation requirement and the impacts of the project, thus providing support for the nexus requirements of *Nollan* and *Dolan* and the Mitigation Fee Act. Such studies should also substantiate the selected mitigation ratio.

3. Include Findings That Demonstrate Compliance

When public agencies adopt mitigation programs, they should also adopt findings that demonstrate compliance with each applicable legal requirement.

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APPENDIX C

ASSESSING THE ECONOMIC AND MARKET TRENDS AFFECTING AGRICULTURE IN THE WESTERN INLAND EMPIRE

Appendix L: Agriculture

Assessing the Economic and Market Trends Affecting Agriculture in the Western Inland Empire

Prepared by:
Justin L. Adams, Ph.D.

Chang & Adams Consulting

September 2011

About Chang & Adams Consulting:
Chang & Adams Consulting is Sacramento's premier management consulting firm, operating at the intersection of the public and private sectors. We are professional economists who routinely advise clients on market and business trends so that they may assess and understand the environment in which they are operating. We specialize in applying cutting-edge quantitative analyses to help frame and solve public policy and business strategy issues. We advise a range of clients, including government agencies, non-profit organizations, campaigns for initiatives and candidates, and Fortune 1000 companies. We provide them with the analytical insight to shape their strategic direction, improve their operations, and develop sound policies. Copies of resumes of our principals are attached to this report as Appendix A.

Assessing the Economic and Market Trends Affecting Agriculture in the Western Inland Empire
(Table of Contents)

Assessing the Economic and Market Trends Affecting Agriculture in the Western Inland Empire (Key Findings)

- The Inland Empire makes up a small part of California's agriculture industry. In 2009, the value of all agricultural production in Riverside and San Bernardino Counties totaled $1.4 billion, compared with $41.4 billion of agricultural production in California as a whole. Additionally, each of the ten most productive agricultural counties in California produces more than Riverside and San Bernardino combined.

- Agriculture is also small compared to other industries in the Inland Empire. The Natural Resources and Mining sector, which is comprised mostly of the agriculture industry, made up 1 percent of the regional economy that year. The largest sectors were Financial Activities (23 percent), Trade (18 percent), and Education and Health Services (11 percent).

- Agriculture is also in decline in the Inland Empire. Between 2006 and 2010, three of the top five agricultural products in Riverside County (nursery stock, milk, and table grapes) decreased in production value or remained flat. Similarly, three of the top five agricultural products in San Bernardino County (cattle and calves, replacement heifers, and trees/shrubs) also have decreased in value and are expected to continue to decrease in value as agricultural operators relocate from the Riverside and San Bernardino Counties in general to places such as Kern County and in some instances out of state.

- The decline in agriculture can be attributed to five key factors:
  - Growth in the demand for housing and development following the 2007 market collapse: After the market collapse in 2007, home prices have stabilized to 2002-2003 prices and monthly home sales have increased since 2009.
  - Growth in the transportation and warehousing sector: Over 40 percent of all goods imported into the United States enter through the Ports of Los Angeles and Long Beach, and most of these goods pass through the Inland Empire for distribution. After declining from 2006 through 2009, imports are rising to near-record levels again.
  - Increased restrictions on water deliveries for agricultural uses after several consecutive drought seasons: Drought conditions led to water allocation cutbacks from both the State Water Project and local water sources, driving the cost of water up across the region as well as limiting access.
  - Higher wages in other industries in the region: Trade, transportation, and construction industries have all seen significant growth in the region and offer higher annual salaries than agriculture for the same skilled and semi-skilled labor.
  - Strong agricultural competition from the southern Central Valley for dairies: The Valley offers cheaper land, a greater number of support industries for agriculture, a larger

agricultural employment base, and cheaper labor for the dairy industry, as well as agriculture in general.

- Increased regulatory pressures from air quality and local jurisdictions regarding particulate matter emissions and land use adjacency issues.
- The trend in Riverside and San Bernardino Counties is for agricultural operations to continue to shift to places like Kern County regardless independent of land use policy due to the economic issues set forth in this report.

Assessing the Economic and Market Trends Affecting Agriculture in the Western Inland Empire

1. Introduction

The Inland Empire region of Southern California generally consists of Riverside and San Bernardino Counties, and is located just east of Los Angeles. The two counties encompass more than 4.2 million people. Figure 1.1 below shows the general geography of the region.

Figure 1.1
The Inland Empire

Compared to the rest of the state, the Inland Empire makes up only a small part of California's agriculture industry. In 2009, the value of all agricultural production in Riverside and San Bernardino totaled $1.4 billion. Agricultural production includes crop production, such as for food grains, feed crops, cotton, oil crops, fruits and tree nuts, and vegetables, and livestock production, including meat animals, dairy products, poultry, and eggs.

Table 1.1
Agricultural Production in California and Inland Empire

Geographic Region	Agricultural Production, 2009 (% of State)	Agricultural Employment, 2007 (% of State)
Riverside/San Bernardino	$1.4 Billion (3.3%)	16,800 (4.3%)
California	$41.4 Billion (100%)	386,400 (100%)

SOURCES: California Department of Food and Agriculture, "County Rank by Gross Value of Agricultural Production, 2008–2009," California Agricultural Resource Directory 2010-2011; California Statistical Abstract, "Wage and Salary Employees in Agricultural Establishments by Areas in California, 1995 to 2007," 2008

By comparison, the value of all agricultural production in California in 2009 was $41.4 billion. The Inland Empire represented just 3.3 percent of this total.

The distribution of employment in the agriculture industry resembles that of production value. In 2007, Riverside and San Bernardino Counties had 16,800 workers in the agriculture industry. This represented 4.3 percent of the 386,000 Californians employed in agriculture that year.

2. Agricultural Production in the Inland Empire is Small

Compared to other individual counties across the state, both Riverside and San Bernardino Counties produce significantly smaller agricultural output. Each of the ten most productive agricultural counties in California produces more than both counties combined.

Table 2.1
Top California Counties by Value of Agricultural Production, 2009

Rank	County	Total Value ($000)	Leading Commodities
1	Fresno	$5,372,009	Grapes, Tomatoes, Poultry, Almonds, Cattle & Calves
2	Tulare	$4,046,355	Milk, Oranges, Grapes, Cattle & Calves, Corn
3	Monterey	$4,033,718	Lettuce, Strawberries, Nursery, Broccoli, Grapes
4	Kern	$3,606,356	Grapes, Milk, Vegetables, Almonds, Pistachios
5	Merced	$2,460,474	Milk, Chickens, Almonds, Cattle & Calves, Sweet Potatoes
6	Stanislaus	$2,310,071	Milk, Almonds, Chickens, Cattle & Calves, Tomatoes
7	San Joaquin	$2,000,474	Grapes, Milk, Cherries, Tomatoes, Walnuts
8	Ventura	$1,621,575	Strawberries, Nursery Stock, Celery, Raspberries, Lemons
9	San Diego	$1,548,124	Woody Ornamentals, Flowers & Foliage, Bedding Plants, Avocados, Tomatoes
10	Imperial	$1,452,970	Lettuce, Cattle, Wheat, Alfalfa, Broccoli
13	Riverside	$1,015,755	Nursery Stock, Milk, Eggs, Table Grapes, Hay
25	San Bernardino	$355,379	Milk, Eggs, Cattle & Calves, Alfalfa, Replacement Heifers

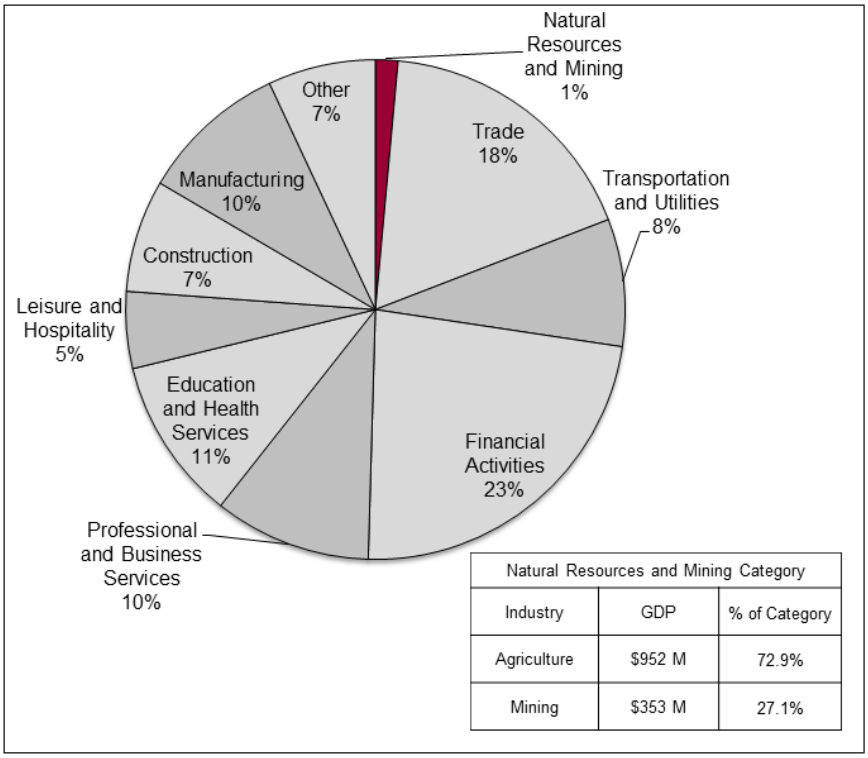
SOURCE: California Department of Food and Agriculture, "County Rank by Gross Value of Agricultural Production, 2008–2009," California Agricultural Resource Directory 2010-2011

The largest California county by agricultural production in 2009 was Fresno. The county produced nearly $5.4 billion in agricultural commodities, including grapes, tomatoes, poultry and almonds, while the tenth largest California county in 2009 was Imperial, producing almost $1.5 billion in agricultural commodities, primarily through lettuce, cattle, wheat, alfalfa, and broccoli.

By contrast, Riverside was the 13th largest agricultural producer, generating $1.0 billion in commodities such as nursery stock, milk, eggs, table grapes, and hay, and San Bernardino was the 25th largest agricultural producer, with $355 million in products including milk, eggs, cattle and calves, alfalfa, and replacement heifers. Together, Riverside and San Bernardino Counties produced nearly $1.4 billion in commodities, but still less than Imperial County.

Agriculture is also small compared to other industries in the Inland Empire region. The largest industrial sectors in the Riverside-San Bernardino-Ontario Metropolitan Statistical Area in 2009 were Financial Activities, Trade, and Education and Health Services. These represented 23 percent, 18 percent, and 11 percent of the Inland Empire's economic activity, respectively, as seen in Figure 2.1.

Figure 2.1
Shares of Private GDP for Riverside-San Bernardino-Ontario, 2009



Natural Resources and Mining Category		
Industry	GDP	% of Category
Agriculture	$952 M	72.9%
Mining	$353 M	27.1%

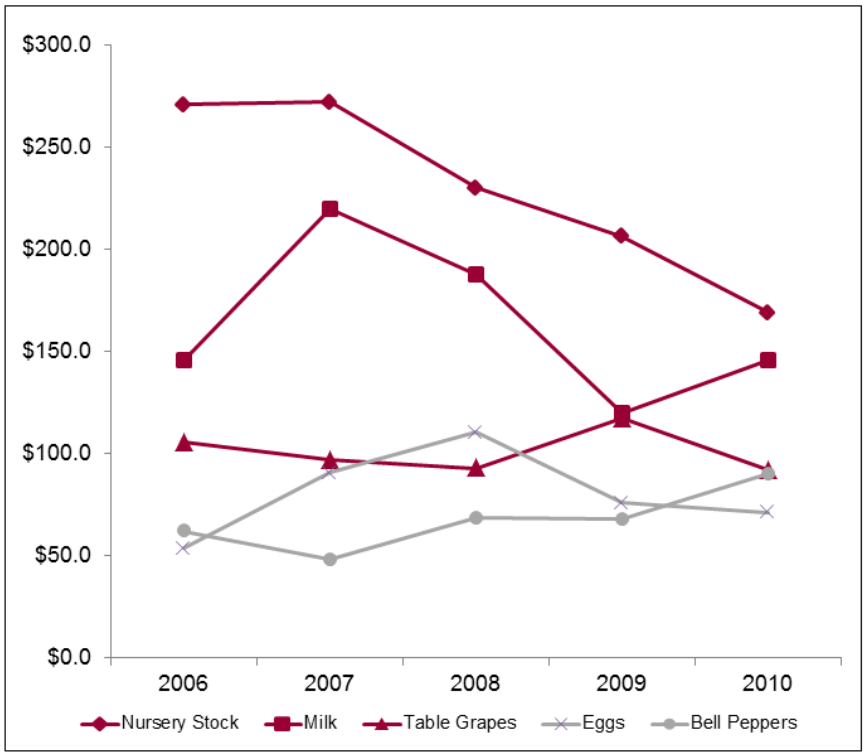
SOURCE: Bureau of Economic Analysis, U.S. Department of Commerce, "Gross Domestic Product by Metropolitan Statistical Area, Riverside-San Bernardino-Ontario 2009," accessed August 2011 (http://www.bea.gov/iTable/iTable.cfm?reqid=70&step=1&isuri=1&acrdn=2)

By contrast, the Natural Resources and Mining sector made up 1 percent of the regional economy that year. This sector includes both the agriculture and mining industries. In fact, given that the agriculture industry comprises about 73 percent of the sector, then in essence agriculture currently makes up about seven-tenths of 1 percent of the Inland Empire's economy.

3. Agriculture in the Inland Empire Continues to Decline

Both Riverside and San Bernardino Counties have seen declines in production for some of their top agricultural products since 2006. Three of the top five agricultural products in Riverside County have decreased in production value or remained flat since 2006 as seen in Figure 3.1. From 2006 to 2010, the top five agricultural products in Riverside County by combined value were nursery stock, milk, table grapes, eggs, and bell peppers.

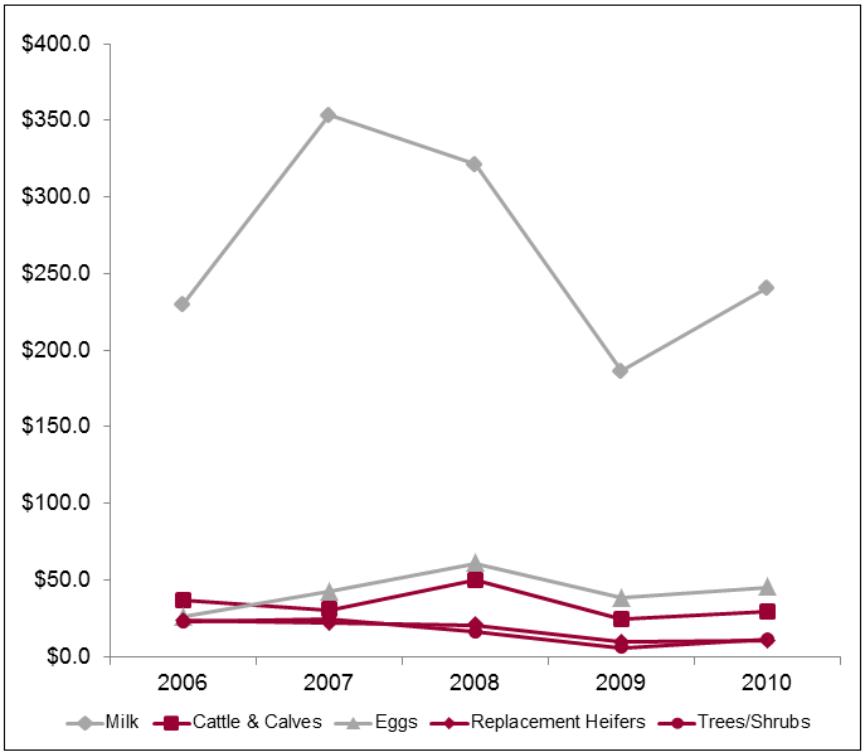
Figure 3.1
Riverside County Leading Agricultural Values (Top 5 Products)



SOURCE: Agricultural Commissioner's Office, County of Riverside, Riverside County Annual Production Report, Assorted Years

Over this five-year time period, three of these agricultural products declined in value in the County or remained flat: nursery stock dropped from $270 million in production value to under $170 million; after a brief run-up, milk production began and ended at $145 million; and table grapes declined in production value from over $105 million to around $92 million. Although eggs and bell peppers did experience higher production values over the five-year period, these are less valuable agricultural products.

Figure 3.2
San Bernardino County Leading Agricultural Values (Top 5 Products)



SOURCE: Department of Agriculture/Weights and Measures, County of San Bernardino, Crop and Livestock Report, Assorted Years

Though San Bernardino did not face as significant losses as Riverside, it has still seen falling revenues. Since 2006, three of the top five agricultural products in San Bernardino County have decreased in value, seen in Figure 3.2. From 2006 to 2010, the top five agricultural products in San Bernardino County by combined value were milk, cattle and calves, eggs, replacement heifers, and trees/shrubs.

Over this five-year time period, three of these agricultural products declined in value in the County: the production value of cattle and calves decreased by nearly $7 million; replacement heifers lost over half of their production value, with a drop from $24.2 million to $10.4 million; and trees and shrubs lost nearly half of their production value, declining from $22.8 million to $11.5 million. Additionally, there was little growth in milk production (just over $10 million) in the county despite it being the top product, and eggs also saw higher production by about $19 million over the five years.

4. Five Major Barriers Limit the Inland Empire's Agriculture Industry

With the agriculture industry continuing to decline in the Inland Empire, five major barriers to the industry were identified. These barriers center on pressures from competing industries, environmental concerns, and operations costs:

- Growth in Demand for Housing and Development
- Growth in Trade and Transportation Sectors
- Increased Restrictions on Water
- Higher Wages in Other Industries
- Strong Agricultural Competition from Central Valley

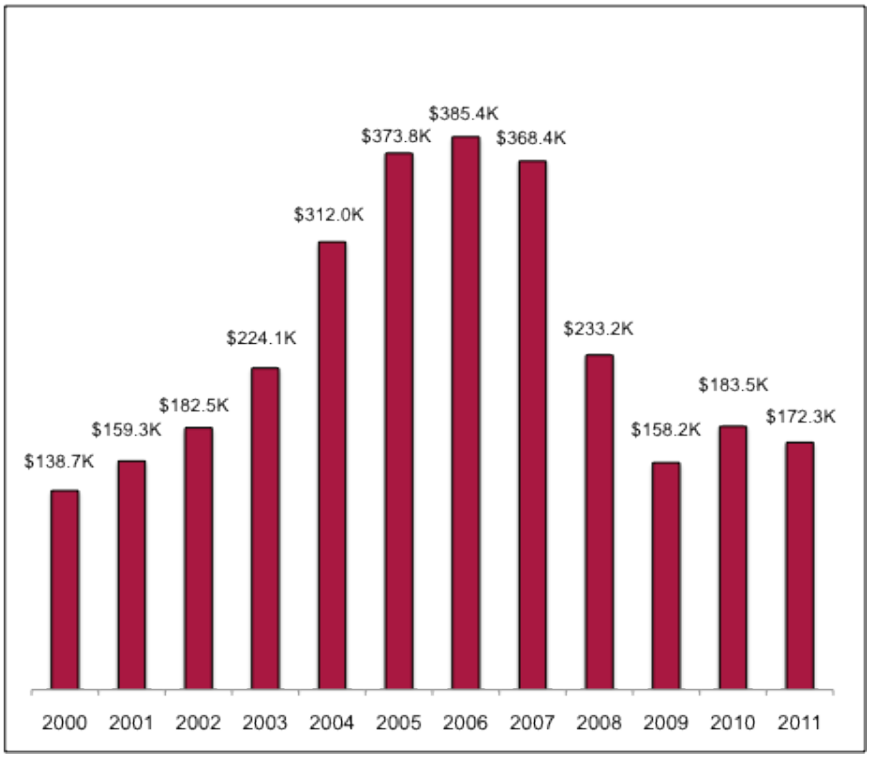
4.1. Growth in Demand for Housing and Development

The Inland Empire generally boasts relatively inexpensive land values compared to other regions of California, such as the coastal counties, making the Inland Empire attractive to developers looking to build residential and commercial property. Beyond this, the return of home prices in the region to more traditional levels has also spurred additional investment in land purchases and developments.

The Inland Empire region saw robust demand for housing during the previous decade, as reflected by significant increases in median home prices between 2002-03 and 2006 to record highs for the region. Much of these gains were erased with the market collapse of 2007, however, with home prices returning to levels last seen in 2002 and 2003. But some analysts believe that the housing market in the region has finally begun to stabilize given that home and land prices are beginning to inch higher. Whittlesey Doyle, a land brokerage firm based in Irvine, stated that a number of recent land deals to homebuilders in the Inland Empire indicate that the market is rebounding.[1]

[1] Wesley G. Hughes, "Land buyers back in game," Inland Valley Daily Bulletin, December 6, 2010.

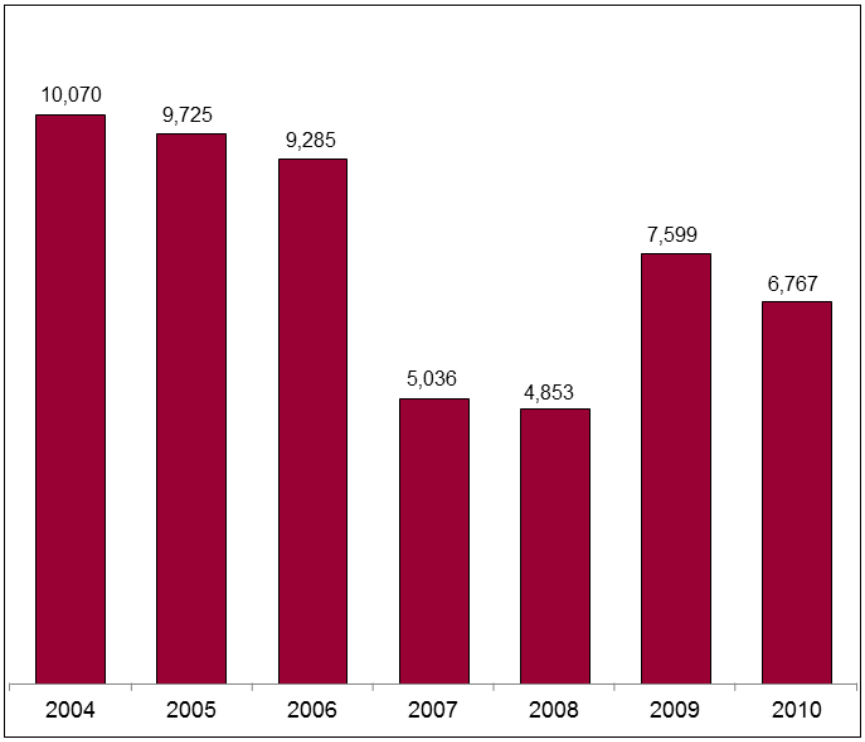
Figure 4.1
Inland Empire Median Home Sales Price, July 2000-July 2011



SOURCE: California Association of REALTORS, "Median Prices of Existing Detached Homes, Historical Data"

As shown in Figure 4.1, the median home sales price in the Inland Empire was just over $385,000 at the peak of the real estate market in 2006. When the market dropped to its low in 2009, the median sales price had fallen 59 percent to just over $158,000. Though prices have fallen significantly since 2007, the median price actually began to increase in 2010 to over $183,000. While there has been some retrenchment in prices this year, they still remain above $172,000.

Figure 4.2
Monthly Home Sales



SOURCE: DataQuick Information Systems, "Southland Home Sales," 2004-2010

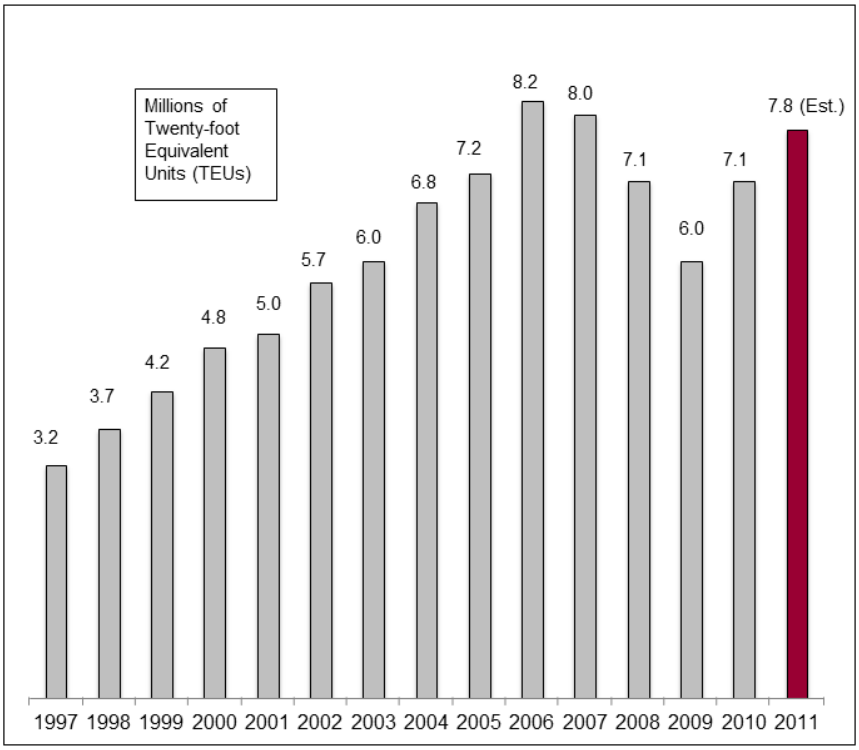
Correspondingly, monthly home sales have tapered off from their peak in 2004, as illustrated in Figure 4.2. As home prices have decreased, there has been an increase in monthly home sales in the region. Though sales remain off of their historic highs, monthly home sales indicate that consumers are buying properties again and driving some growth in the market.

With home prices stabilizing and home sales returning, newspaper accounts and anecdotal evidence suggest that several large homebuilders have indicated that they have begun purchasing more land and restarting stalled home developments across the region.

4.2. Growth in Trade and Transportation Sectors

On the commercial front, the agriculture industry faces increasing competition from trade and transportation, two of the largest industrial sectors in the Inland Empire. Transportation, warehousing, and other goods movement industries are strong in the region because of their proximity to the Ports of Los Angeles and Long Beach and because of the abundance of relatively inexpensive land for distribution centers and transportation hubs.

Figure 4.3
Flow of Imported Containers, Los Angeles-Long Beach Ports



SOURCE: Husing, John, Inland Empire 2011… Start of the Recovery?, Economics & Politics, Inc., April 2011

Over 40 percent of all goods imported into the United States enter through the Ports of Los Angeles and Long Beach, and most of these goods pass through the Inland Empire for distribution. The Burlington Northern Santa Fe (BNSF) Railway has an intermodal railroad yard located in San Bernardino, for example. The Union Pacific Railroad has its main switching yard in Colton as well.

And as shown in Figure 4.3, imports into the Ports of Los Angeles and Long Beach have begun to rebound from the recent recession. Imports as measured by Twenty-foot Equivalent Unit (TEU) containers steadily increased between 1997 and 2006 from 3.2 million TEUs to 8.2 million TEUs. With the recession, imports dropped in 2009 to 6.0 million – the same level as seen in 2003. But as a sign that economic activity is returning to California and the United States, imports into the Ports of Los Angeles and Long Beach increased to 7.1 million TEUs in 2010 and are projected to reach 7.8 million TEUs in 2011. These represent near-record levels of goods movement in the region.

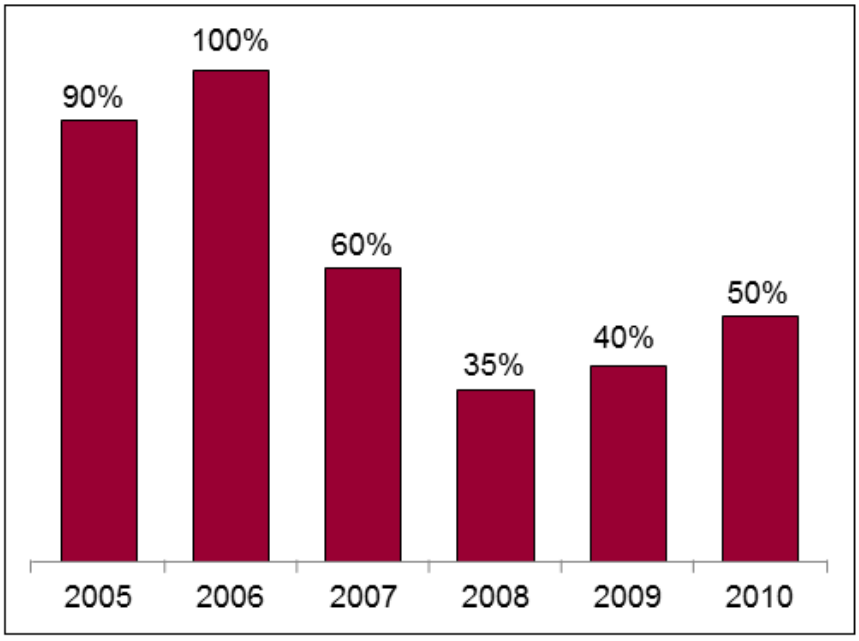
4.3. Increased Restrictions on Water

The State Water Project was constructed in the 1950s and 1960s to provide most of California, particularly Southern California, with a stable statewide water resource to

augment local sources. Currently, the State Water Project provides supplemental water to approximately 25 million Californians and about 750,000 acres of irrigated farmland. Each year, its contracting water agencies make water allocation requests and the state Department of Water Resources plans the initial allocation percentage. Over the course of the year, these allocations can be increased to adjust for wet years, or rolled back in cases of drought.

California faced severe drought conditions for most of the latter-half of the previous decade, however. These conditions necessitated reduced water allocations to the Inland Empire through the State Water Project, and hindered farms and dairies' ability to extract water from their nearby groundwater basins and reservoirs.

Figure 4.4
State Water Project Allocations to Inland Empire Water Districts

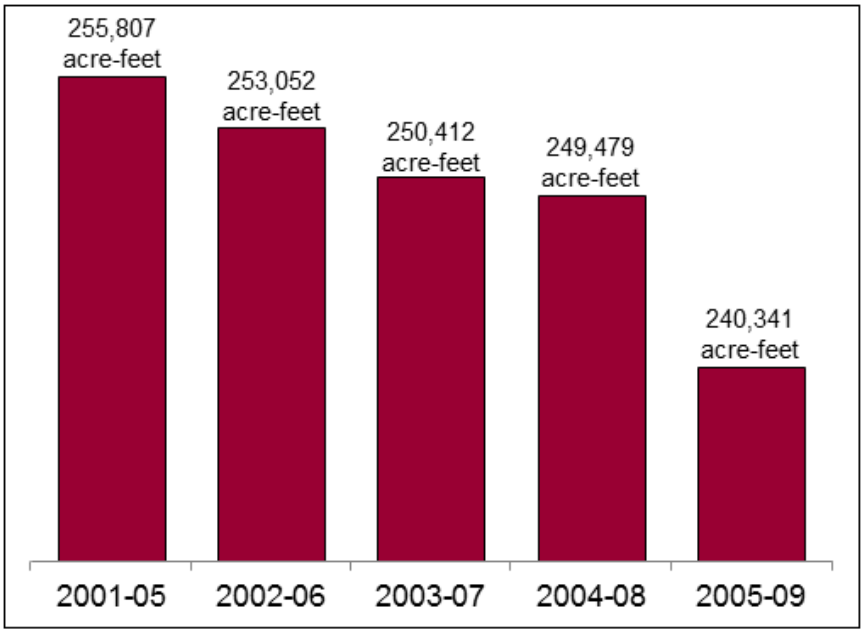


SOURCE: California Department of Water Resources, Notice to State Water Project Contractors, 2005-2010

As illustrated in Figure 4.4, drought conditions following 2006 led to a decrease in State Water Project allocations across California between 2007 and 2010. The drought was so severe that in 2008 only 35 percent of water allocations were provided. Last year the allocation was only 50 percent. A wet 2011 combined with heavy snowpacks promises to increase allocations, however much of the damage to the agriculture industry has already occurred considering that the operating costs to the Inland Empire's agriculture industry have been severely impacted by the water restrictions.

Additionally, water extractions from the San Bernardino Basin have also steadily declined over the previous decade. This is shown in Figure 4.5 below. As the secondary water resource for the region, groundwater and reservoir stores backfill losses to agriculture from the State Water Project. Restrictions on forced groundwater recharge and environmental regulations have also decreased the amount of water extracted from these sources, even in drought seasons.

Figure 4.5
Water Extractions from the San Bernardino Basin



SOURCE: Western-San Bernardino Watermaster, "Annual Report of the Western-San Bernardino Watermaster," Calendar Year 2010

With respect to agriculture, water restrictions adversely impact the industry in a couple of ways. First, they limit the amount of water available for crops and livestock, requiring farmers and ranchers to reduce the size of their production and thus negatively impacting their revenue, according to Gregg Warren, vice president of American AgCredit[2]. Additionally, farmers and ranchers' costs rise as well since the inputs obtained from associated agricultural industries, such as feed, become more scarce and therefore more expensive.

[2] Chris Sieroty, "Inland Farmers Facing Several Threats," The Business Press (Riverside, CA), March 23, 2009.

4.4. Higher Wages in Other Industries

Improved economic conditions have brought a resurgence of housing and other industries such as trade and transportation in the Inland Empire. This resurgence has resulted in more job opportunities that provide higher salary options for skilled and semi-skilled labor.

Figure 4.6
Occupations in the Inland Empire

Occupation	Estimated Employment, 2010	Mean Annual Salary, 2010
Construction and Extraction	51,850	$48,720
Office and Administrative Support	195,850	$33,900
Sales and Related Occupations	121,510	$32,860
Transportation and Material Moving	108,130	$32,400
Personal Care and Service	31,190	$24,370
Farming, Fishing, and Forestry	58,402	$21,400
Food Preparation and Serving Related Occupations	111,450	$21,310

SOURCE: U.S. Department of Labor, "Occupational Employment Statistics, May 2010, Riverside-San Bernardino-Ontario, CA, " accessed August 2011 (http://www.bls.gov/oes/current/oes_40140.htm)

As shown in Figure 4.6, agriculture competes with a number of other higher-paying industries for hired labor. Compared to other skilled and semi-skilled employment, agricultural salaries lag behind most of their counterparts across the region. Construction jobs, for example, have highest mean salary of the group at $48,720 a year. Additionally, three of the four largest occupations in the Inland Empire – office and administrative support, sales and related occupations, and transportation and material moving – all provide higher mean salaries for employees with semi-skilled or low-skilled backgrounds. In fact the third-largest occupation, food preparation and serving, had a mean annual salary only $90 below that of agriculture.

Jack King, of the California Farm Bureau Federation, pointed out that even agricultural wages increases were not enough to draw an adequate amount of agricultural workers. He

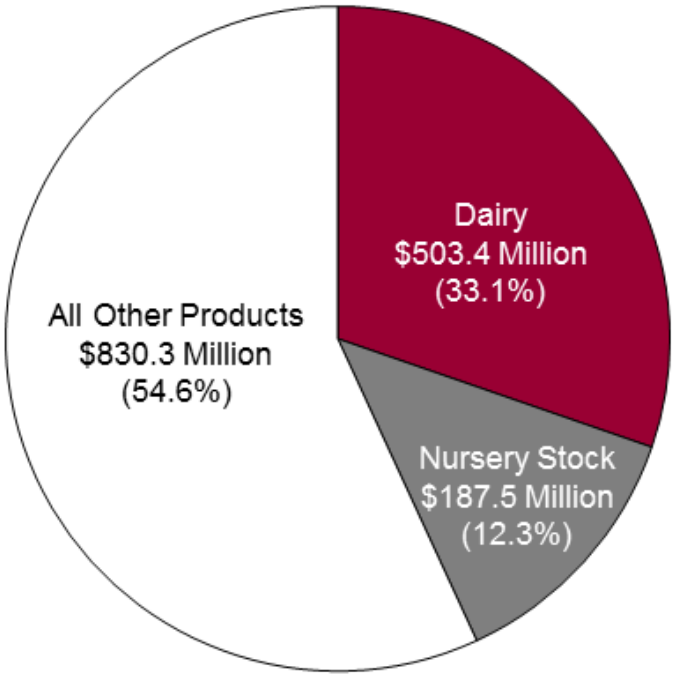
stated that even with raises, the soft market will only allow agriculture to make limited raises.[3]

It should be noted that the farming employment figure does not take into account family labor and other non-paid employment. That said, the total employment and mean annual salary for agriculture do not compare favorably to other equivalent employment opportunities in the region, particularly as the agricultural industry continues to decline relative to other industries such as transportation and construction.

4.5. Strong Agricultural Competition from Central Valley

The fifth barrier involves competition with the southern Central Valley for agricultural production, particularly with respect to the dairy industry. The dairy industry comprises the production of milk, meat, and feed, such as alfalfa and hay. Milk is the largest agricultural product for San Bernardino County, and it is the second largest in Riverside County. As shown in Figure 4.7 below, dairy and nursery production accounts for approximately 45.4 percent of all agricultural production in the Inland Empire. In fact, dairy alone accounts for approximately one-third of all agriculture in the region.

Figure 4.7
Agriculture in the Region



SOURCE: Department of Agriculture/Weights and Measures, County of San Bernardino, Crop and Livestock Report, Assorted Years; Agricultural Commissioner's Office, County of Riverside, Riverside County Annual Production Report, Assorted Years

[3] Andrew Silva, "Lack of laborers leaves crops to rot," Inland Valley Daily Bulletin (Ontario, CA), December 13, 2006.

Bill Van Leeuwen, a dairy farmer from the region, has expressed surprise at the speed with which the milk industry is leaving the Inland Empire for places such as the Central Valley.[4]

The Central Valley produces milk more cheaply than the Inland Empire does. In the Southern California region (consisting of San Luis Obispo, Santa Barbara, San Bernardino, Los Angeles, Riverside, Imperial and San Diego counties), the average total investment per cow is $274 more than in the Southern Central Valley (consisting of Fresno, Tulare, Kings and Kern counties). The average total investment per cow takes into account all expenses, capital costs, and operating costs for every cow on the dairy. This is shown in Figure 4.8 below.

Moreover, dairy production in the Central Valley is far larger than that in the Inland Empire. The total number of milk cows in Tulare County alone (502,395) more than quadruples the number in the Southern California region. This is also shown in Figure 4.8 below.

Figure 4.8
Total Dairy Costs, 2010

	Southern California	**Southern Central Valley**
Average Total Investment per Cow	$2,993	$2,719
Total Cows	119,805 (San Bernardino and Riverside)	983,954
Hourly Wage, All Hired Labor	$16.23	$13.78

SOURCE: California Department of Food and Agriculture, "California Dairy Statistics," 2010 Data; California Department of Food and Agriculture, "Cost of Production" 2010 Annual Report

Additionally, hourly wages are roughly $2.50 higher in the Southern California region than the Central Valley. The cheaper costs to operate in the Southern Central Valley can make a significant difference in the bottom line of dairy producers. In fact, there has been anecdotal evidence of dairy ranchers selling land in the Inland Empire and using those profits to open or expand dairy operations in the Central Valley.

[4] Jerry Hirsch, "Dairies Moving Out of Inland Empire," Los Angeles Times, January 9, 2006.

5. Conclusion

Our analysis shows that agriculture is small compared to other industries in the Inland Empire – Riverside and San Bernardino Counties – and is continuing to decline in importance in the region. We identify a number of systemic and regional economic factors that create significant economic barriers to the continued viability of agriculture in the Inland Empire. These barriers include the growth in demand for housing and development; the growth in the trade and transportation sectors; increased restrictions on water; higher wages in other industries; and strong agricultural competition from the Central Valley.

It should be pointed out that the decline of agriculture in the Inland Empire and the barriers to its viability are independent of any land use policies pursued by Riverside and San Bernardino Counties. That is, the market forces affecting agricultural production in Riverside and San Bernardino Counties will continue to shrink the industry in the future regardless of potential local efforts to preserve agricultural production through land use policies or other similar measures.

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07/09 – present **Chang & Adams Consulting** Sacramento, CA
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- Provide economic analysis and strategy consulting to Fortune 1000 companies at the intersection of the public- and private-sectors. Provide policy, economic, and public finance analysis as well as operations consulting for government agencies and not-for-profit organizations.

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08/04 – 04/07 **California Department of General Services** Sacramento, CA
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- Chief Financial and Operations Officer of a state department with $1 billion annual operating budget, thirteen business units and 4,000 employees. Oversaw the state's procurement and real estate operations. Also responsible for the state's telecommunications, automobile fleet, printing, warehousing, insurance and school construction operations.
- Special assignment to the Governor's Office to serve as chief staff economist for the Governor's Council of Economic Advisors. Facilitated Council meetings, prepared written briefings for the Governor on policy issues for consideration and assisted Council members with original research to present at the Council meetings.
- Special assignment to the California Department of Corrections and Rehabilitation to assess the agencies procurement operations and develop recommendations to improve procedures and operations.

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- Lead teams to develop strategies for new lines of business for a Fortune 1000 technology company, a national consumer products consortium and an international consumer products retail company.
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- Analytic and modeling methods subject matter expert. Finance and Accounting business processes subject matter expert.

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- Conduct research and develop recommendations for various clients in the high technology and consumer products industries.

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- Implemented studies to improve finances and operations for Cleveland Unified School District, Florida State University and the California Resources Agency.

10/95 – 12/98 **California State and Consumer Services Agency** Sacramento, CA
Assistant Secretary for Policy and Operations
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January 19, 2009

Dana Whitmer
Vice President
Sares Regis Group
18802 Bardeen Avenue
Irvine, CA 92612

Re: Economic Viability of Agriculture in the West Inland Empire

Dear Mr. Whitmer:

Per your request CBRE Consulting has examined the economic and market trends affecting agriculture operations throughout California, with particular attention to the specific challenges relative to the communities of Chino and Ontario in the western Inland Empire.

Founded in 1978 as Sedway Group, CBRE Consulting is a nationally recognized full-service real estate and urban economics consulting firm with offices in Los Angeles and San Francisco. CBRE brings a multi-disciplined approach to property evaluation of all major land use types. CBRE specializes in real estate market analysis, economic development studies for residential, commercial and industrial projects throughout California and the western United States.

BACKGROUND

The Inland Empire once held the largest concentration of dairies in the world, with most of them in the Chino/Ontario basin. This region is now facing tremendous urbanization and development pressures. According to the San Bernardino County General Plan, the agricultural land is continually declining. According to the State of California, Department of Conservation, the County lost 47,000 cares of farmland from 1990 through 2002. Riverside County lost 50,000 acres in prime farmland over the same period.

For this analysis, CBRE performed an extensive internet/literature search relative to the economics of agricultural and dairy farming to understand the economic and other challenges to continued agriculture uses in the Inland Empire. CBRE also gathered relevant demographic, real estate and other economic data to illustrate historic and projected land use trends near Chino and the western Inland Empire.

There are many factors which demonstrate the infeasibility of agriculture production in Western Inland Empire, resulting in many dairy operators moving to Kern County.

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- Urbanization in the Inland Empire, resulting in dramatically increasing land prices,
- Higher water and labor costs;
- Environmental regulation (insects, odors, ground water contamination and solid waste removal) and,
- Competition from Kern County and the Central Valley with lower land costs and reduced regulations

1. **Increasing Land Values**
   Due to competing land uses, land prices have increased dramatically in the area in excess of $300,000 per acre. It has become more profitable for farmers to sell their land for a premium and relocate to a different area. The adoption of the Ontario Sphere of Influence General Plan in 1998, which provided for significant residential and commercial development, encouraged the farmers to sell their land and relocate.

2. **Conflicts between Urban Neighbors and Dairy Farms**
   The proximity of agriculture and urban development in the Inland Empire region bring with it many conflicts. There is an increase in the land use incompatibility with nuisance complaints from the urban neighbors regarding flies, farm odors, early morning noise, and also water and air pollution. The farmers also face pressures due to increased water and land-use restrictions.

3. **Increasingly Stringent Environmental Regulations**
   The Region 8 Water Board, which encompasses Chino/Ontario, was among the first to develop environmental regulations to control dairy operations, with increasing restrictions imposed in 1994, 1999 and 2004, as the proximity of urban neighborhoods, contamination of ground water and air pollution started raised more concerns.

4. **Competition from Central Valley**
   The dairy farmers in the Chino basin face stiff competition from the farmers in the Central Valley because of "high operating costs, including high feed costs and the cost of manure disposal" (Ontario Sphere of Influence General Plan, which is hereby incorporated by reference).

   A study published in Agriculture and Resource Economics Review in 2008 demonstrated the effect of environmental regulations over time and the growth in dairy industries, attributed to the cheap land and relatively weak regulations in the Central Valley.

   According to CDFA, milk production has declined by 55 percent in San Bernardino County between 2003 and 2007, while production increased by 88 percent in Kern County.

   Figures 1 and 2 on the following page show trends in the number of milk cows in the Central Valley (Region 5) as compared to the loss in Region 8 from 1980 to 2008.

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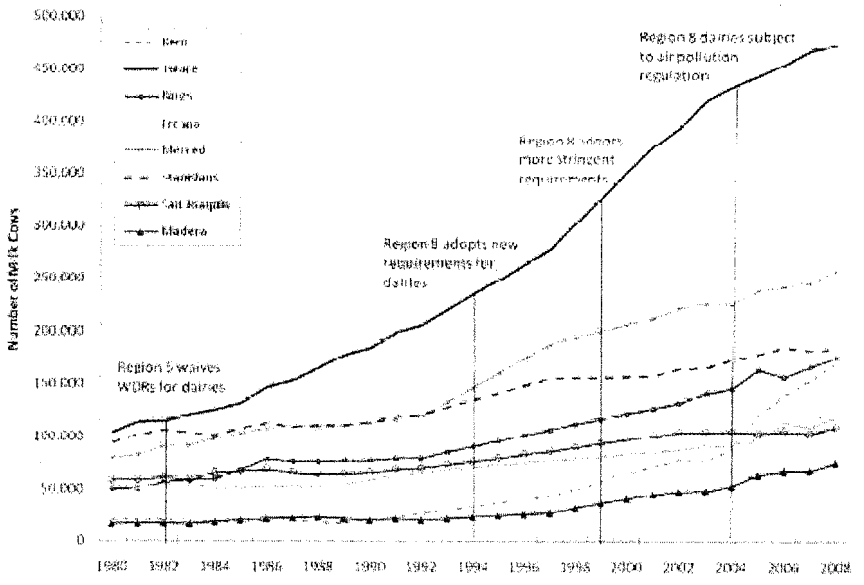
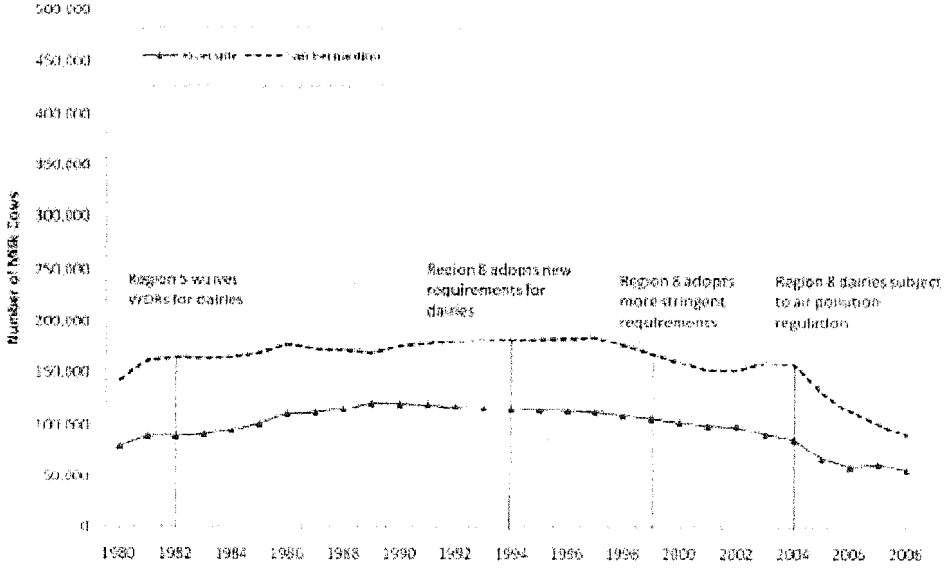
Figure: 1
Milk Cows in Counties of Region 5 Central Valley



Source: Steeringer and Hogle, 2008

Figure: 2
Milk Cows in Region 8 – Inland Empire



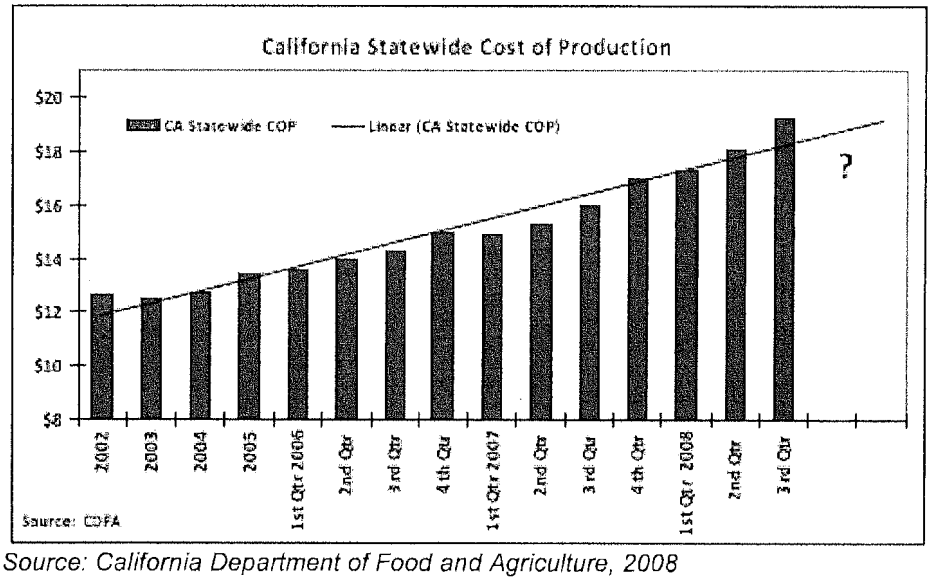
Source: Steeringer and Hogle, 2008

The Central Valley farmers also face few development pressures as compared to the Chino area and they benefit from diverse farm economy, which is no longer present in the Chino basin. For example, the farmers use dairy waste to fertilize their own crops or of the neighbors. They also use agricultural waste from neighboring farms as feed. This reduces their waste disposal and feed costs.

5. Operating Costs

According to the CDFA, production costs in dairy industry have risen by 50 percent since 2002 in California, putting more pressure on dairy farmers to cut other costs. Figure 3 below shows the growth in cost of production per CWT from 2002 to 3rd quarter 2008.

Figure 3
Cost of Production in the California Dairy Industry



Source: California Department of Food and Agriculture, 2008

Labor Costs

There is a shortage of labor in the dairy industry. Many agricultural workers are looking for higher paying jobs in non-agricultural industries according to the CDFA, which makes it difficult for the dairy farmers to compete for labor and leads to increased labor costs.

The issue of immigration and compliance also leads to labor problems. As shown in Figure 4 there is significant difference in labor costs in the different milk-producing regions of California. In the chart, South Valley represents the counties of the Central Valley composed of Fresno, Kings, Tulare and Kern County. Overall labor costs are 25 percent higher in the Southern California region as compared to the statewide average.

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Figure 4 – Labor Costs, 2007

Labor Costs	North Coast	North Valley	South Valley	Southern California	2007 State Average
Per Hired Milker					
Hourly Cash Wage	$8.77	$10.29	$9.82	$12.38	$10.02
Hourly Perquisites (1)	1.84	2.24	0.95	1.49	1.40
Hourly Wage (2)	12.53	14.60	12.67	16.52	13.40
Per Hired Labor					
Hourly Cash Wage	8.87	10.88	11.36	13.79	11.18
Hourly Perquisites (1)	1.58	2.49	1.44	1.52	1.86
Hourly Wage (2)	12.40	15.56	14.94	18.18	15.21
Per All Hired					
Hourly Cash Wage	8.81	10.55	10.37	12.89	10.47
Hourly Wage (2)	12.48	15.03	13.48	17.12	14.10

(1) Includes Fair Market Value For Housing Supplied By Employer, Health Insurance, Meat, Etc.
(2) Includes Cash Wages, Perquisites, and Employment Taxes Paid by Employer

Source: *Cost of production, 2007, California Department of Food and Agriculture (CDFA)*

Water and Feed Costs

The San Bernardino County General Plan indicates that increasing cost of water is another reason for the conversion of agricultural land into other uses. Dairying itself does not need as much water, but increasing cost and lower supply of water affects the feed supply for dairy. Dairy producers rely on alfalfa produced in the state as the source for their feed supply. If production of alfalfa is curtailed, the dairy farmers will incur high costs in getting the feed from outside the area.

Waste Disposal Costs

It is estimated that the cows in Chino corrals[1] produce 500,000 tons of manure every year. With nearby farmland, encroached by urbanization, the cost of waste disposal increases, as distances to where the waste can be disposed increases, as well as the frequency of disposal that is required. As a result many farmers need to hire professional corral cleaners, which increases costs by up to $50,000 a year.

Commercial/Industrial and Residential Development Trends

With historic growth in commercial/industrial/residential demand throughout southern California over the past 50 years, there has been a consistent growth in residential and commercial/industrial development activity on former agricultural lands throughout Orange County, Los Angeles County and more recently into Riverside and San Bernardino County. Since 1990, the Inland Empire has seen population growth of over 1.5 million people, and it is projected to add another 75,000 people each year over the coming decade. In the City of Chino, there have been almost 4,000 new housing units

[1] An enclosure for confining livestock

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built since 2000, with median housing prices tripling by 2007 (still more than doubling after the dramatic 2008 market declines).

Industrial development in the West Inland Empire region has seen similar growth with inventory increasing by 40 percent, or 75 million square feet since 2000. In Chino the growth has been over 50 percent, with 13 million square feet built in past eight years.

As a result of these trends, average land prices in the Inland Empire have increased to over $300,000 per acre, which compares to Kern County land values of less than $50,000 per acre

See Appendix Exhibits A-1 through A-6 for detailed trends in Chino/Inland Empire population, employment, residential building permits, home prices, industrial markets and land prices. Exhibit A-7 illustrates land sales in Kern County over the past three years.

Conclusion

Agriculture is being been significantly impacted by numerous economic, political and regulatory factors. As a result over 100,000 acres of farmland has been taken out of service since 1990 and is being redeveloped for residential, commercial and industrial uses. With massively lower land costs and less regulation, dairy operators have been steadily moving out of the Inland Empire towards Central Valley, Barstow and Kern County.

Continued agricultural operations are not financially feasible in western San Bernardino County. Agricultural operations of all types will continue to decline as a result of the economic forces at work impacting land owners. Agricultural operator's business decisions to cease production in western San Bernardino County will continue to occur regardless of land use decisions made by local agencies. In other words, land designated for agricultural use has little impact on the continued declining agricultural trends in western San Bernardino County.

Respectfully submitted,

Thomas R. Jirovsky
Senior Managing Director

Attachment

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Exhibit A-1:

POPULATION, HOUSEHOLD & EMPLOYMENT TRENDS

City of Chino and Inland Empire Region, 1990 - 2028

	1990	2000	2008	2013	2018	2023	2028	
City of Chino								
Population	59,542	67,159	80,840	87,171	95,363	103,310	110,925	
Households	15,591	17,302	20,037	22,439	25,267	28,129	31,011	
Employment (1)	--	34,055	40,083	43,601	46,369	49,176	52,014	
Inland Empire								
Population	2,588,793	3,254,821	4,170,780	4,412,362	4,860,408	5,288,378	5,694,330	
Households	866,804	1,034,812	1,297,214	1,408,835	1,589,394	1,770,540	1,951,244	
Employment (1)	--	1,121,464	1,403,755	1,622,181	1,837,011	2,055,234	2,276,332	
Growth - #		**1990-2000**	**2000-08**	**2008-13**	**2013-18**	**2018-23**	**2023-28**	**2008-28 Total**
City of Chino								
Population		7,617	13,681	6,331	8,192	7,947	7,615	30,085
Households		1,711	2,735	2,402	2,828	2,862	2,882	10,974
Employment (1)		--	6,028	3,518	2,769	2,806	2,838	11,931
Inland Empire								
Population		666,028	915,959	241,582	448,046	427,970	405,952	1,523,550
Households		168,008	262,402	111,621	180,559	181,147	180,704	654,030
Employment (1)		--	282,291	218,426	214,830	218,223	221,097	872,577
Growth - % CAGR		**1990-2000**	**2000-08**	**2008-13**	**2013-18**	**2018-23**	**2023-28**	**2008-28**
City of Chino								
Population		1.2%	2.3%	1.5%	1.8%	1.6%	1.4%	1.6%
Households		1.0%	1.9%	2.3%	2.4%	2.2%	2.0%	2.2%
Employment (1)		--	2.1%	1.7%	1.2%	1.2%	1.1%	1.3%
Inland Empire								
Population		2.3%	3.1%	1.1%	2.0%	1.7%	1.5%	1.6%
Households		1.8%	2.9%	1.7%	2.4%	2.2%	2.0%	2.1%
Employment (1)		--	2.8%	2.9%	2.5%	2.3%	2.1%	2.4%

Sources: Southern California Association of Governments (SCAG); Claritas; and CBRE Consulting

(1) Daytime employment data available from the year 2000.

(2) Projections based on forecast growth rates in population, households and employment according to SCAG.

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Exhibit A-2:
RESIDENT EMPLOYMENT TRENDS BY INDUSTRY & OCCUPATION
US Census, 1990 and 2000

	City of Chino, California					Inland Empire Region, CA				
	1990		2000		Change	1990		2000		Change
	#	%	#	%	('90-'00)	#	%	#	%	('90-'00)
RESIDENT EMPLOYMENT BY INDUSTRY										
Agriculture, forestry, and fisheries	**995**	*4.0%*	**378**	*1.4%*	**-62.0%**	**36,314**	*3.4%*	**18,997**	*1.5%*	**-47.7%**
Construction	2,172	*8.6%*	1,904	*7.1%*	-12.3%	109,894	*10.2%*	105,268	*8.3%*	-4.2%
Manufacturing	5,062	*20.1%*	4,660	*17.3%*	-7.9%	161,282	*14.9%*	157,003	*12.4%*	-2.7%
Transportation, Communication & Utilities	1,921	*7.6%*	1,907	*7.1%*	-0.7%	79,357	*7.4%*	78,459	*6.2%*	-1.1%
Wholesale trade	1,148	*4.6%*	1,355	*5.0%*	18.0%	44,018	*4.1%*	48,574	*3.8%*	10.4%
Retail trade	4,324	*17.2%*	3,360	*12.5%*	-22.3%	191,714	*17.8%*	160,926	*12.7%*	-16.1%
Finance, insurance, and real estate	1,811	*7.2%*	1,772	*6.6%*	-2.2%	68,174	*6.3%*	71,208	*5.6%*	4.5%
Services	6,404	*25.4%*	10,402	*38.6%*	62.4%	333,481	*30.9%*	557,909	*44.1%*	67.3%
Public administration	1,344	*5.3%*	1,243	*4.6%*	-7.5%	55,394	*5.1%*	65,784	*5.2%*	18.8%
RESIDENT EMPLOYMENT BY OCCUPATION										
Managerial & professional specialty	5,777	*22.9%*	7,702	*28.5%*	33.3%	253,002	*23.4%*	353,835	*28.0%*	39.9%
Technical, sales, & administrative support	8,655	*34.4%*	7,920	*29.4%*	-8.5%	338,842	*31.4%*	343,542	*27.2%*	1.4%
Service occupations, excl. Farming	6,098	*24.2%*	3,649	*13.5%*	-40.2%	297,318	*27.5%*	210,174	*16.6%*	-29.3%
Farming, forestry, & fishing	**825**	*3.3%*	**230**	*0.9%*	**-72.1%**	**31,593**	*2.9%*	**12,539**	*1.0%*	**-60.3%**
Operators, fabricators, & laborers	3,826	*15.2%*	7,480	*27.7%*	95.5%	158,873	*14.7%*	344,038	*27.2%*	116.5%

Sources: US Census 1990 and 2000; and, CBRE Consulting

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Exhibit A-3:

RESIDENTIAL BUILDING PERMIT TRENDS

City of Chino and Inland Empire, 2003 - 2008 YTD

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008 YTD (1)	Total
CITY OF CHINO											
Number of Units											
Single Family	208	97	213	290	133	461	548	1,530	270	233	3,983
2-4 Units	2	0	0	6	0	6	3	2	10	11	40
Over 5 Units	0	0	0	0	0	46	0	0	5	0	51
Total	**210**	**97**	**213**	**296**	**133**	**513**	**551**	**1,532**	**285**	**244**	**4,074**
INLAND EMPIRE											
Number of Units											
Single Family	18,776	18,824	23,588	29,876	35,965	43,029	43,911	33,001	15,807	5,723	268,500
2-4 Units	154	169	335	323	719	1,085	971	943	717	218	5,634
Over 5 Units	1,730	2,198	3,486	2,103	5,568	7,206	3,887	3,609	3,346	2,667	35,800
Total	**20,660**	**21,191**	**27,409**	**32,302**	**42,252**	**51,320**	**48,769**	**37,553**	**19,870**	**8,608**	**309,934**

Source: US Census Bureau; and CBRE Consulting

(1) Year-to-date figures are through November.

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Exhibit A-4:
SINGLE FAMILY DETACHED AND CONDOMINIUM RESALES AND MEDIAN PRICES
1999 - 2008 YTD

	1999	2000	2001	2002	2003	2004	2005	2006	2007	CAGR (1) 1999-2007	2008 YTD (2)
CITY OF CHINO											
Single Family Detached											
Number of Sales	771	742	734	824	807	812	892	638	383	-8.4%	390
Median Price	$165,000	$180,000	$200,000	$245,000	$293,000	$393,000	$468,000	$510,000	$493,000	14.7%	$348,828
Median Price per Sq. Ft.	$107	$117	$130	$150	$186	$242	$282	$316	$299	13.7%	$205
Condominium											
Number of Sales	176	177	249	227	270	297	249	199	114	-5.3%	75
Median Price	$89,000	$101,000	$213,000	$139,000	$172,000	$257,000	$350,000	$360,000	$349,000	18.6%	$220,000
INLAND EMPIRE (3)											
Single Family Detached											
Number of Sales	53,616	53,280	53,402	60,923	66,117	71,107	77,105	57,655	34,418	-5.4%	47,428
Median Price	$114,093	$127,093	$147,072	$169,301	$209,463	$279,000	$351,000	$384,000	$371,000	15.9%	$237,000
Median Price per Sq. Ft.	$80	$89	$100	$114	$139	$183	$225	$243	$219	13.4%	$129
Condominium											
Number of Sales	7,907	8,241	7,523	9,135	9,556	10,125	9,208	6,234	4,526	-6.7%	3,818
Median Price	$110,654	$125,616	$134,856	$156,656	$185,689	$246,000	$305,000	$324,000	$309,000	13.7%	$235,000

Source: DataQuick; and CBRE Consulting

(1) CAGR is the Compounded attached product.
(2) Through November of 2008.
(3) Counties of Riverside and San Bernardino.

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Exhibit A-5:

INDUSTRIAL MARKET TRENDS (Including Manufacturing, Warehouse/ Distribution and Flex/ R&D Space)

All Industrial Space, 2000 - 2008

Annual Trend by Market Area	SUPPLY				DEMAND				LEASE RATE ($/ SF/ Yr.) (1,2)
	Inventory Bldgs.	Inventory GLA (SF)	Vacancy Rate % (1)	SF Delivered	Availability Rate % (1)	Total Deals	Total SF Leased	SF Net Absorption	
CITY OF CHINO									
2000	700	26,193,974	6.3%	1,324,718	6.2%	48	2,837,298	2,066,088	$4.22
2001	740	29,556,952	9.1%	3,356,978	7.0%	69	3,992,191	1,143,131	4.23
2002	746	30,987,160	9.5%	1,430,208	6.7%	62	1,837,843	2,333,176	4.22
2003	759	31,808,016	6.9%	840,856	5.3%	70	3,269,765	1,233,039	4.28
2004	810	34,244,597	5.8%	2,436,581	4.8%	58	2,298,219	2,646,719	4.05
2005	839	35,806,075	6.0%	1,561,478	3.2%	49	4,086,926	1,408,611	4.37
2006	890	36,983,611	4.1%	1,177,536	3.2%	90	2,519,670	1,741,256	4.89
2007	920	37,807,715	3.5%	824,104	1.9%	79	3,439,874	1,253,582	5.27
2008	940	39,388,723	3.8%	1,532,073	3.0%	92	1,272,884	236,914	5.62
Total				**14,484,532**		617	25,554,670	14,062,516	
INLAND EMPIRE - WEST									
2000	4,525	182,350,197	7.0%	11,832,057	6.0%	327	20,719,392	11,652,452	$4.33
2001	4,647	196,559,678	9.1%	14,229,605	7.0%	386	16,767,690	7,590,465	4.10
2002	4,733	205,652,089	9.7%	9,112,241	8.0%	449	14,359,710	10,426,034	4.07
2003	4,846	212,236,879	8.1%	6,616,190	6.9%	420	17,009,833	8,889,859	4.10
2004	5,020	221,351,863	6.7%	9,114,984	5.1%	520	15,696,199	11,621,860	4.16
2005	5,193	231,106,533	5.9%	9,754,670	4.1%	428	17,533,422	9,322,643	4.37
2006	5,354	241,718,326	6.6%	10,693,858	5.2%	556	14,797,337	7,318,331	4.76
2007	5,517	247,095,120	4.9%	5,357,915	3.5%	492	18,765,295	10,781,364	5.28
2008	5,605	256,069,663	7.0%	8,902,188	6.3%	656	12,466,952	(807,685)	5.50
Total				**85,613,708**		4,234	148,115,830	76,795,323	

Sources: Costar Group Inc., 2008; and, CBRE Consulting

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Exhibit A-6:

LAND SALES IN THE CITY OF CHINO

5+ Acres' Land Sales, 2005 - 2008

#	Property Location		Property Characteristics				Sales Characteristics		
	Address	Property Name	Land Improvements	Zoning	Acres	Land SF	Sale Date	Sale Price	$/Acre
1	8649 Merrill Ave	Land			83.5	3,635,082	11/30/2006	$36,050,400	$432,000
2	8711 Pine Ave	Single Family Residence Site	Previously developed lot	LDR, Chino	51.3	2,233,321	4/17/2006	14,242,000	277,784
3	Bickmore Ave	Warehouse/distribution Site	Raw land	M2, Chino	33.2	1,444,014	10/4/2005	14,229,525	429,247
4	7851 Bickmore Ave	H & R Westra Dairy Land	Raw land	N/Av,Chino	27.7	1,206,612	6/30/2006	6,248,000	225,560
5	4619 Eucalyptus Ave	26.67 acres		C	26.7	1,161,745	11/9/2006	6,774,500	254,012
6	Riverside Dr	Single Family Residence Site	Not Available	N/Av, Chino	23.6	1,028,016	3/29/2006	4,250,000	180,085
7	Mountain Ave	M2 Zoned Acreage	Raw land	M2, Chino	19.1	832,919	11/4/2005	1,102,000	57,632
8	7850 Bickmore Ave	Mdr Zoned Land	None	MDR, Chino	18.8	817,246	10/5/2005	6,097,000	324,976
9	Kimball Ave	Lewis Preserve	Finished lot	PD, Chino	18.8	817,185	7/15/2005	11,300,000	602,346
10	4500 Chino Hills Pky	The Village At Chino Walk	Raw land	CO, Chino	12.8	558,439	2/10/2006	7,889,000	615,367
11	13945 Ramona Ave	Planned Industrial Development Site	Fully Improved Lot	M2, Chino	9.0	392,911	11/3/2005	935,000	103,659
12	7.19 Acres Mountain Ave				7.2	313,196	9/4/2007	725,000	100,835
13	15757 Mountain Ave				6.2	270,072	10/12/2006	5,075,000	818,548
14	Kimball Ave	58 Lot Condominums Site	Raw land	RD8, Chino	6.1	266,587	7/22/2005	7,431,000	1,214,217
15	12594 Roswell Ave		Previously developed lot	RD-20M	4.9	214,315	7/22/2005	1,100,000	223,577
16	13116-13142 Norton Ave	Residential Zoned Acreage		RS-1, SB County	4.8	211,004	9/19/2006	1,625,000	335,468
							Land Sales Avg.:		**$353,718**
							Land Sales Median:		**$301,380**

Sources: Costar Group Inc., 2008; and, CBRE Consulting

- The above is not an exhaustive list of sales. Only those sales greater than 5 acres in size with complete sale price information as reported by the Costar Group are presented.

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Exhibit A-7:

LAND SALES IN KERN COUNTY

Commercial, Industrial and Residential Land Sales, 2005 - 2008

#	Property Location		Property Characteristics				Sales Characteristics		
	Address in City of Chino	City	Property Name/Land Imp.	Zoning	Acres	Land SF	Sale Date	Sale Price	$/Acre
1	SE Elmo Hwy @ Elmo Hwy & Browning Rd	Mc Farland	Falcon Heights		135.0	5,880,600	11/15/2007	$2,142,000	$15,867
2	Pacheco Rd	Bakersfield	Vacant Land 67.57 Acres	M-3, Bakersfield	67.6	2,943,349	10/10/2008	2,500,000	36,999
3	1234 Willow Springs Rd	Mojave			40.0	1,742,400	12/19/2008	128,000	3,200
4	Scofield Rd	Wasco	Wasco Valley Rose - vacant land		40.0	1,742,400	9/29/2006	1,999,582	49,990
5	Mojave Tropical Rd	Rosamond			40.0	1,742,400	6/7/2007	335,000	8,375
6	NW Hanawalt Ave @ Hanawalt & Mast Ave	Mc Farland	Sierra Springs		38.2	1,665,655	11/15/2007	599,000	15,665
7	16701 Brimhall Rd	Bakersfield		E-1 RS, Bakersfield	35.0	1,524,164	12/7/2007	2,000,000	57,159
8	17174 Highway 14	Mojave		M-2	34.4	1,496,286	2/22/2008	550,000	16,012
9	4057-4061 Industrial Pky	Lebec	Tejon Industrial Complex - Bldg. U.C.		23.8	1,034,550	7/1/2008	2,500,000	105,263
10	College Heights Blvd @ Kendall Avenue	Ridgecrest	Villas at College Heights		22.7	988,812	3/22/2007	2,300,000	101,322
11	Stockdale Hwy @ Heath	Bakersfield		Commercial	20.0	871,200	5/1/2007	3,600,000	180,000
12	Archibald Ave	Maricopa	Parcel 4		20.0	871,200	4/20/2007	165,000	8,250
13	Johnson Rd @ Driver	Bakersfield		A-1	20.0	871,200	9/11/2007	1,000,000	50,000
14	Wheeler Ridge Rd @ Creekside Dr.	Arvin	Wheeler Ridge Site		19.5	847,242	11/17/2008	379,990	19,537
15	132 White Ln	Bakersfield	3 Buildings apx 2,555 SF	Light Industrial	15.5	673,002	11/28/2007	1,300,000	84,142
16	Avenue A & 120th W	Rosamond	no zoning restrictions		14.5	631,620	1/24/2007	125,000	8,621
17	Henry Rd	Taft		M-2	14.3	620,730	2/5/2008	505,000	35,439
18	NWC McCutchen & Gosford Rd	Bakersfield		C2	10.0	435,600	6/15/2007	2,275,000	227,500
19	Compagnoni St	Bakersfield			10.0	435,600	9/21/2007	650,000	65,000
20	Mercedes Blvd	California City	10 Acres	R2.5	10.0	435,600	5/4/2007	25,000	2,500
21	Redrock Randsburg Rd	North Edwards	Vacant Land-10 Acres		10.0	435,600	5/26/2006	20,000	2,000
22	Eucalyptus Dr (2 Properties)	Bakersfield	Multi-Property Sale		9.6	418,176	11/9/2007	980,000	102,083
23	5901 Mills Rd	Bakersfield	Mills Road Land		8.8	381,150	9/12/2007	820,000	93,714
24	S China Lake Blvd @ Bowmen Ave.	Ridgecrest	NEC of S. China Lake @ Bowman	GC, Ridgecrest	6.9	302,306	7/3/2008	1,500,000	216,139
25	1245 Kern St	Taft			6.4	279,655	8/31/2007	200,000	31,153
26	N Norma St @ West Ward Avenue	Ridgecrest		R-2	6.0	259,618	10/4/2006	420,000	70,470
27	W Day Ave @ Airport Drive	Bakersfield			5.8	250,470	10/4/2007	1,300,000	226,087
				Residential Land Sales Avg.:					**$44,347**
				Residential Land Sales Median:					**$49,990**

Sources: Costar Group Inc., 2008; and, CBRE Consulting

- The above is not an exhaustive list of sales. Only those sales greater than 5 acres in size with complete sale price information as reported by the Costar Group are presented.

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March 18, 2009

Matt Englhard
Regional Development Officer
First Industrial Realty Trust, Inc.
114 Pacifica, Suite 220
Irvine, CA 92618

Re: Economic Viability of Agriculture in the East Inland Empire

Dear Mr. Englhard:

Per your request CBRE Consulting has examined the economic and market trends affecting agriculture operations throughout California, with particular attention to the specific challenges relative to the communities of Perris and Sun City in eastern Riverside County area of the Inland Empire.

Founded in 1978 as Sedway Group, CBRE Consulting is a nationally recognized full-service real estate and urban economics consulting firm with offices in Los Angeles and San Francisco. CBRE brings a multi-disciplined approach to property evaluation of all major land use types. CBRE specializes in real estate market analysis, economic development studies for residential, commercial and industrial projects throughout California and the western United States.

BACKGROUND

The Inland Empire once held the largest concentration of dairies and supporting agriculture (e.g., alfalfa farming) in the world. This region is now facing tremendous urbanization and development pressures. The agricultural land is continually declining in the Inland Empire. According to the State of California, Department of Conservation, Riverside County lost 50,000 acres of farmland from 1990 through 2002. San Bernardino County lost 47,000 acres in prime farmland over the same period.

For this analysis, CBRE performed an extensive internet/literature search relative to the economics of agricultural and dairy farming to understand the economic and other challenges to continued agriculture uses in the Inland Empire. CBRE also gathered relevant demographic, real estate and other economic data to illustrate historic and projected land use trends near Perris and the eastern Inland Empire.

There are many factors which demonstrate the infeasibility of agriculture production in Eastern Inland Empire, resulting in many dairy operators and supporting agricultural operations moving to Kern County.

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- Urbanization in the Inland Empire, resulting in dramatically increasing land prices,
- Higher water and labor costs;
- Environmental regulation (insects, odors, ground water contamination and solid waste removal) and,
- Competition from Kern County and the Central Valley with lower land costs and reduced regulations

1. **Increasing Land Values**
   Due to competing land uses, land prices have increased dramatically in the area in excess of $250,000 per acre. It has become more profitable for farmers to sell their land for a premium and relocate to a different area. The adoption of various General Plans in the Inland Empire emphasizing significant residential and commercial development have also encouraged the farmers to sell their land and relocate.

2. **Conflicts between Urban Neighbors and Dairy Farms**
   The proximity of agriculture and urban development in the Inland Empire region bring with it many conflicts. There is an increase in the land use incompatibility with nuisance complaints from the urban neighbors regarding flies, farm odors, early morning noise, and also water and air pollution. The farmers also face pressures due to increased water and land-use restrictions.

3. **Increasingly Stringent Environmental Regulations**
   The Region 8 Water Board, which encompasses Perris, was among the first to develop environmental regulations to control dairy operations, with increasing restrictions imposed in 1994, 1999 and 2004, as the proximity of urban neighborhoods, contamination of ground water and air pollution started raised more concerns.

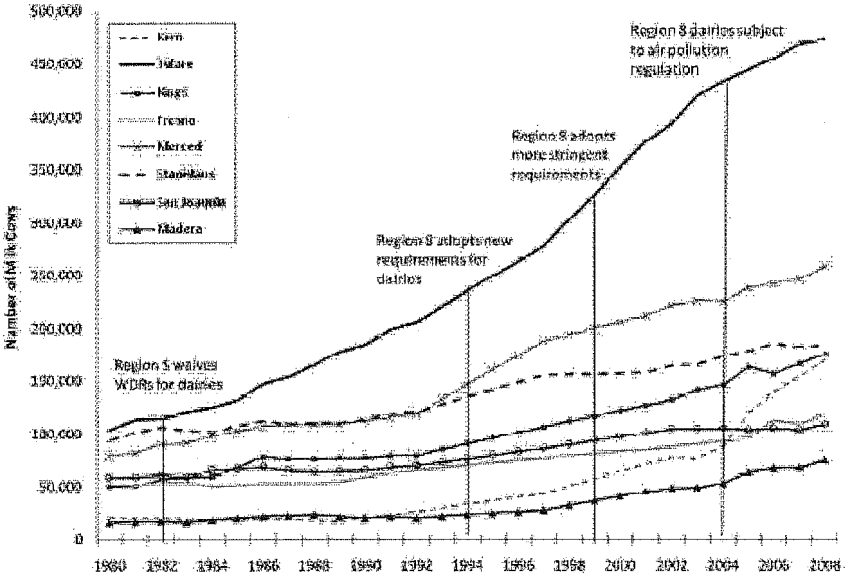
4. **Competition from Central Valley**
   The dairy farmers in the Inland Empire face stiff competition from the farmers in the Central Valley because of high operating costs, including high feed costs and the cost of manure disposal.

   A study published in Agriculture and Resource Economics Review in 2008 demonstrated the effect of environmental regulations over time and the growth in dairy industries, attributed to the cheap land and relatively weak regulations in the Central Valley.

   According to CDFA, milk production has declined by approximately 45 percent in Riverside County between 2002 and 2007, while production increased by 88 percent in Kern County.

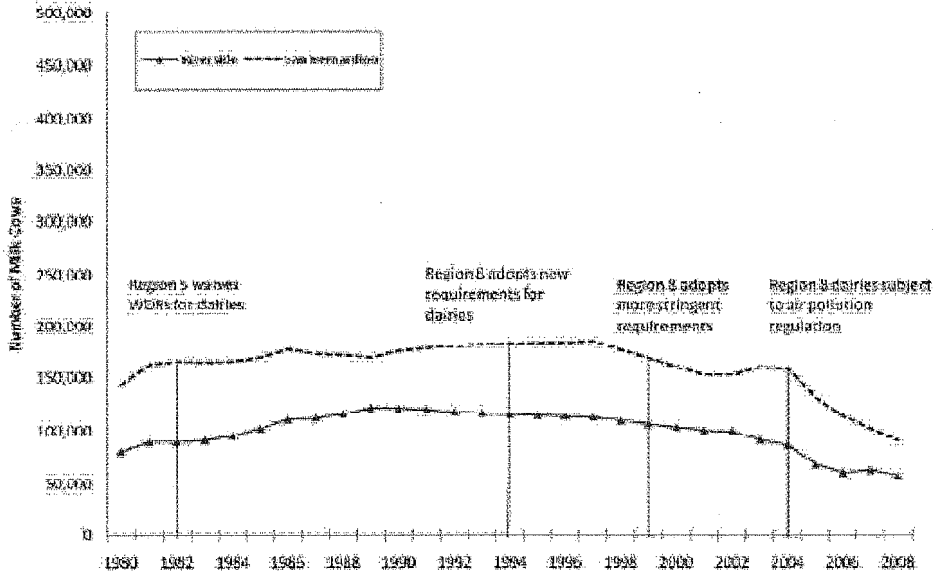
   Figures 1 and 2 on the following page show trends in the number of milk cows in the Central Valley (Region 5) as compared to the loss in Region 8 from 1980 to 2008.

Figure: 1
Milk Cows in Counties of Region 5 Central Valley



Source: Steeringer and Hogle, 2008

Figure: 2
Milk Cows in Region 8 – Inland Empire



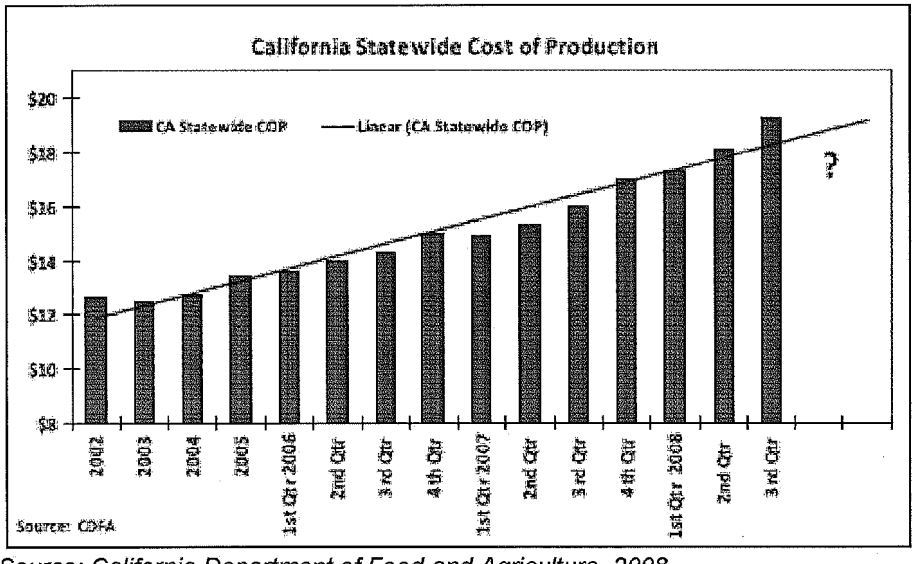
Source: Steeringer and Hogle, 2008

The Central Valley farmers also face few development pressures as compared to the Inland Empire and they benefit from diverse farm economy. For example, the farmers use dairy waste to fertilize their own crops or of the neighbors. They also use agricultural waste from neighboring farms as feed. This reduces their waste disposal and feed costs.

5. Operating Costs

According to the CDFA, production costs in dairy industry have risen by 50 percent since 2002 in California, putting more pressure on dairy farmers to cut other costs. Figure 3 below shows the growth in cost of production per CWT from 2002 to 3rd quarter 2008.

Figure 3
Cost of Production in the California Dairy Industry



Source: California Department of Food and Agriculture, 2008

Labor Costs

There is a shortage of labor in the dairy industry. Many agricultural workers are looking for higher paying jobs in non-agricultural industries according to the CDFA, which makes it difficult for the dairy farmers to compete for labor and leads to increased labor costs.

The issue of immigration and compliance also leads to labor problems. As shown in Figure 4 there is significant difference in labor costs in the different milk-producing regions of California. In the chart, South Valley represents the counties of the Central Valley composed of Fresno, Kings, Tulare and Kern County. Overall labor costs are 25 percent higher in the Southern California region as compared to the statewide average.

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Figure 4 – Labor Costs, 2007

Labor Costs	North Coast	North Valley	South Valley	Southern California	2007 State Average
Per Hired Milker					
Hourly Cash Wage	$8.77	$10.29	$9.82	$12.38	$10.02
Hourly Perquisites (1)	1.84	2.24	0.95	1.49	1.40
Hourly Wage (2)	12.53	14.60	12.67	16.52	13.40
Per Hired Labor					
Hourly Cash Wage	8.87	10.88	11.36	13.79	11.18
Hourly Perquisites (1)	1.58	2.49	1.44	1.52	1.86
Hourly Wage (2)	12.40	15.56	14.94	18.18	15.21
Per All Hired					
Hourly Cash Wage	8.81	10.55	10.37	12.89	10.47
Hourly Wage (2)	12.48	15.03	13.48	17.12	14.10

(1) Includes Fair Market Value For Housing Supplied By Employer, Health Insurance, Meat, Etc.
(2) Includes Cash Wages, Perquisites, and Employment Taxes Paid by Employer

Source: *Cost of production, 2007, California Department of Food and Agriculture (CDFA)*

Water and Feed Costs

Increasing cost of water is another reason for the conversion of agricultural land into other uses. Dairying itself does not need as much water, but increasing cost and lower supply of water affects the feed supply for dairy. Dairy producers rely on alfalfa produced in the state as the source for their feed supply. If production of alfalfa is curtailed, the dairy farmers will incur high costs in getting the feed from outside the area.

Waste Disposal Costs

The livestock at dairy farms produce significant tonnage of manure every year. With nearby farmland, encroached by urbanization, the cost of waste disposal increases, as distances to where the waste can be disposed increases, as well as the frequency of disposal that is required. As a result many farmers need to hire professional corral cleaners, which increases costs by up to $50,000 a year.

Commercial/Industrial and Residential Development Trends

With historic growth in commercial/industrial/residential demand throughout southern California over the past 50 years, there has been a consistent growth in residential and commercial/industrial development activity on former agricultural lands throughout Orange County, Los Angeles County and more recently into Riverside and San Bernardino County. Since 1990, the Inland Empire has seen population growth of over 1.5 million people, and it is projected to add another 75,000 people each year over the coming decade. In the City of Perris, there have been almost 4,500 new housing units built since 2000, with median housing prices more than tripling by 2007, and still nearly doubling after the dramatic 2008 market declines.

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Industrial development in the East Inland Empire region has seen similar growth with inventory increasing by 60 percent, or 92 million square feet since 2000. In Perris the growth has been nearly 100 percent, with 5 million square feet built in past eight years.

As a result of these trends, average land prices in the Inland Empire have increased to over $250,000 per acre, which compares to Kern County land values of less than $50,000 per acre

See Appendix Exhibits A-1 through A-6 for detailed trends in Perris/Inland Empire population, employment, residential building permits, home prices, industrial markets and land prices. Exhibit A-7 illustrates land sales in Kern County over the past three years.

Conclusion

Agriculture is being been significantly impacted by numerous economic, political and regulatory factors. As a result over 100,000 acres of farmland has been taken out of service since 1990 and is being redeveloped for residential, commercial and industrial uses. With lower land costs and less regulation, dairy operators and supporting agricultural uses such as dry farming and alfalfa production have been steadily moving out of the Inland Empire towards Central Valley, Barstow and Kern County.

Continued agricultural operations are not financially feasible in the Perris/eastern Riverside County region. Agricultural operations of all types will continue to decline as a result of the economic forces at work impacting land owners. Agricultural operator's business decisions to cease production will continue to occur regardless of land use decisions made by local agencies. In other words, land designated for agricultural use has little impact on the continued declining agricultural trends in Perris/eastern Riverside County.

Respectfully submitted,

Thomas R. Jirovsky
Senior Managing Director

Attachment

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Exhibit A-1:

POPULATION, HOUSEHOLD & EMPLOYMENT TRENDS

City of Perris and Inland Empire Region, 1990 - 2029

	1990	2000	2009	2014	2019	2024	2029	
City of Perris								
Population	22,202	36,189	54,592	62,440	69,956	77,175	83,601	
Households	6,848	9,652	14,160	16,300	18,032	19,808	21,616	
Employment (1)	--	11,715	17,332	19,042	20,108	22,194	24,810	
Inland Empire								
Population	2,588,793	3,254,821	4,170,780	4,505,315	4,950,365	5,373,155	5,774,903	
Households	866,804	1,034,812	1,297,214	1,445,415	1,626,549	1,807,342	1,988,035	
Employment (1)	--	1,121,464	1,450,397	1,665,604	1,881,342	2,099,942	2,321,648	
Growth - #		**1990-00**	**2000-09**	**2009-14**	**2014-19**	**2019-24**	**2024-29**	**2009-29 Total**
City of Perris								
Population		13,987	18,403	7,848	7,516	7,219	6,426	29,009
Households		2,804	4,508	2,140	1,732	1,776	1,808	7,456
Employment (1)		--	5,617	1,710	1,066	2,086	2,616	7,478
Inland Empire								
Population		666,028	915,959	334,535	445,050	422,791	401,748	1,604,123
Households		168,008	262,402	148,201	181,134	180,793	180,693	690,821
Employment (1)		--	328,933	215,207	215,738	218,600	221,706	871,251
Growth - % CAGR		**1990-00**	**2000-09**	**2009-14**	**2014-19**	**2019-24**	**2024-29**	**2009-29**
City of Perris								
Population		5.0%	4.7%	2.7%	2.3%	2.0%	1.6%	2.2%
Households		3.5%	4.4%	2.9%	2.0%	1.9%	1.8%	2.1%
Employment (1)		--	4.4%	1.9%	1.1%	2.0%	2.3%	1.8%
Inland Empire								
Population		2.3%	2.8%	1.6%	1.9%	1.7%	1.5%	1.6%
Households		1.8%	2.5%	2.2%	2.4%	2.1%	1.9%	2.2%
Employment (1)		--	2.9%	2.8%	2.5%	2.2%	2.0%	2.4%

Sources: Southern California Association of Governments (SCAG); Claritas; and CBRE Consulting

(1) Daytime employment data available from the year 2000.

(2) Projections based on forecast growth rates in population, households and employment according to SCAG.

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Exhibit A-2:

RESIDENT EMPLOYMENT TRENDS BY INDUSTRY & OCCUPATION

US Census, 1990 and 2000

	City of Perris, California					Inland Empire Region, CA				
	1990		2000		Change	1990		2000		Change
	#	%	#	%	('90-'00)	#	%	#	%	('90-'00)
RESIDENT EMPLOYMENT BY INDUSTRY										
Agriculture, forestry, and fisheries	**389**	*5.0%*	**97**	*0.8%*	**-75.1%**	**36,314**	*3.4%*	**18,997**	*1.5%*	**-47.7%**
Construction	965	*12.4%*	1,352	*11.3%*	40.1%	109,894	*10.2%*	105,268	*8.3%*	-4.2%
Manufacturing	1,668	*21.4%*	2,233	*18.7%*	33.9%	161,282	*14.9%*	157,003	*12.4%*	-2.7%
Transportation, Communication & Utilities	484	*6.2%*	634	*5.3%*	31.0%	79,357	*7.4%*	78,459	*6.2%*	-1.1%
Wholesale trade	242	*3.1%*	474	*4.0%*	95.9%	44,018	*4.1%*	48,574	*3.8%*	10.4%
Retail trade	1,274	*16.3%*	1,563	*13.1%*	22.7%	191,714	*17.8%*	160,926	*12.7%*	-16.1%
Finance, insurance, and real estate	400	*5.1%*	408	*3.4%*	2.0%	68,174	*6.3%*	71,208	*5.6%*	4.5%
Services	2,019	*25.9%*	4,653	*39.0%*	130.5%	333,481	*30.9%*	557,909	*44.1%*	67.3%
Public administration	357	*4.6%*	520	*4.4%*	45.7%	55,394	*5.1%*	65,784	*5.2%*	18.8%
RESIDENT EMPLOYMENT BY OCCUPATION										
Managerial & professional specialty	1,357	*17.4%*	2,110	*17.7%*	55.5%	253,002	*23.4%*	353,835	*28.0%*	39.9%
Technical, sales, & administrative support	2,042	*26.2%*	2,967	*24.9%*	45.3%	338,842	*31.4%*	343,542	*27.2%*	1.4%
Service occupations, excl. Farming	2,327	*29.8%*	2,071	*17.4%*	-11.0%	297,318	*27.5%*	210,174	*16.6%*	-29.3%
Farming, forestry, & fishing	**345**	*4.4%*	**52**	*0.4%*	**-84.9%**	**31,593**	*2.9%*	**12,539**	*1.0%*	**-60.3%**
Operators, fabricators, & laborers	1,727	*22.1%*	4,734	*39.7%*	174.1%	158,873	*14.7%*	344,038	*27.2%*	116.5%

Sources: US Census 1990 and 2000; and, CBRE Consulting

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Exhibit A-3:

RESIDENTIAL BUILDING PERMIT TRENDS

City of Perris and Inland Empire, 10-Year Trends

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
CITY OF PERRIS											
Number of Units											
Single Family	186	9	145	492	1,269	1,573	1,746	812	599	107	6,938
2-4 Units	4	8	0	0	0	0	0	0	0	0	12
Over 5 Units	76	62	0	186	0	0	0	0	96	0	420
Total	**266**	**79**	**145**	**678**	**1,269**	**1,573**	**1,746**	**812**	**695**	**107**	**7,370**
INLAND EMPIRE											
Number of Units											
Single Family	18,776	18,824	23,588	29,876	35,965	43,029	43,911	33,001	15,807	5,723	268,500
2-4 Units	154	169	335	323	719	1,085	971	943	717	218	5,634
Over 5 Units	1,730	2,198	3,486	2,103	5,568	7,206	3,887	3,609	3,346	2,667	35,800
Total	**20,660**	**21,191**	**27,409**	**32,302**	**42,252**	**51,320**	**48,769**	**37,553**	**19,870**	**8,608**	**309,934**

Source: US Census Bureau; and CBRE Consulting

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Exhibit A-4:
SINGLE FAMILY DETACHED AND CONDOMINIUM RESALES AND MEDIAN PRICES
1999 - 2008 YTD

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	CAGR(1) 1999-2008
CITY OF PERRIS											
Single Family Detached											
Number of Sales	1,042	970	919	976	1,069	1,166	1,657	1,466	638	1,670	5.4%
Median Price	$81,246	$94,597	$116,899	$133,884	$170,564	$241,973	$326,336	$372,010	$348,354	$183,635	9.5%
Median Price per Sq. Ft.	$62	$72	$87	$101	$126	$178	$224	$240	$207	$96	5.1%
Condominium											
Number of Sales	0	0	0	0	1	0	0	0	0	6	n.a.
Median Price	$0	$0	$0	$0	$140	$0	$0	$0	$0	$138	n.a.
INLAND EMPIRE (2)											
Single Family Detached											
Number of Sales	53,616	53,280	53,402	60,923	66,117	71,107	77,105	57,655	34,418	53,947	0.1%
Median Price	$114,093	$127,093	$147,072	$169,301	$209,463	$279,000	$351,000	$384,000	$371,000	$231,000	8.2%
Median Price per Sq. Ft.	$80	$89	$100	$114	$139	$183	$225	$243	$219	$125	5.0%
Condominium											
Number of Sales	7,907	8,241	7,523	9,135	9,556	10,125	9,208	6,234	4,526	4,095	-7.1%
Median Price	$110,654	$125,616	$134,856	$156,656	$185,689	$246,000	$305,000	$324,000	$309,000	$220,000	7.9%

Source: DataQuick; and CBRE Consulting

(1) CAGR is the Compounded annual growth rate.
(2) Counties of Riverside and San Bernardino.

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Exhibit A-5:

INDUSTRIAL MARKET TRENDS (Including Manufacturing, Warehouse/ Distribution and Flex/ R&D Space)

All Industrial Space, 2000 - 2008

Annual Trend by Market Area	SUPPLY				DEMAND				LEASE RATE ($/SF/Yr.) (1,2)
	Inventory Bldgs.	Inventory GLA (SF)	Vacancy Rate % (1)	SF Delivered	Availability Rate % (1)	Total Deals	Total SF Leased	SF Net Absorption	
CITY OF PERRIS SUB-MARKET									
2000	141	5,373,641	0.6%	38,110	0.6%	1	1,272,500	51,860	$4.88
2001	146	7,076,631	1.7%	1,702,990	1.6%	1	20,350	1,606,362	5.64
2002	146	7,076,631	2.1%	0	1.4%	2	115,960	5,509	4.68
2003	147	7,125,503	2.2%	48,872	2.2%	2	65,303	28,429	5.11
2004	150	7,381,220	1.0%	255,717	0.7%	0	17,800	367,551	n.a.
2005	153	7,595,862	0.9%	214,642	0.9%	2	2,500	165,460	n.a.
2006	157	7,663,213	1.3%	67,351	1.3%	3	3,458	4,173	5.72
2007	175	9,666,032	8.8%	2,002,819	8.7%	5	1,760,642	1,768,468	7.08
2008	206	10,458,307	11.1%	792,275	11.1%	13	38,674	(339,813)	6.74
Total				**5,122,776**		29	3,297,187	3,657,999	
INLAND EMPIRE - EAST MARKET									
2000	5,002	150,133,588	3.9%	6,630,360	3.6%	312	10,892,596	7,668,578	$6.50
2001	5,076	157,202,306	3.9%	7,068,718	3.1%	355	7,684,689	6,501,787	4.68
2002	5,182	161,820,506	4.3%	4,582,653	3.8%	404	6,636,531	2,394,637	4.57
2003	5,269	167,822,636	5.0%	6,098,659	4.3%	387	9,055,454	5,240,209	4.59
2004	5,470	176,211,830	4.6%	8,389,194	3.1%	500	8,017,923	9,626,436	4.98
2005	5,725	188,313,075	4.6%	12,120,753	3.6%	470	7,611,452	8,938,859	5.01
2006	6,055	208,029,558	7.5%	19,691,663	5.7%	545	13,195,412	13,006,436	5.90
2007	6,291	226,876,355	8.4%	18,563,797	7.5%	624	17,026,809	16,405,909	6.28
2008	6,541	242,869,862	13.0%	15,234,949	12.0%	996	12,632,717	1,932,294	5.71
Total				**98,380,746**		4,593	92,753,583	71,715,145	

Sources: Costar Group Inc., 2008; and, CBRE Consulting

(1) The sub-market is defined as a 5-mile radius from the City Hall and includes the entire City of Perris.

(2) Inland Empire East market, which comprises the City of Perris per Costar definition, also includes the Coachella Valley, Corona, East San Bernardino, Riverside, South Riverside and Outlying San Bernardino sub-markets.

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Exhibit A-6:

LAND SALES IN THE CITY OF PERRIS SUB-MARKET

5+ Acres Land Sales, 2006 - 2009

	Property Location		Property Characteristics					Sales Characteristics		
#	Address	Property Name	Land Improvements	Type	Zoning	Acres	Land SF	Sale Date	Sale Price	$/ Acre
1	Lukens Ln			Commercial	M3	36.7	1,599,087	9/21/2007	$500,000	$13,620
2	Nuevo Rd @ I-215	Nuevo & A St.		Commercial		6.0	261,360	7/27/2007	1,833,000	305,500
3	Dawson Rd @ San Jacinto			Commercial	RR	14.4	628,570	6/13/2007	1,734,000	120,166
4	Ethanac Rd @ McPherson r	5.0 Acres		Commercial	Commercial Commuity	5.0	217,800	5/17/2007	1,250,000	250,000
5	Nuevo Rd @ I-215	Nuevo & A St.		Commercial		6.0	261,360	5/10/2007	653,400	108,900
6	Morgan St	Hold For Development Site	Raw land	Commercial	CC, Perris	6.2	268,329	2/7/2007	1,895,000	307,631
7	9.24 acres Nuevo Rd	Vacant Land	None	Commercial	LI	9.2	402,494	1/24/2007	1,600,000	173,160
8	Old Nuevo Rd @ Perris Blvd		None	Commercial	C1	7.8	341,510	1/2/2007	4,960,000	632,654
9	23040 Rider St			Commercial		7.3	318,423	12/7/2006	875,000	119,699
10	Palomar Rd @ McLaughlin Rd			Commercial		18.2	794,098	11/15/2006	1,700,000	93,253
11	23641 Placentia Ave	Zoned Acreage	Not Available	Commercial	RR	9.5	412,077	9/5/2006	900,000	95,138
12	Redlands Ave	Sp Zoned Acreage	Raw land	Commercial	SP, Perris	20.7	901,774	8/25/2006	3,500,000	169,067
13	Citrus Ave	CC Zoned Acreage	Raw land	Commercial	CC, Perris	38.4	1,670,765	6/29/2006	7,087,000	184,771
14	Cajalco Rd	Acreage	Raw land	Commercial	N/Av, Riverside Co.	13.3	580,219	6/14/2006	2,800,000	210,210
15	23772 Water St	Indacochea Sheep Farm	Not Available	Commercial	N/Av	9.7	420,354	6/6/2006	1,650,000	170,984
16	28067 State Highway 74	R Zoned Acreage	Raw land	Commercial	RR, Riverside Co.	5.2	227,383	5/23/2006	1,275,000	244,253
17	Markham St	Unknown Site	Raw land	Commercial	A102, Riverside	9.7	422,967	3/3/2006	1,150,000	118,435
								Commercial Average:		**$158,336**
								Commercial Median:		**$170,984**
18	Mountain Ave	Future Cemex Location		Industrial	GI	5.0	218,235	12/5/2008	1,819,837	363,242
19	355 W Markham St	22.25 acres		Industrial	RA	22.4	977,050	5/20/2008	5,446,960	242,843
20	24390 Nuevo Rd		None	Industrial	IP	6.0	261,360	11/8/2007	1,090,000	181,667
21	Rider St @ Redlands Ave	17.1 Acres		Industrial	M1, RA	17.1	744,876	6/26/2007	3,550,000	207,602
22	Webster Ave @ Morgan St	6.0-Acres Vacant Land		Industrial		6.0	261,360	3/9/2007	1,895,000	315,833
23	24345 Citrus Ave	First Park Nuevo Rd Phase I	None	Industrial	M-H	16.2	707,414	3/9/2007	6,366,730	392,040
24	23121 Cajalco Rd	6.91 ac		Industrial	MSC	6.9	300,999	11/20/2006	2,521,500	364,907
25	Mountain Ave	Finished Land Parcels		Industrial	GI	19.2	838,094	10/4/2006	4,350,000	226,092
26	Cajalco Expy @ 215 Freew	10.42 Acre Industrial Park Site		Industrial	M-SC, Riverside	10.4	453,895	9/13/2006	2,500,000	239,923
27	24475 Markham St	Planned Industrial Development Site	Previously developed lot	Industrial	LI, Perris	9.1	396,901	7/18/2006	2,778,000	304,886
28	Ramona Expy	Planned Industrial Development Site	Raw land	Industrial	LI, Perris	9.2	399,880	7/12/2006	1,999,500	217,811
29	Indian Ave	Planned Industrial Development Site	Raw land	Industrial	MSC, Perris	8.4	366,661	6/30/2006	2,099,500	249,424
30	Perry St	Planned Unit Development Site	Raw land	Industrial	LI, Perris	9.1	396,901	6/30/2006	1,954,000	214,452
31	4244 Perry St	Planned Industrial Development Site	Raw land	Industrial	LI, Perris	18.2	793,798	6/30/2006	5,562,000	305,217
32	24392 Nance St	Auto Salvage Yard Site	Raw land	Industrial	GI, Perris	9.1	395,960	6/14/2006	2,079,000	228,713
33	Perry St	Planned Unit Development Site	Raw land	Industrial	LI, Perris	8.8	384,634	6/9/2006	2,308,000	261,382
34	Markham St	Planned Unit Development Site	Raw land	Industrial	LI, Perris	9.1	396,901	5/31/2006	2,600,000	285,351
35	Harvill Ave	M-Sc Zoned Acreage	Raw land	Industrial	L1	20.8	903,870	5/9/2006	3,358,500	161,855
36	Mapes Rd	Gi Zoned Acreage	Raw land	Industrial	GI, Perris	5.9	258,746	5/8/2006	1,113,000	187,374
37	Rider St	Planned Industrial Development Site	Raw land	Industrial	LI, Perris	16.3	709,592	3/15/2006	3,550,000	217,925
								Industrial Average:		**$252,529**
								Industrial Median:		**241,383**

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Exhibit A-6: ..... Continued.....

LAND SALES IN THE CITY OF PERRIS SUB-MARKET

5+ Acres' Land Sales, 2006 - 2009

#	Property Location		Property Characteristics					Sales Characteristics		
	Address	Property Name	Land Improvements	Type	Zoning	Acres	Land SF	Sale Date	Sale Price	$/ Acre
38	Barnett Rd @ McLughlin Road			Residential	RR	42.3	1,842,587	11/14/2006	4,600,000	108,747
39	Evans Rd			Residential		12.8	558,874	9/27/2006	885,000	68,979
40	Evans Rd	R6000 Zoned Acreage	Raw land	Residential	R6000	12.8	558,874	8/25/2006	885,500	69,018
41	Nuevo Rd	A1 Zoned Acreage	Not Available	Residential	CC & R14	29.8	1,298,523	5/24/2006	2,700,000	90,574
42	Dockery Ln	Residential Zoned Acreage	Raw land	Residential	N/Av, Perris	6.0	259,617	4/19/2006	1,050,000	176,175
43	Dockery Ln	Residential Zoned Acreage	Raw land	Residential	N/Av, Perris	9.7	420,789	4/19/2006	1,750,000	181,160
								Residential Average:		**$104,687**
								Residential Median:		**99,660**
								All Land Sales Average:		**$186,228**
								All Land Sales Median:		**210,210**

Sources: Costar Group Inc., 2009; and, CBRE Consulting

(1) The sub-market is defined as a 5-mile radius from the City Hall and includes the entire City of Perris.

(2) The above is not an exhaustive list of sales. Only those sales greater than 5 and up to 50 acres in size with complete sale price information as reported by the Costar Group are presented.

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Exhibit A-7:

LAND SALES IN KERN COUNTY

Commercial, Industrial and Residential Land Sales, 2006 - 2008

#	Property Location		Property Characteristics				Sales Characteristics		
	Address in City of Chino	City	Property Name/Land Imp.	Zoning	Acres	Land SF	Sale Date	Sale Price	$/Acre
1	SE Elmo Hwy @ Elmo Hwy & Browning Rd	Mc Farland	Falcon Heights		135.0	5,880,600	11/15/2007	$2,142,000	$15,867
2	Pacheco Rd	Bakersfield	Vacant Land 67.57 Acres	M-3, Bakersfield	67.6	2,943,349	10/10/2008	2,500,000	36,999
3	1234 Willow Springs Rd	Mojave			40.0	1,742,400	12/19/2008	128,000	3,200
4	Scofield Rd	Wasco	Wasco Valley Rose - vacant land		40.0	1,742,400	9/29/2006	1,999,582	49,990
5	Mojave Tropical Rd	Rosamond			40.0	1,742,400	6/7/2007	335,000	8,375
6	NW Hanawalt Ave @ Hanawalt & Mast Ave	Mc Farland	Sierra Springs		38.2	1,665,655	11/15/2007	599,000	15,665
7	16701 Brimhall Rd	Bakersfield		E-1 RS, Bakersfield	35.0	1,524,164	12/7/2007	2,000,000	57,159
8	17174 Highway 14	Mojave		M-2	34.4	1,496,286	2/22/2008	550,000	16,012
9	4057-4061 Industrial Pky	Lebec	Tejon Industrial Complex - Bldg. U.C.		23.8	1,034,550	7/1/2008	2,500,000	105,263
10	College Heights Blvd @ Kendall Avenue	Ridgecrest	Villas at College Heights		22.7	988,812	3/22/2007	2,300,000	101,322
11	Stockdale Hwy @ Heath	Bakersfield		Commercial	20.0	871,200	5/1/2007	3,600,000	180,000
12	Archibald Ave	Maricopa	Parcel 4		20.0	871,200	4/20/2007	165,000	8,250
13	Johnson Rd @ Driver	Bakersfield		A-1	20.0	871,200	9/11/2007	1,000,000	50,000
14	Wheeler Ridge Rd @ Creekside Dr.	Arvin	Wheeler Ridge Site		19.5	847,242	11/17/2008	379,990	19,537
15	132 White Ln	Bakersfield	3 Buildings apx 2,555 SF	Light Industrial	15.5	673,002	11/28/2007	1,300,000	84,142
16	Avenue A & 120th W	Rosamond	no zoning restrictions		14.5	631,620	1/24/2007	125,000	8,621
17	Henry Rd	Taft		M-2	14.3	620,730	2/5/2008	505,000	35,439
18	NWC McCutchen & Gosford Rd	Bakersfield		C2	10.0	435,600	6/15/2007	2,275,000	227,500
19	Compagnoni St	Bakersfield			10.0	435,600	9/21/2007	650,000	65,000
20	Mercedes Blvd	California City	10 Acres	R2.5	10.0	435,600	5/4/2007	25,000	2,500
21	Redrock Randsburg Rd	North Edwards	Vacant Land-10 Acres		10.0	435,600	5/26/2006	20,000	2,000
22	Eucalyptus Dr (2 Properties)	Bakersfield	Multi-Property Sale		9.6	418,176	11/9/2007	980,000	102,083
23	5901 Mills Rd	Bakersfield	Mills Road Land		8.8	381,150	9/12/2007	820,000	93,714
24	S China Lake Blvd @ Bowmen Ave.	Ridgecrest	NEC of S. China Lake @ Bowman	GC, Ridgecrest	6.9	302,306	7/3/2008	1,500,000	216,139
25	1245 Kern St	Taft			6.4	279,655	8/31/2007	200,000	31,153
26	N Norma St @ West Ward Avenue	Ridgecrest		R-2	6.0	259,618	10/4/2006	420,000	70,470
27	W Day Ave @ Airport Drive	Bakersfield			5.8	250,470	10/4/2007	1,300,000	226,087
				Land Sales Avg.:					**$44,347**
				Land Sales Median:					**$49,990**

Sources: Costar Group Inc., 2008; and, CBRE Consulting

- The above is not an exhaustive list of sales. Only those sales greater than 5 acres in size with complete sale price information, as reported by the Costar Group, are presented.

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DRAFT

ENVIRONMENTAL IMPACT REPORT

VIP MORENO VALLEY
STATE CLEARINGHOUSE NO. 2011081084

CITY OF MORENO VALLEY

RIVERSIDE COUNTY, CALIFORNIA

LSA

April 18, 2012

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ENVIRONMENTAL IMPACT REPORT

VIP MORENO VALLEY
STATE CLEARINGHOUSE NO. 2011081084

CITY OF MORENO VALLEY

RIVERSIDE COUNTY, CALIFORNIA

Lead Agency:

City of Moreno Valley Community and Economic Development Department
Planning Division
14177 Frederick Street
Post Office Box 88005
Moreno Valley, California 92552
Attn: Jeff Bradshaw, Associate Planner
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LSA Project No. VOG1001

LSA

April 18, 2012

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B-8: Preliminary Hydrology Report and Hydraulic Analysis for PA09-004, VIP Moreno Valley, SWC Perris Boulevard and Grove View Road, Robert A. Bebensee, R.C.E., March 27, 2009.

B-9: Preliminary Water Quality Management Plan, for PA09-0004 VIP Moreno Valley, SWC Perris Boulevard and Grove View Road, Robert A. Bebensee, R.C.E., July 24, 2009.

B-10: Water Supply Assessment for City of Moreno Valley Plot Plan Application PA09-004, Eastern Municipal Water District, January 20, 2010.

C: LESA Modeling Worksheets and Agriculture Viability Report

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C-2: Economic Viability of Agriculture in the East Inland Empire, CB Richard Ellis, March 18, 2009.

D: Air Quality Reports

D-1: Air Quality Analysis VIP Moreno Valley, LSA Associates, Inc., March 2012.

D-2: Health Risk Assessment VIP Moreno Valley, LSA Associates, Inc., March 2012.

E: Greenhouse Gas Emissions and Global Climate Change Study, LSA Associates, Inc., December 2011.

F: Noise Impact Analysis VIP Moreno Valley, LSA Associates, Inc., March 2012.

G: Traffic Study VIP Moreno Valley, LSA Associates, Inc., April 2012.

FIGURES

TABLES

1.0 EXECUTIVE SUMMARY

1.1 INTRODUCTION

The Draft Environmental Impact Report (EIR) (State of California Clearinghouse No. 2011081084) for the VIP Moreno Valley Project (proposed project or project) has been prepared by LSA Associates, Inc. on behalf of the City of Moreno Valley (City) to: 1) identify the proposed project's impacts on the environment; 2) to discuss alternatives to the proposed project; and 3) to propose mitigation measures that will offset, minimize or otherwise avoid significant environmental impacts. This EIR has been prepared in accordance with the *California Environmental Quality Act*[1] and Sections 15120 through 15131 and 15161 of the *Guidelines for California Environmental Quality Act,*[2] both of which regulate the preparation of EIRs. Based on the potential impacts of the proposed project, including cumulative impacts, and the comments received during the public review of the Initial Study (IS) and public scoping meeting, the City determined that an EIR should be prepared to analyze potential impacts of the proposed project with respect to the following environmental issues:

- Agricultural and Forest Resources;
- Air Quality;
- Greenhouse Gas Emissions and Global Climate Change;
- Noise; and
- Traffic and Circulation.

These five environmental issues are individually addressed in Section 4.0 (Environmental Analysis). Based on the analysis provided in the IS (contained in Appendix A) for the proposed project, all impacts associated with the following eight environmental issues were determined to be "Effects Not Found to be Significant" according to §15128 of the *CEQA Guidelines* and are not addressed in detail in Section 4 of this EIR:

- Aesthetics
- Hazards and Hazardous Materials
- Land Use/Planning
- Mineral Resources
- Population and Housing
- Public Services
- Recreation
- Utilities/Services Systems

Based on the analysis provided in the IS (contained in Appendix A) for the proposed project, all impacts associated with the following four environmental issues were determined to be less than significant with implementation of mitigation measures. These topics are not addressed in detail in Section 4 of this EIR but the mitigation measures will be contained in the mitigation monitoring and reporting plan to ensure that the measures are implemented:

- Biological Resources
- Cultural Resources
- Geology and Soils
- Hydrology/Water Quality

[1] *California Environmental Quality Act*, as of January 1, 2011, §§21000–21177, Public Resources Code, State of California.
[2] *Guidelines for California Environmental Quality Act*, as of January 1, 2011, §§15000–15387, California Code of Regulations, Title 14, Chapter 3, State of California.

Additional discussion of these issues is provided in Section 2.0 of this EIR and the IS prepared for the proposed project.

1.2 PROPOSED PROJECT

The project site is located in the City of Moreno Valley, Riverside County (Figure 1.1). The approximately 71-acre site is generally located on the southwest corner of Perris Boulevard and Grove View Road. The Perris Valley Storm Drain Lateral B channel forms the southern boundary of the site while Indian Street forms the western boundary.

The proposed development would result in the construction and operation of approximately 1,616,133 square feet of distribution warehouse uses on an approximately 71-acre site. The single building will be constructed with 264 vertical-lift dock-high roll up doors on the long (north and south) sides of the building to allow access for the loading and unloading of products from diesel truck/trailers. The building will include a total of approximately 44,000 square feet of business office space for the management of the warehouse. Parking at the warehouse will be provided for 368 trucks and trailers as well as 589 parking stalls for passenger vehicles in accordance with City standards for light industrial uses. See Figure 1.2.

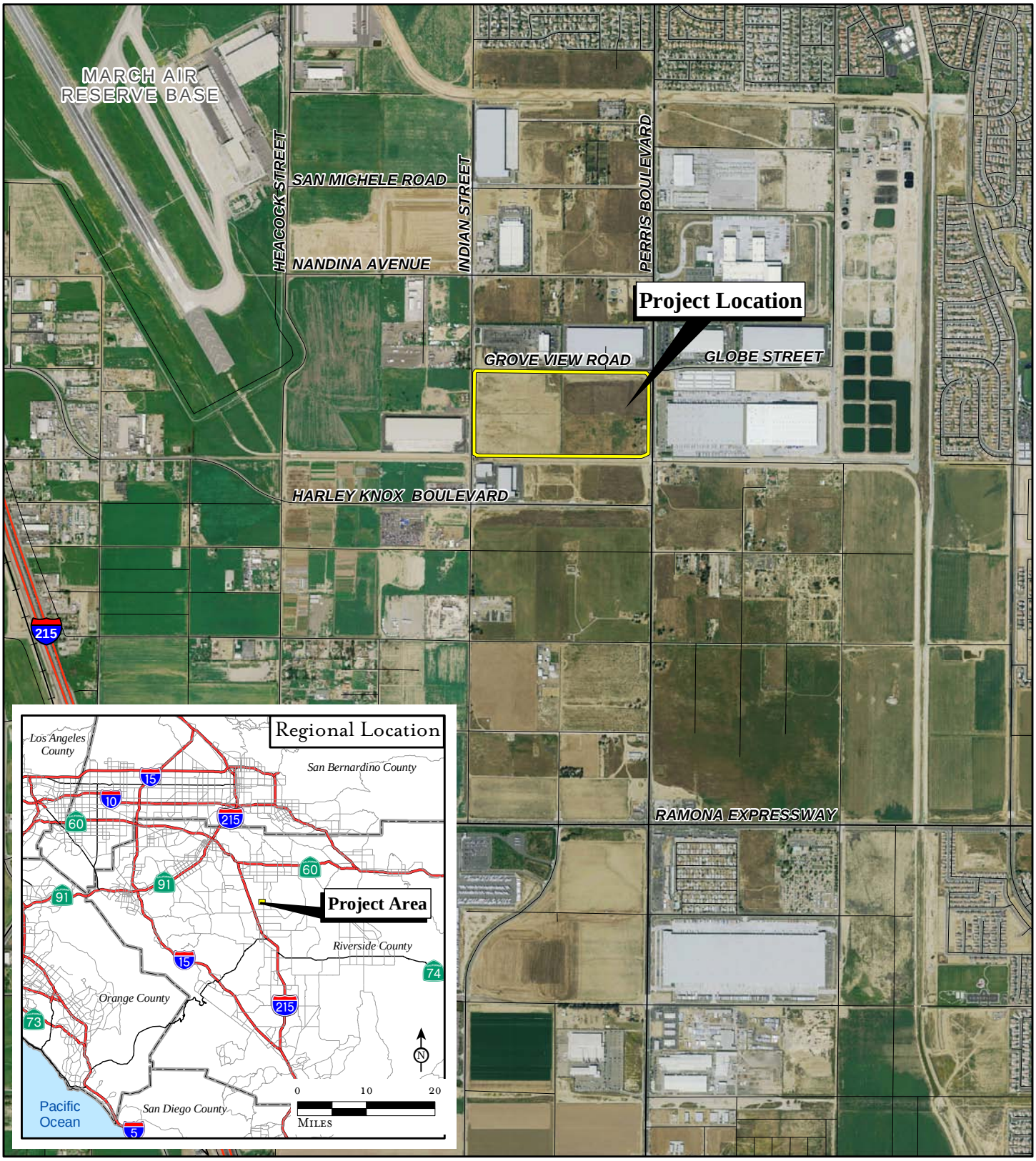
Site and building design attributes for the proposed project will incorporate many sustainability and Green Building concepts. Green Building is the practice of increasing building efficiency through site planning, water and energy management, material use, control of indoor air quality and the use of innovative design concepts. These practices help to improve building operational efficiency, conserve water, reduce waste, and lessen the heat island effect of development.

Green building designs typically exhibit the following features:

- More natural ventilation or, at least, a mixture of natural ventilation and air conditioning, and/or increased fresh air via the mechanical ventilation system.
- Narrow plan forms, often within the 15m limits of natural ventilation and daylight access, the corollary of which is less 'deep' space in the middle, which users dislike.
- Better utilization of daylight.
- More user controls for windows, blinds, lights and ventilators. This can mean that needs (like thermal comfort) are met more quickly even though the conditions may only be 'good enough'. Users preferred rapid response when things go wrong or need changing, and will tolerate conditions which are reasonable.
- Higher floor to ceiling heights, which helps, e.g., with daylight penetration.
- More open plan workspaces (usually desks) close to or next to windows.

1.3 AREAS OF CONTROVERSY AND ISSUES TO BE RESOLVED

The EIR discusses impacts that would occur to on-site and off-site uses as a result of implementation of the proposed project. This EIR also includes proposed mitigation measures that have been identified to reduce or avoid significant effects that would result from the construction and operation of the proposed on-site uses. *CEQA Guidelines* Section 15123(b)(2) requires that areas of controversy known to the Lead Agency (City of Moreno Valley) be stated in the EIR summary. The following discussion identifies issues raised by other agencies and the public during the 30-day public comment period of the Initial Study (IS) and Notice of Preparation (NOP), as well as comments received during the public scoping meeting that was held for the proposed project at the City of Moreno Valley City Council Chambers on September 19, 2011, at 6:00 p.m.



LSA

FIGURE 1.1

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FEET

VIP Moreno Valley
Environmental Impact Report

SOURCE: AirPhotoUSA, 2008; Thomas Bros., 2009

Regional and Project Location

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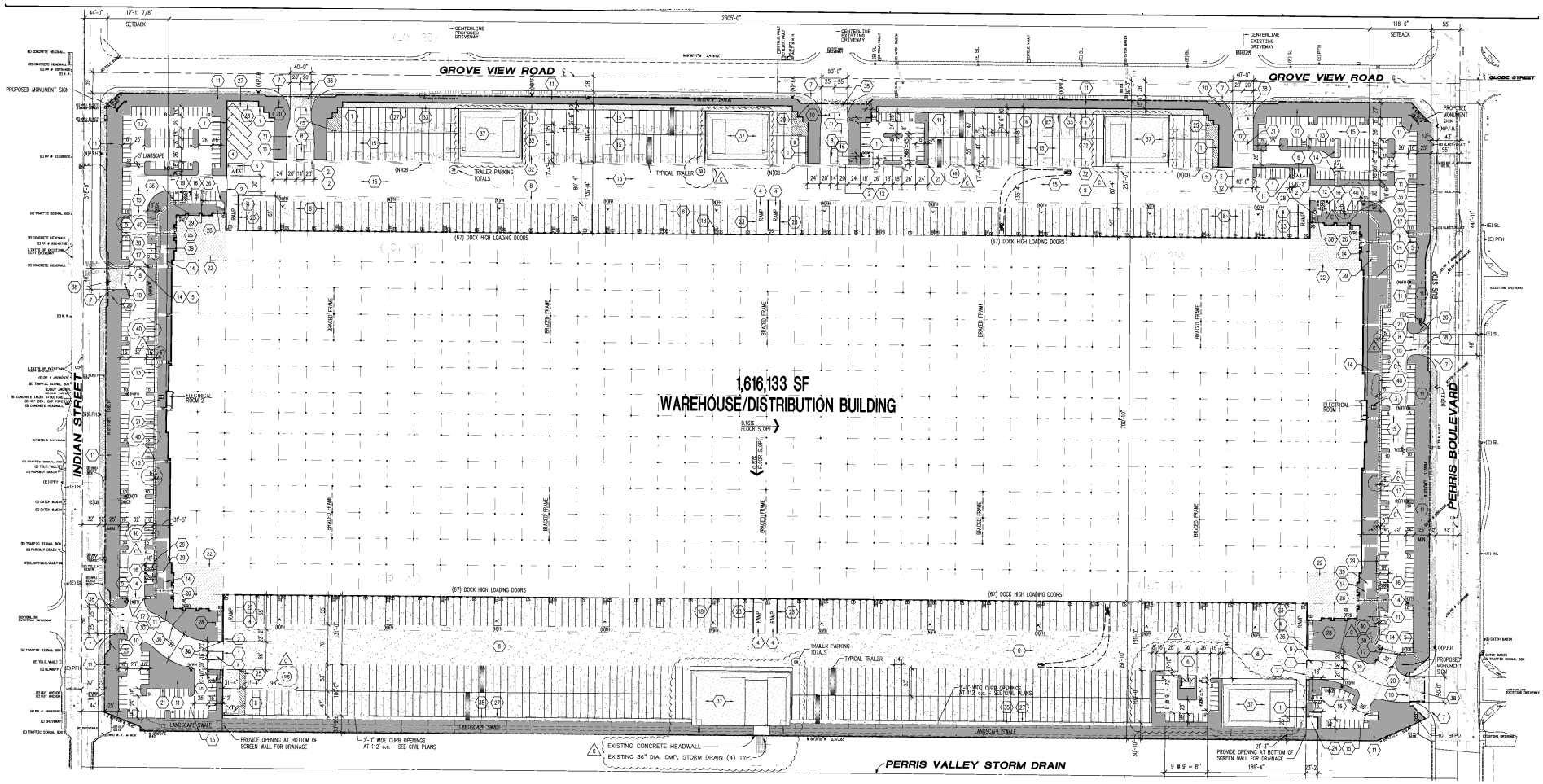

LSA

FIGURE 1.2

VIP Moreno Valley
Environmental Impact Report

Site Plan

0 150 300

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SOURCE: RKZ, Inc., 2009

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1.3.1 Notice of Preparation

The objective of distributing a Notice of Preparation (NOP) is to solicit public comment in order to identify and determine the full range and scope of issues of concern so that these issues might be fully examined in the EIR. An IS was distributed in tandem with the NOP. The NOP was distributed to the State Clearinghouse, as well as to the organizations and persons considered likely to be interested in the project and its potential impacts. Comments received regarding the NOP were used to help identify impacts that could result from implementation of the proposed project. An NOP for the Draft EIR was distributed to state, regional, and local agencies on August 26, 2011, for a 30-day review period ending on September 26, 2011.

The IS, NOP, distribution list, Notice of Public Scoping Meeting, and response letters are included in Appendix A of the Draft EIR. As of the close of the 30-day NOP public review period, 12 responses to the NOP had been received. Table 1.A summarizes the comments received regarding the NOP.

Table 1.A: Notice of Preparation Comment Letters Received

Agency/Organization	Date	Comments	Addressed in EIR Section
State of California Governor's Office of Planning and Research	August 25, 2011	Explanation of Notice of Preparation procedures.	Not applicable
Native American Heritage Commission	August 26, 2011	Explanation of SB18 Consultation Process (e.g. sacred lands file search and associated mitigation measures)	Not applicable
California Department of Transportation – District 8	August 30, 2011	Recommendation of coordination with Caltrans District 8 for project's local traffic and circulation impacts. Identifies concern regarding potential impacts to I-215 ramps and interchange in the project area.	4.5
South Coast Air Quality Management District	September 7, 2011	Request to discuss air pollutant emissions for construction and operational phases; calculation of $PM_{2.5}$ emissions using $PM_{2.5}$ significance thresholds; calculation of localized significance thresholds; and inclusion of a mobile source health risk assessment.	4.5
Southern California Association of Governments	September 7, 2011	Request to include a project consistency analysis with SCAG's Regional Transportation Plan and Compass Growth Visioning goals and policies.	5.0
Riverside County Flood Control and Water Conservation District	September 8, 2011	Explanation of the payment of drainage fees associated with the District's Perris Valley Area Drainage Plan, the obtainment of an encroachment permit (if applicable) for any construction related activities occurring within District right of way or facilities.	Not applicable
Department of Toxic Substances Control	September 14, 2011	Request for the EIR to take a look at hazardous materials databases run by regulatory agencies and the inclusion of mitigation measures for any recommended remediation efforts in the EIR.	Initial Study (Appendix A)

Table 1.A: Notice of Preparation Comment Letters Received

Agency/Organization	Date	Comments	Addressed in EIR Section
California Department of Fish and Game	September 19, 2011	Request to include discussion on MSHCP consistency, impacts to red-tailed hawk, American kestrel, associated common bird species, the side-blotched lizard, the western fence lizard, and desert cottontail. Also request for information on any loss of jurisdictional waters, vernal pools and development into areas with native habitat values.	Initial Study (Appendix A) and Biological Resources Study (Appendix B-)
City of Riverside	September 23, 2011	Request to include information on number of projected employees, evaluation of projected local and regional traffic impacts to existing transportation systems and networks in the area.	4.5 and 5.0
Eastern Municipal Water District	September 23, 2011	Disclosure that EMWD intends to construct additional recycled water facilities immediately north of its existing facility on Trumble Road in Perris with the excavated soil temporarily stockpiled and available to others for use as fill. Letter also requests that the project initiate the New Development process with EMWD.	Not applicable
Sierra Club – San Gorgonio Chapter	September 25, 2011	Request for information to be included in EIR involving LEED certification levels, mitigation for agricultural lands, providing amenities encouraging the use of alternative modes of transportation, truck routes, global climate change, projected greenhouse gas emissions, and a reasonable range of alternatives.	Initial Study (Appendix A); 4.1; 4.3; 4.3; 6.0
City of Perris	September 26, 2011	Request for the EIR to include information regarding impacts to I-215/Harely Knox Boulevard Interchange, Indian Avenue, Perris Boulevard, and other roadways within the project area. Request to identify mitigation for impacted intersections in the EIR.	4.5

Note: All NOP response letters (along with the Initial Study) are included in Appendix A of the Draft EIR.

1.3.2 Public Scoping Meeting

In compliance with *State CEQA Guidelines*, the City of Moreno Valley has taken steps to maximize opportunities for individuals, parties, and agencies to participate in the environmental process. During circulation of the NOP, various federal, state, regional, and local government agencies, and other interested parties were contacted to solicit comments and to inform the public of the proposed project. A public scoping meeting was held to solicit public comment on direction and scope of the analysis necessary for the Draft EIR. The public scoping meeting was held on September 19, 2011, at 6:00 p.m., at the City of Moreno Valley City Council Chambers, Moreno Valley California. Copies of the IS, NOP, and the conceptual site plan were available to the public for review. City staff, the project applicant, and the EIR consultant (LSA Associates, Inc.) were present to provide information regarding the project and collect public comment. Two members from the public attended the scoping meeting.

1.4 ALTERNATIVES TO THE PROPOSED PROJECT

In compliance with *CEQA Guidelines* (Section 15126.6), an EIR must describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the project objectives, and would avoid or substantially lessen significant effects of the project. The EIR need not consider every conceivable alternative; rather it must consider a reasonable range of potentially feasible alternatives. An EIR must evaluate a "No Project" alternative in order to allow decision-makers to compare the effect of approving the project to the effect of not approving the project. A more detailed description of each project alternative as well as an analysis of the potential environmental impacts associated with the construction and operation of each is provided in Section 6.0.

1.4.1 No Project Alternative

Pursuant to CEQA (§15126.6[e][2]), the No Project Alternative should discuss what would reasonably be expected to occur, based on current plans and consistent with available infrastructure and community services, in the foreseeable future. The project site's zoning designation is currently Specific Plan 208 – Moreno Valley Industrial Area Plan. The project site is currently designated by the General Plan for Business Park/Light Industrial uses. Given the goals and objectives of the City of Moreno Valley, it is highly reasonable in the event the proposed project were not approved that the site would be developed with some type of industrial park uses. For analysis purposes, it is assumed that the No Project Alternative would be developed with approximately 1,420,000 square feet of industrial warehouse uses on approximately 63 acres and approximately 180,000 square feet of commercial on 8 acres.

1.4.2 Reduced Intensity Alternative

With the intent of avoiding or substantially reducing significant impacts created by the project traffic, air quality, and noise, the City has considered a Reduced Intensity Warehouse Alternative. This alternative includes one warehouse building covering approximately 1,212,100 square feet. Under this alternative, the proposed warehouse uses would represent a net decrease of approximately 25 percent (400,000 square feet) as compared to the proposed project.

1.4.3 Commercial Center (Mixed Commercial/Office) Alternative

The Commercial Center Alternative would result in the development of commercial service and office uses on the project site. Although business and professional offices, financial institutions, and medical clinics are permitted in SP208, they are permitted only in the industrial support areas while commercial service-oriented uses are a permitted throughout the SP208 Industrial designation. For this reason, the General Plan and zoning designations for the site would need to be amended to accommodate the business and professional offices. Permitted commercial service uses include, but are not limited to, Automotive Sales/Rental/Leasing & Accessories, Automotive/Truck Repair, Business Supply/Equipment Sales/Rental & Services, and Repair Services. Approximately 760,000 square feet of commercial service uses would be developed on approximately 35 acres. The balance of the site (35 acres) would be developed with up to approximately 760,000 square feet of office uses.[1]

[1] Square footage is based on a 50 percent development of the project site.

1.4.4 Off-Site Location Alternative

This alternative would result in the development of approximately 1,616,133 square feet of warehouse uses on approximately 70 acres. The alternative project site identified by the City is bounded by Krameria Street (extended) to the north, vacant and partially developed property and March Air Reserve Base to the west, Indian Street to the east, and the Perris Valley Storm Drain and vacant land to the south. The off-site location is currently zoned SP 208 I and is designated BP in the City's General Plan, identical to the proposed project. Since the proposed uses are consistent with the uses identified for the off-site location, no zone change or General Plan Amendment would be required.

1.5 IMPACTS, MITIGATION, AND LEVEL OF IMPACTS SUMMARY TABLE

Table 1.B provides a summary of the proposed project impacts, proposed mitigation measures, and the level of significance of each impact following the application of identified mitigation measures.

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
AESTHETICS (FROM THE INITIAL STUDY [APPENDIX A])		
Would the project Have a substantial adverse effect on a scenic vista?	Less than significant impact. No mitigation is required.	Less Than Significant
Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?	No Impact. No mitigation is required.	Not applicable - No Impact
Substantially degrade the existing visual character or quality of the site and its surroundings?	Less than significant impact. No mitigation is required.	Less Than Significant
Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	Less than significant impact. No mitigation is required.	Less Than Significant
4.1 AGRICULTURAL RESOURCES		
Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?	No Impact. No mitigation is required.	Not applicable - No Impact
Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	No Impact. No mitigation is required.	Not applicable - No Impact
Would the project result in the loss of forest land or conversion of forest land to non-forest uses?	No Impact. No mitigation is required.	Not applicable - No Impact
Would the proposed project result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program (FMMP) of the California Resources Agency, to non-agricultural use?	Significant Impact. No feasible mitigation is available.	Significant and Unavoidable
Would the proposed project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	Significant Impact. No feasible mitigation is available.	Significant and Unavoidable
Cumulative Impacts: The cumulative area for agricultural resource impacts is Riverside County. No local or regional program to mitigate for the cumulative impacts to agricultural resources is available. Because agricultural	Significant Impact. No feasible mitigation is available.	Significant and Unavoidable

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
land, including Prime Farmland is a finite resource, and because neither the City of Moreno Valley nor the County of Riverside maintains a program to offset agricultural resource impacts, the conversion of the project site to warehouse uses, in conjunction with planned and future development in the City and region, would contribute to a further reduction in the amount of land available for agricultural uses. This reduction in agricultural land represents a significant impact.		
4.2 AIR QUALITY		
Would the project conflict with or obstruct implementation of the applicable air quality plan?	No impact. No mitigation is required.	Not applicable - No Impact
Would the proposed project create objectionable odors affecting a substantial number of people?	Less than significant impact. No mitigation is required.	Less Than Significant
Long-Term Microscale (CO Hot Spot) Emissions: Would the proposed project violate any air quality standard or contribute substantially to an existing or projected air quality violation? For CO, the applicable thresholds are: - California State one-hour CO standard of 20.0 ppm; - California State eight-hour CO standard of 9.0 ppm.	No impact. No mitigation is required.	Not applicable - No Impact
Localized Operational Emissions: Would the proposed project violate any AAQS or contribute to an existing or projected air quality violation; or expose sensitive receptors to pollutants? For long-term operation, the applicable localized daily thresholds are: - 12,083 pounds per day of CO; - 585 pounds per day of NO_X; - 32 pounds per day of PM_{10}; and - 14 pounds per day of $PM_{2.5}$.	Less than significant impact. No mitigation is required.	Less Than Significant
Operational-Acute and Operational–Chronic Health Risk Impacts: Would the proposed project expose sensitive receptors to substantial pollutant concentrations?	Less than significant impact. No mitigation is required.	Less Than Significant

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
Construction Equipment Exhaust Emissions: Would the proposed project violate any AAQS or contribute to an existing or projected air quality violation; or expose sensitive receptors to pollutants? For construction operations, the applicable daily thresholds are: - 75 pounds per day of ROC; - 100 pounds per day of NO_X; - 550 pounds per day of CO; - 150 pounds per day of PM_{10}; - 150 pounds per day of SO_X; and - 55 pounds per day of $PM_{2.5}$.	Significant Impact. Mitigation is required. **4.2.6.1A** Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall place construction equipment staging areas at least 200 feet away from sensitive receptors. Contract specifications shall be included in the proposed project construction documents, which shall be reviewed by the City. **4.2.6.1B** Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall utilize power sources (e.g., power poles) or clean-fuel generators. Contract specifications shall be included in the proposed project construction documents, which shall be reviewed by the City. **4.2.6.1C** Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall utilize California Air Resources Board (CARB) Tier II Certified equipment or better during the rough/mass grading phase for the following pieces of equipment: rubber-tired dozers and scrapers. Contract specifications shall be included in the proposed project construction documents, which shall be reviewed by the City. **4.2.6.1D** All clearing, grading, earthmoving, or excavation activities shall cease when winds exceed 25 mph per SCAQMD guidelines in order to limit fugitive dust emissions. **4.2.6.1E** The contractor shall ensure that all disturbed unpaved roads and disturbed areas within the project are watered at least three times daily during dry weather. Watering, with complete coverage of disturbed areas, shall occur at least three times a day, preferably in the mid-morning,	Significant and Unavoidable

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	afternoon, and after work is done for the day. **4.2.6.1F** The contractor shall ensure that traffic speeds on unpaved roads and project site areas are reduced to 15 miles per hour or less to reduce PM10 and PM2.5 fugitive dust haul road emissions. Speed limit signs (15 mph maximum) shall be posted at entry points to the project site, and along any unpaved roads providing access to or within the project site and/or any unpaved designated on-site travel routes. **4.2.6.1G** Groundcover shall be replaced, and/or non-toxic soil stabilizers shall be applied (according to manufacturers' specifications) to any inactive construction areas (previously graded areas inactive for ten days or more). **4.2.6.1H** The contractor shall minimize pollutant emissions by maintaining equipment engines in good condition and in proper tune according to manufacturer's specifications and during smog season (May through October) by not allowing construction equipment to be left idling for more than five minutes (per California law). **4.2.6.1I** The contractor shall ensure use of low-sulfur diesel fuel in construction equipment as required by the California Air Resources Board (CARB) (diesel fuel with sulfur content of 15 ppm by weight or less). **4.2.6.1J** If available, the project applicant shall use "Low-Volatile Organic Compounds" paints, coatings, and solvents with a VOC content lower than required under Rule 1113 (not to exceed 150 grams/liter; 1.25 pounds/gallon). High Pressure Low Volume (HPLV) applications of paints, coatings, and solvents shall be consistent with South Coast Air Quality Management District Rule 1113. Alternatively, the project applicant shall use materials that do not require painting or are pre-painted.	

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	4.2.6.1K Grading plans, construction specifications and bid documents shall also include the following notations: • Off-road construction equipment shall utilize alternative fuels where feasible e.g., biodiesel fuel (a minimum of B20), natural gas (CNG), liquefied natural gas (LNG), propane, except for equipment where use of such fuels would void the equipment warranty; • Gravel pads shall be provided at all access points to prevent tracking of mud onto public roads; • Install and maintain trackout control devices at all access points where paved and unpaved access or travel routes intersect; • The contractor or builder shall designate a person or person(s) to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust off site; • The contractor or builder shall post a publicly visible sign with the telephone number and person to contact regarding dust complaints. The contact person shall take corrective action within 24 hours; • High pressure injectors shall be provided on diesel construction equipment where feasible; • Engine size of construction equipment shall be limited to the minimum practical size; • Substitute gasoline-powered for diesel-powered construction equipment where feasible; • Use electric construction equipment where feasible; • Install catalytic converters on gasoline-powered	

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	equipment where feasible; • Ride-sharing program for the construction crew shall be encouraged and shall be supported by contractor(s) via incentives or other inducement; • Documentation shall be provided to the City of Moreno Valley indicating that construction workers have been encouraged to carpool or otherwise reduce VMT to the greatest extent practical, including providing information on available park and ride programs; • Lunch vendor services shall be provided onsite during construction to minimize the need for offsite vehicle trips; • All forklifts used during construction and in subsequent operation of the project shall be electric or natural gas powered. **4.2.6.1L** Throughout project construction, a construction relations officer/community liaison, appointed by the Applicant, shall be retained on-site. In coordination and cooperation with the City, the construction relations officer/community liaison shall respond to any concerns related to PM10 (fugitive dust) generation or other construction-related air quality issues. **4.2.6.1M** All project entrances shall be posted with signs which state: • Truck drivers shall turn off engines when not in use; • Diesel delivery trucks servicing the project shall not idle for more than three (3) minutes; and • Telephone numbers of the building facilities manager and CARB, to report violations. These measures shall be enforced by the on-site facilities manager (or equivalent).	

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
Localized Construction Emissions: Would the proposed project expose sensitive receptors to substantial pollutant concentrations?	Significant Impact. Mitigation is required. Implement **Mitigation Measures 4.2.6.1A** through **4.2.6.1M.** There is no feasible mitigation over and above those measures prescribed by Rule 403 and Mitigation Measures 4.2.6.1A through 4.2.6.1M.	Significant and Unavoidable
Long-Term Operational Emissions: Would the proposed project violate any AAQS or contribute to an existing or projected air quality violation; or expose sensitive receptors to pollutants? For long-term operations, the applicable daily thresholds are: - 55 pounds of ROC; - 55 pounds of NO_X; - 550 pounds of CO; - 150 pounds of PM_{10}; - 55 pounds of $PM_{2.5}$; and - 150 pounds of SO_X.	Significant Impact. Mitigation is required. **4.2.6.3A** Prior to issuance of the first building permit, building and site plan designs shall ensure that the project's energy efficiencies surpass applicable 2008 California Title 24, Part 6 Energy Efficiency Standards by a minimum of 20 percent. Verification of increased energy efficiencies shall be documented in Title 24 Compliance Reports provided by the Applicant, and review and approved by the City. Any combination of design features including but not limited to the following list may be used to fulfill this requirement provided that the total increase in energy efficiency meets or exceeds 20 percent: • Buildings shall exceed California Title 24 Energy Efficiency performance standards for water heating and space heating and cooling, as deemed acceptable by the City. • Increase in insulation such that heat transfer and thermal bridging is minimized. • Limit air leakage through the structure or within the heating and cooling distribution system to minimize energy consumption. • Incorporate dual-paned or other energy efficient windows. • Incorporate energy efficient space heating and cooling equipment. • Interior and exterior energy efficient lighting which exceeds the California Title 24 Energy Efficiency performance standards shall be installed, as deemed acceptable by the City.	Significant and Unavoidable

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	Automatic devices to turn off lights when they are not needed shall be implemented. • To the extent that they are compatible with landscaping guidelines established by the City, shade-producing trees, particularly those that shade paved surfaces such as streets and parking lots and buildings shall be planted at the project site. • Paint and surface color palette for the project shall emphasize light and off-white colors which reflect heat away from the buildings. • All buildings shall be designed to accommodate renewable energy sources, such as photovoltaic solar electricity systems, appropriate to their architectural design. • To reduce energy demand associated with potable water conveyance, the project shall implement the following: o Landscaping palette emphasizing drought-tolerant plants; o Use of water-efficient irrigation techniques; and, o U.S. EPA Certified WaterSense labeled for equivalent faucets, high-efficiency toilets (HETs), and water-conserving shower heads. • The project shall provide on-site bicycle storage/parking consistent with City of Moreno Valley requirements. • The project shall provide on-site showers (one for males and one for females). Lockers for employees shall be provided. • The project will establish a Transportation Management Association (TMA). The TMA will coordinate with other TMAs within the City to	

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	encourage and coordinate carpooling among building occupants. The TMA will advertise its services to building occupants, and offer transit and/or other incentives to reduce GHG emissions. A plan will be submitted by the TMA to the City within two months of project completion that outlines the measures implemented by the TMA, as well as contact information. • The project shall provide preferential parking for carpools and vanpool. Locations and configurations of proposed preferential parking for carpools and vanpools are subject to review and approval by the City. Prior to final site plan approval, preferential parking for carpools and vanpools shall be delineated on the project site plan. • The project shall provide at least two electric vehicle charging stations. Locations and configurations of proposed charging stations are subject to review and approval by the City. Prior to issuance of the first building permit, stub outs for charging stations shall be indicated on the project building plans. • Lease/purchase documents shall identify that tenants are encouraged to promote the following: o Implementation of compressed workweek schedules; o SmartWay partnership; o Achievement of at least 20% per year (as a percentage of previous percentage, not total trips) increase in percentage of consolidated trips carried by SmartWay carriers until it reaches a minimum of 90% of all long haul trips carried by SmartWay 1.0 or greater carriers.	

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	o Achievement of at least 15% per year (as a percentage of previous percentage, not total trips) increase in percentage of long haul trips carried by SmartWay carriers until it reaches a minimum of 85% of all consolidator trips carried by SmartWay 1.0 or greater carriers. o Use of fleet vehicles conforming to 2010 air quality standards or better. o Installation of catalytic converters on gasoline-powered equipment. o Inclusion of electric powered and/or compressed natural gas fueled trucks and/or vehicles in fleets; o Establishment and use of carpool/vanpool programs, complemented by parking fees for single-occupancy vehicles; o Provision of preferential parking for EV and CNG vehicles; o Use of electrical equipment (instead of gasoline-powered equipment) for landscape maintenance; o Use of electric (instead of diesel or gasoline-powered) yard trucks; o Use of SmartWay 1.25 rated trucks. **4.2.6.3B** The project shall be designed to facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills by providing easily accessible areas that are dedicated to the collection and storage of recyclable materials including: paper, cardboard, glass, plastics, and metals. Locations of proposed recyclable materials collection areas are subject to review and approval by the City. Prior to Final Site Plan approval, locations of proposed recyclable materials collection areas shall be delineated on the project site plan.	

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
Cumulative Impacts: The cumulative area for air quality impacts is the Basin. The project would contribute criteria pollutants to the area during project construction. Depending on construction schedules and actual implementation of projects in the area, generation of fugitive dust and pollutant emissions during construction would result in substantial short-term increases in air pollutants. This would be a contribution to short-term cumulatively significant air quality impacts. The Basin is in nonattainment for PM10 and ozone at the present time; therefore, the construction and operation of the proposed project would exacerbate nonattainment of air quality standards within the Basin and contribute to adverse cumulative air quality impacts. Implementation of the proposed project would unavoidably contribute to significant cumulative air quality impacts.	Significant unavoidable. The project-specific measures will help reduce project-related air pollutants, however, no feasible mitigation is available to reduce cumulative air quality impacts to a less than significant level.	Significant and Unavoidable
BIOLOGICAL RESOURCES (FROM THE INITIAL STUDY [APPENDIX A])		
Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service? Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan?	Potentially Significant Impact Unless Mitigation Incorporated. **Mitigation Measure BIO-1:** No more than 72 hours prior to initiation of ground-disturbing activities, a pre-construction survey shall be completed by a qualified biologist. The survey will identify special status avian species (if any) within the area of intended disturbance. In the event no special status avian species are identified within the limits of disturbance, no further mitigation is required. In the event such species are identified within the limits of ground disturbance, **Mitigation Measure BIO-3** shall apply. **Mitigation Measure BIO-2:** No more than 72 hours prior to initiation of ground-disturbing activities, a pre-construction burrowing owl survey shall be completed by a qualified biologist for the planned disturbance area. The pre-construction burrowing owl surveys may be conducted as part of the survey required in **Mitigation Measure BIO-1**. A report detailing the findings of the pre-construction survey shall be submitted to the City prior to the initiation of ground-disturbing activities. In the event no	Less Than Significant

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	burrowing owls are identified within the limits of ground disturbance, no further mitigation is required. In the event burrowing owls are identified within the limits of ground disturbance, **Mitigation Measures BIO-3** and **BIO-4** shall apply. **Mitigation Measure BIO-3:** If nesting special status avian or burrowing owl species are determined to occupy a proposed area of disturbance, no construction activity shall take place within 500 feet of an active nest/burrow until it has been determined that the nest/burrow is no longer active, and all juveniles have fledged the nest/burrow. **Mitigation Measure BIO-4:** If active burrowing owl burrows are detected outside the breeding season, then passive and/or active relocation may be approved following consultation with the CDFG and/or USFWS. One-way doors may be installed as part of a passive relocation program. Burrowing owl burrows shall be excavated with hand tools by a qualified biologist when determined to be unoccupied, and backfilled to ensure that animals do not re-enter the holes/dens.	
Have a substantially adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Wildlife Service?	Less than significant impact. No mitigation is required.	Less Than Significant
Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	Less than significant impact. No mitigation is required.	Less Than Significant
Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established native resident migratory wildlife corridors, or impede the use of native wildlife nursery sites?	Less than significant impact. No mitigation is required.	Less Than Significant
Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or	No impact. No mitigation is required.	Not applicable - No Impact

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Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
ordinance?		
CULTURAL RESOURCES (FROM THE INITIAL STUDY [APPENDIX A])		
Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	Less than significant impact. No mitigation is required.	Less Than Significant
Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	Less than significant impact. No mitigation is required.	Less Than Significant
Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	Potentially Significant Impact Unless Mitigation Incorporated. **Mitigation Measure CUL-1:** Prior to construction involving excavation four feet or more below existing surface grade, the construction contractor shall provide evidence that a qualified paleontologist has been retained, and that the paleontologist(s) shall be present during all grading and other significant ground-disturbing activities that reach four feet or more below existing surface grade. If the paleontologist(s) do not find evidence for Pleistocene-era deposits once the maximum excavation depth is reached, monitoring shall be discontinued. In the event fossiliferous deposits are encountered, the following measures shall be implemented: • Monitoring shall be conducted by qualified paleontological monitor(s) of excavation in areas identified as likely to contain paleontological resources, including undisturbed older Pleistocene alluvium. Paleontological monitors shall be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors shall be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring may be reduced if the potentially fossiliferous units are determined upon exposure and examination by qualified	Less Than Significant

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Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	paleontological personnel to have low potential to contain fossil resources. • Paleontological monitoring of any earthmoving will be conducted by a monitor, under direct guidance of a qualified paleontologist. Earthmoving in areas of the parcel where previously undisturbed sediments are buried, but not otherwise disturbed, will not be monitored. • If too few fossil remains are found after 50 percent of the planned-for earthmoving has been completed, monitoring can be reduced or discontinued in those areas at the project paleontologist's direction. • Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates. • Identification and curation of specimens into a professional, fully accredited museum repository with permanent retrievable storage. The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities. • Preparation or a report of findings with and appended itemized inventory of specimens. The report and report and inventory, when submitted to the City of Moreno Valley along with confirmation of the curation of recovered of recovered specimens into an established, accredited museum repository, will signify completion of the program to mitigate impacts to paleontological resources.	
Disturb any human remains, including those interred outside of formal cemeteries?	Less than significant impact. No mitigation is required.	Less Than Significant

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Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
GEOLOGY AND SOILS (FROM THE INITIAL STUDY [APPENDIX A])		
Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving: (i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	No impact. No mitigation is required.	Not applicable - No Impact
Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving: (ii) Strong seismic ground shaking?	Less than significant impact. No mitigation is required.	Less Than Significant
Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving: (iii) Seismic-related ground failure, including liquefaction?	Less than significant impact. No mitigation is required.	Less Than Significant
Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving: (iv) Landslides?	No impact. No mitigation is required.	Not applicable - No Impact
Result in substantial soil erosion or the loss of topsoil?	Less than significant impact. No mitigation is required.	Less Than Significant
Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-site or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	Potentially Significant Impact Unless Mitigation Incorporated. **Mitigation Measure GEO-1:** Prior to the issuance of grading permits, any existing low density soils and/or saturated soils shall be removed to competent natural soil under the inspection of the Soils Engineering Firm. After the exposed surface has been cleansed of debris and/or vegetation, it shall be scarified until it is uniform in consistency, brought to the proper moisture content and compacted to a minimum of 90 percent relative compaction (in accordance with ASTM: D-1557). In any area where a transition between fill and native soil or between bedrock and soil are encountered, additional excavation beneath foundations and slabs will be	Less Than Significant

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Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	necessary in order to provide uniform support and avoid differential settlement of the structure. The on-site soils or approved import soils may be utilized for the compacted fill, provided they are free of any deleterious materials and shall not contain any rocks, brick, asphaltic concrete, concrete, or other hard materials greater than eight inches in maximum dimensions. Any import soil must be approved by the Soils Engineering firm a minimum of 24 hours prior to importation to the site. The approved fill soils shall be placed in layers not in excess of six inches in thickness. Each lift shall be uniform in thickness and thoroughly blended. The fill soils shall be brought to within 2 percent of the optimum moisture content, unless otherwise specified by the Soils Engineering firm. Each lift shall be compacted to a minimum of 90 percent relative compaction (in accordance with ASTM: D-1557) and approved prior to the placement of the next layer of soil. Compaction tests shall be obtained at the discretion of the Soils Engineering firm but to a minimum of one test for every 500 cubic yards placed and/or for every two feet of compacted fill placed. The minimum relative compaction shall be obtained in accordance with accepted methods in the construction industry. The final grade of the structural areas shall be in a dense and smooth condition prior to placement of slabs-on-grade or pavement areas. No fill soils shall be placed, spread, or compacted during unfavorable weather conditions. When the grading is interrupted by heavy rains, compaction operations shall not be resumed until approved by the Soils Engineering firm.	
Be located on expansive soil, as defined in Table 18-a-B of the Uniform Building Code (1994), creating substantial risks to life or property?	Potentially Significant Impact Unless Mitigation Incorporated. **Mitigation Measure GEO-2:** Prior the issuance of	Less Than Significant

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Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	grading permits, the project proponent shall inform the project engineers, architects, owner, maintenance personnel, and other interested parties of the Expansive Soil Guidelines provided in the project's geotechnical analysis. The recommendations identified in the project's Expansive Soil Guidelines shall be reviewed and considered by the project engineers, architects, owner, maintenance personnel, and other interested parties to determine applicable design guidelines. Applicable design guidelines shall be included and implemented in the project's grading plans.	
Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	No impact. No mitigation is required.	Not applicable - No Impact
4.3 GREENHOUSE GASES AND GLOBAL CLIMATE CHANGE		
Would the proposed project conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?	Less than significant. No mitigation is required.	Less Than Significant
Would the proposed project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	Significant Impact. Mitigation is required. Previously referenced **Mitigation Measures 4.2.6.3A** and **4.2.6.3B** will reduce project greenhouse gas emissions. **4.3.6.1A** Prior to the issuance of building permits, the project applicant shall provide evidence to the City of Moreno Valley that building features have been incorporated in building plans as required by Title 24 of the California Code of Regulations. These features include but are not limited to the following: • Exterior windows shall utilize window treatments for efficient energy conservation. • Per CALGreen Code requirements, water-efficient fixtures and appliances, including but not limited to low-flow faucets, dual-flush toilets minimizing water consumption by 20 percent	Less Than Significant

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Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	from the Building Standards Code baseline water consumption shall be used. • Per CALGreen Code requirements, a Commissioning Plan shall be prepared and all building systems (e.g., heating, ventilation, and air-conditioning [HVAC], irrigation systems, lighting, water heating) shall be commissioned by the Commissioning Authority. • Per CALGreen Code, restrict watering methods (e.g., prohibit systems that apply water to non-vegetated surfaces) and control runoff. **4.3.6.1B** Prior to the issuance of building permits, the project applicant shall provide evidence to the City of Moreno Valley that the following measures have been be incorporated into the design and construction of the project: • Use locally produced and/or manufactured building materials for at least 10 percent of the construction materials used for the project. • Use "Green Building Materials," such as those materials that are resource efficient, and recycled and manufactured in an environmentally friendly way, for at least 10 percent of the project. • Limit unnecessary idling of construction equipment. A reduction in equipment idling would reduce fuel consumption, and therefore, GHG emissions. • Maximize the use of electricity from the power grid by replacing diesel- or gasoline-powered equipment. This would reduce GHG emissions because electricity can be produced more efficiently at centralized power plants. • Design the project building to exceed the California Building Code's (CBC) Title 24 energy	

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Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	standard, including, but not limited to, any combination of the following: o Increase insulation such that heat transfer and thermal bridging is minimized. o Limit air leakage through the structure or within the heating and cooling distribution system to minimize energy consumption. o Incorporate ENERGY STAR or better rated windows, space heating and cooling equipment, light fixtures, appliances, or other applicable electrical equipment. • Provide a landscape and development plan for the project that takes advantage of shade, prevailing winds, and landscaping. • Install efficient lighting and lighting control systems. Use daylight as an integral part of the lighting systems in buildings. • Install light-colored "cool" roof and cool pavements. • Install energy-efficient heating and cooling systems, appliances and equipment, and control systems. • Install solar or light-emitting diodes (LEDs) for outdoor lighting. **4.3.6.1C** Prior to the issuance of occupancy permits, the project applicant shall provide evidence to the City of Moreno Valley that the following measures have been be incorporated into the operation of the project: • The project applicant shall use less than 3,900 Global Warming Potential (GWP) hydrofluorocarbon (HCF) refrigerants or natural refrigerants (ammonia, propane, carbon dioxide	

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Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	[CO_2]) for refrigeration and fire suppression equipment. • Provide vegetative or man-made exterior wall shading devices for east-, south-, and west facing walls with windows. • Devise a comprehensive water conservation strategy appropriate for the project and its location. The strategy may include the following, plus other innovative measures that may be appropriate: o Install drought tolerant plants for landscaping. o Use reclaimed water for landscape irrigation within the project. Install the infrastructure to deliver and use reclaimed water. o Install water-efficient irrigations systems, such as weather-based and soil-moisture-based irrigation controllers and sensors for landscaping according to the California Department of Water Resources Model Efficient Landscape Ordinance. • Provide employee education about reducing waste and available recycling services.	
Cumulative Greenhouse Gas Emissions and Climate Change: Cumulatively, the build out of the proposed project would contribute approximately 0.044 metric tons of CO_2e per year, which is 0.009 percent of California's existing total emissions for carbon dioxide, methane, and nitrous oxide (478 metric tons of CO_2e per year). The mitigation measures discussed above will likely reduce the project's emissions of greenhouse gases; however, without the necessary science and analytical tools, it is not possible to determine with certainty whether the project's emissions of greenhouse gases will be cumulatively considerable, within the meaning of *CEQA Guidelines* Sections 15065(a)(3) and 15130.	Significant impact. Mitigation is required. **Mitigation Measures 4.2.6.3A** and **4.3.6.3.B**. **Mitigation Measures 4.3.6.1A** through **4.3.6.1.C**.	Significant and Unavoidable. Given the uncertainty of data and appropriate methodology to accurately analyze, and the inability to quantify the reduction achieved through implementation of strategies and programs previously identified, the proposed project's GHG emission contribution would result in a cumulative impact regarding global climate change and the cumulative impacts of the proposed project on global climate change are considered to be significant and unavoidable.

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Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
HAZARDS AND HAZARDOUS MATERIALS (FROM THE INITIAL STUDY [APPENDIX A])		
Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	Less than significant impact. No mitigation is required.	Less Than Significant
Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?	Less than significant impact. No mitigation is required.	Less Than Significant
Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	No impact. No mitigation is required.	Not applicable - No Impact
Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	Less than significant impact. No mitigation is required.	Less Than Significant
For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	Less than significant impact. No mitigation is required.	Less Than Significant
For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	No impact. No mitigation is required.	Not applicable - No Impact
Impair implementation of, or physically interfere with an adopted emergency response plan or emergency evacuation plan?	Less than significant impact. No mitigation is required.	Less Than Significant
Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	Less than significant impact. No mitigation is required.	Less Than Significant
HYDROLOGY AND WATER QUALITY (FROM THE INITIAL STUDY [APPENDIX A])		
Would the project: Violate any water quality standards or waste discharge requirements?	Potentially Significant Impact Unless Mitigation Incorporated. **Mitigation Measure HYD-01:** Prior to grading plan approval and the issuance of a grading permit by the	Less Than Significant

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Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or surface runoff in a manner that would result in flooding on site or off site? Create or contribute runoff which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff? Otherwise substantially degrade water quality?	City, the project proponent shall provide evidence to the City that a Notice of Intent (NOI) with the Regional Water Quality Control Board has been filed to be covered under the State NPDES General Construction Permit for discharge of stormwater associated with construction activities. **Mitigation Measure HYD-02:** Prior to grading plan approval and the issuance of a grading permit by the City, the project proponent shall submit to the State Water Quality Control Board, a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP shall include a surface water control plan and erosion control plan citing specific measures to control on-site and off-site erosion during the entire grading and construction period. Additionally, the SWPPP shall identify structural and nonstructural BMPs to control sediment and non-visible discharges from the site. BMPs to be implemented in the SWPPP may include but shall not be limited to the following: • Sediment discharges from the site may be controlled by the following: gravel bags, silt fences, straw wattles and temporary debris basins (if deemed necessary), and other discharge control devices. The construction and condition of the BMPs will be periodically inspected during construction, and repairs will be made when necessary as required by the SWPPP. • Materials that have the potential to contribute non-visible pollutants to stormwater must not be placed in drainage ways and must be contained, elevated, and placed in temporary storage containment areas. • All loose piles of soil, silt, clay, sand, debris, and other earthen material shall be protected in a reasonable manner to eliminate any discharge	

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Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	from the site. Stockpiles will be surrounded by silt fences. • The SWPPP will include inspection forms for routine monitoring of the site during the construction phase to ensure NPDES compliance. • Additional BMPs and erosion control measures will be documented in the SWPPP and utilized if necessary. • The SWPPP will be kept on site for the entire duration of project construction and will also be available to the local RWQCB for inspection at any time. In the event that it is not feasible to implement the above BMPs, the City of Moreno Valley can make a determination that other BMPs will provide equivalent or superior treatment either on or off site. **Mitigation Measure HYD-03:** Prior to the issuance of grading permits, the project proponent shall provide evidence to the City that the following provisions have been added to construction contracts for the project: • The Construction Contractor shall be responsible for performing and documenting the application of BMPs identified in the SWPPP. Weekly inspections shall be performed on sediment control measures called for in the SWPPP. Monthly reports shall be maintained by the Contractor and submitted to the City for inspection. In addition, the Contractor will also be required to maintain an inspection log and have the log on site to be reviewed by the City of Moreno Valley and the representatives of the Regional Water Quality Control Board. **Mitigation Measure HYD-04:** Prior to grading plan	

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Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	approval and the issuance of a grading permit by the City, the project proponent shall receive approval from the City of Moreno Valley for a Final Water Quality Management Plan (F-WQMP). The F-WQMP shall specifically identify pollutants of concern, site design, source control, and treatment control BMPs that shall be used on site to control predictable pollutant runoff in order to reduce impacts to water quality to the maximum extent practicable.	
Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	Less than significant impact. No mitigation is required.	Less Than Significant
Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on site or off site?	Potentially Significant Impact Unless Mitigation Incorporated. **Mitigation Measure HYD-05:** Prior to grading plan approval and the issuance of a grading permit, the project proponent shall submit a detailed grading plan and drainage report, with supporting engineering calculations, to the City Engineer for review and approval. The plan and report shall incorporate relevant requirements identified by the City and/or site-specific geotechnical investigations. The plan and report shall provide evidence that the storm drainage system would be adequate to convey water for the 100-year storm event from the project site and that the post-development flows exiting the proposed project site are less than or equal to pre-development flows.	Less Than Significant
Place housing within a 100-year floodplain, as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	No impact. No mitigation is required.	Not applicable - No Impact
Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	Less than significant impact. No mitigation is required.	Less Than Significant

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Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	No impact. No mitigation is required.	Not applicable - No Impact
Expose people or structures to inundation by seiche, tsunami, or mudflow?	Less than significant impact. No mitigation is required.	Less Than Significant
LAND USE (FROM THE INITIAL STUDY [APPENDIX A])		
Physically divide an established community?	No impact. No mitigation is required.	Not applicable - No Impact
Conflict with an applicable land use plan, policy or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	Less than significant impact. No mitigation is required.	Less Than Significant
Conflict with any applicable habitat conservation plan or natural community conservation plan?	Potentially Significant Impact Unless Mitigation Incorporated. Implementation of **Mitigation Measures BIO-1 through BIO-4**	Less Than Significant
MINERAL RESOURCES (FROM THE INITIAL STUDY [APPENDIX A])		
Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	No impact. No mitigation is required.	Not applicable - No Impact
Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	No impact. No mitigation is required.	Not applicable - No Impact
4.4 NOISE		
For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, results in exposure of people residing or working in the project area to excessive noise levels.	No impact. No mitigation is required.	Not applicable - No Impact
For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.	No impact. No mitigation is required.	Not applicable - No Impact
Would the project result in exposure of persons to or generation of excessive groundborne vibration or	Less than significant impact. No mitigation is required.	Less Than Significant

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Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
groundborne noise levels?		
Long-Term Traffic Noise Impacts: Would the project result in a substantial temporary, periodic, and/or permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	Less than significant impact. No mitigation is required.	Less Than Significant
Long-Term Operational Noise Impacts: Would the project cause exposure of persons to or generation of noise levels in excess of standards established in the City of Moreno Valley General Plan, Moreno Valley Municipal Code, or applicable standards of other agencies?	Less than significant impact. No mitigation is required	Less Than Significant
Short-Term Construction Noise Impacts: Would the project result in a substantial temporary, periodic, and/or permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	Significant impact. Mitigation is required. **4.9.6.1A** During all project site excavation and grading on site, the project contractor shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards. **4.9.6.1B** The project contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest to the project site. **4.9.6.1C** The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receptors nearest to the project site during all project construction. **4.9.6.1D** During all project site construction activities, the construction contractor shall limit all construction-related activities that would result in high noise levels to between the hours of 6:00 a.m. and 8:00 p.m. on weekdays and between the hours of 7:00 a.m. to 8:00 p.m. on weekends and holidays, unless written approval is obtained from the City Building Official or City Engineer. For grading activity, the hours are limited to between 7 am and 6 pm weekdays and 8 am to 4 pm on weekends and holidays.	Less Than Significant

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Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
Cumulative Noise Impacts: It is not possible to predict if contiguous properties may be constructed at the same time and create cumulative noise impacts that would be greater than if developed at separate times, However, in the event that adjacent properties are developed at the same time as the proposed project, implementation of the required mitigation at each development site would reduce the cumulative impacts of the proposed project to less than significant levels. The increases over existing traffic volume are attributable to cumulative development projects in the project vicinity and region. Cumulative noise impacts associated with roadway noise have been addressed based on the projected future traffic volumes. Comparing cumulative noise levels that would occur both with and without the project, the proposed project would not expose sensitive uses located adjacent to area roadways to excessive noise levels. Therefore, the proposed project's contribution to cumulative noise impacts at sensitive uses would not be significant.	No Impact. No mitigation is required.	Less Than Significant
POPULATION AND HOUSING (FROM THE INITIAL STUDY [APPENDIX A])		
Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	Less than significant impact. No mitigation is required.	Less Than Significant
Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	No Impact. No mitigation is required.	Not applicable - No Impact
Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	No Impact. No mitigation is required.	Not applicable - No Impact
PUBLIC SERVICES (FROM THE INITIAL STUDY [APPENDIX A])		
Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other	Less than significant impact. No mitigation is required.	Less Than Significant

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Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
performance objectives for any of the public services: A) Fire Protection		
Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: B) Police Protection	Less than significant impact. No mitigation is required.	Less Than Significant
Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: C) Schools	Less than significant impact. No mitigation is required.	Less Than Significant
Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: D) Parks	No Impact. No mitigation is required.	Not applicable - No Impact
Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: E) Other Public Facilities	Less than significant impact. No mitigation is required.	Less Than Significant

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Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
RECREATION (FROM THE INITIAL STUDY [APPENDIX A])		
Would the project increase the use of existing neighborhood or regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	Less than significant impact. No mitigation is required.	Less Than Significant
Would the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	Less than significant impact. No mitigation is required.	Less Than Significant
4.5 TRANSPORTATION		
Would the proposed project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	Less than significant impact. No mitigation is required.	Less Than Significant
Would the proposed project result in inadequate emergency access?	Less than significant impact. No mitigation is required.	Less Than Significant
Would the proposed project conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	Less than significant impact. No mitigation is required.	Less Than Significant
Would the proposed project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	Less than significant impact. No mitigation is required.	Less Than Significant
Would the proposed project conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways, and freeways, pedestrian and bicycle paths, and mass transit? Would the proposed project conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	<u>Existing Plus Project Intersection, Roadway Segment, and Freeway Segment Impacts</u>: Significant impact. Mitigation is required. **4.5.6.1A.** Prior to the issuance of building permits, the project applicant shall participate in the City of Moreno Valley Development Impact (DIF) Fee Program and pay the project's fair share for local circulation improvements as outlined in the VIP Moreno Valley Project Traffic Study. The City shall ensure that the intersection and street improvements outlined in the VIP Moreno Valley Project Traffic Study will be constructed pursuant to the timeframes established by the City of Moreno Valley Development Impact Fee Program.	Intersections and Roadway Segments: Less Than Significant Freeway Segments: Significant and Unavoidable

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
	4.5.6.1B. Prior to the issuance of building permits, the project applicant shall participate in the County of Riverside Transportation Uniform Mitigation Fee (TUMF) Program and pay the project's fair share for regional circulation improvements. The City shall ensure that the intersection and street improvements outlined in the VIP Moreno Valley Project Traffic Study will be constructed pursuant to the timeframe established by the County of Riverside TUMF Program.	
Would the proposed project conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways, and freeways, pedestrian and bicycle paths, and mass transit? Would the proposed project conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	<u>Opening Year 2013 Cumulative With Project Conditions Project Intersection, Roadway Segment, and Freeway Segment Impacts:</u> Significant impact. Mitigation is required. **4.5.6.2A.** Prior to the issuance of occupancy permits, the project applicant shall have constructed the site access roadway improvements outlined below. • Indian Street/South Project Driveway: Restripe to convert center turn lane on Indian Street to a two-way left-turn lane. This location does not meet a peak hour signal warrant. This is a site-adjacent improvement to be constructed by the project applicant.	Intersections and Roadway Segments: Less Than Significant Freeway Segments: Significant and Unavoidable
<u>Cumulative Impacts:</u> With the development of the proposed project and the cumulative projects, ten intersections and four roadway segments would require improvements in order to maintain the City's LOS standard. The LOS analysis for freeway segments and ramp merge/diverge areas indicates that three freeway segments and ramp merge/diverge areas would operate at unsatisfactory levels of service with the development of proposed project and cumulative projects.	Significant impact. Mitigation is required. **Mitigation Measures 4.5.6.1A, 4.5.6.1B** and **4.5.6.2A.**	The roadway and intersection improvements are consistent with the City's General Plan and are included in the County's TUMF program, with the exception of Indian Street/South Project Driveway which would be constructed entirely by the project applicant. A portion of the City's DIF is allocated toward funding improvements to the City's transportation system and the specific improvements are based on the General Plan Circulation Element. For these reasons, the project's impacts to affected roadway segments will be mitigated

Table 1.B: VIP Moreno Valley - Environmental Summary

Thresholds of Significance	Significance Impact & Mitigation Measures	Level of Significance after Mitigation
		through payment of the City's DIF and the County's TUMF resulting in a less than significant impact. Improvements to affected freeway segments and ramp merge/diverge areas are outside the City's jurisdiction. Since the City has no control over when and how these improvements will be in place, impacts associated with these identified freeway segments would remain significant and unavoidable until such improvements are constructed.
UTILITIES AND SERVICE SYSTEMS (FROM THE INITIAL STUDY [APPENDIX A])		
Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	Less than significant impact. No mitigation is required.	Less Than Significant
Require or result in construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	Less than significant impact. No mitigation is required.	Less Than Significant
Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects	Less than significant impact. No mitigation is required.	Less Than Significant
Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	Less than significant impact. No mitigation is required.	Less Than Significant
Result in a determination by the wastewater treatment provider which serves or may serve the project determined that it has adequate to serve the project's projected demand in addition to the provider's existing commitments?	Less than significant impact. No mitigation is required.	Less Than Significant
Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	Less than significant impact. No mitigation is required.	Less Than Significant
Comply with federal, state, and local statues and regulations related to solid waste?	Less than significant impact. No mitigation is required.	Less Than Significant

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2.0 INTRODUCTION AND PURPOSE

This section of the Draft EIR describes the purpose and type of EIR, the intended uses of the EIR, documents incorporated by reference, and the process and procedures governing the preparation of the environmental document. Included in this section is a discussion of issues determined to be less than significant. This section also identifies topic areas of discussion and analysis in the Draft EIR and provides an outline of the document format.

2.1 DOCUMENT FORMAT

To assist the reader's review of the document, the following describes the format of this EIR.

Section 1.0 *Executive Summary* provides a summary of the EIR document and (in Table 1.B) the proposed project impacts, proposed mitigation measures, and the level of significance of each impact following the application of identified mitigation measures.

Section 2.0 *Introduction and Purpose* provides a discussion of the EIR's purpose, focus, legal requirements, and an outline of the document's format and content.

Section 3.0 *Project Description* provides a detailed description of the proposed project, discretionary actions required to implement the project, and objectives of the proposed project.

Section 4.0 *Existing Setting, Impacts, and Mitigation Measures* evaluates the impacts associated with the proposed project. This section is organized by issue area and follows the following framework:

- *Existing Setting*. Information in the existing setting contains a discussion of the local and regional environment conditions (environmental and man-made) in existence at the time the NOP was circulated for public review. Existing setting information provides the reader with the "baseline" from which future impacts are analyzed, and provides a standard against which to measure these impacts.
- *Existing Policies and Regulations.* Regulatory requirements and policies (federal, state, and local) applicable to the issue area are summarized.
- *Methodology.* Identification of methods and techniques utilized for analysis.
- *Thresholds of Significance*. Determinations regarding the significance of potential impacts resulting from implementation of the proposed project are provided. These thresholds represent the criteria used in this EIR to determine whether identified impacts are significant.
- *Impacts*. Potential impacts are identified based on implementation of the proposed project. An analysis of potential impacts of the proposed project is presented in this section. This discussion focuses on the impacts of implementation of the proposed project, and includes potential short-term/long-term and direct/indirect project impacts, and consistency with applicable planning documents or regulations.
    - *Mitigation Measures*. The measures proposed to mitigate any potential impacts of the proposed project.
    - *Level of Significance after Mitigation.* Discussion that provides a conclusion as to whether implementation of the mitigation measures will reduce the project-related and cumulative impacts to a level that is less than significant.

- *Cumulative Impacts.* This discussion focuses on the potential environmental effect of the proposed project combined with the effects of reasonably foreseeable development within the project study area.

Section 5.0 *Additional Topics Required by CEQA* contains discussions of additional topics required by CEQA, including unavoidable effects of the proposed project, growth inducement, and significant irreversible environmental changes.

Section 6.0 *Alternatives* contains discussion of alternatives to development of the proposed project. As intended by CEQA, sufficient information about each alternative is included to provide meaningful evaluation, analysis, and comparison with the proposed project. This section also evaluates the proposed effects of the No Project Alternative and identifies the environmentally superior alternative.

Sections 7.0–9.0 Contain listings of organizations and persons consulted in preparation of the EIR, references cited, a list of the EIR preparers, and acronyms used in the document.

The *Appendices* contain a copy of the NOP, NOP mailing list, NOP comment letters and responses, public scoping meeting information, technical reports, and other relevant correspondence received during the course of the analysis of the proposed project.

2.2 PURPOSE OF THE DRAFT ENVIRONMENTAL IMPACT REPORT

Approval of the proposed project requires the following discretionary actions by the City:

- Certification of the Project EIR;
- Approval of a Tentative Parcel Map; and
- Approval of the Development Plan Review.

Because of these discretionary actions to be considered by the City, CEQA requires that the proposed project be reviewed to determine the environmental effects that would result if the project is approved and implemented. The City is the Lead Agency and has the responsibility for preparing and certifying this EIR prior to consideration of the proposed project. The City has the authority to make decisions regarding discretionary actions relating to implementation of the proposed project. Ministerial actions include approval of a Preliminary Water Quality Management Plan (P-WQMP) and Final WQMP (F-WQMP), Grading Plans, and Improvement Plans.

The objective of the Draft EIR is to inform City decision-makers, representatives of other affected/responsible agencies, the public, and other interested parties of the potential environmental consequences that may be associated with the approval and implementation of the proposed project. The Draft EIR also examines various alternatives to the proposed project and describes potential impacts relating to a variety of environmental issues and methods in which these impacts would be mitigated or avoided. This Draft EIR has been prepared in accordance with CEQA, California Public Resources Code Section 21000 *et seq.*; the *Guidelines for California Environmental Quality Act* (California Code of Regulations, Title 14, Chapter 3); and the rules, regulations, and procedures for implementing CEQA as adopted by the City.

2.2.1 Purpose of the California Environmental Quality Act

According to Section 15002 of *CEQA Guidelines*, the basic purposes of CEQA are to:

- Inform government decision-makers and the public about the potential significant environmental effects of proposed activities;

- Identify ways that environmental damage can be avoided or significantly reduced;
- Prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governing agency finds the changes to be feasible; and
- Disclose to the public the reasons why a governmental agency approved the project in the manner the agency chose if significant environmental effects are involved.

2.2.2 Intended Use of This EIR

The City, as the Lead Agency, has the responsibility for reviewing and approving the project-related actions. Under contract to the City and as permitted under *CEQA Guidelines* (§ 15084[d-e]), LSA Associates, Inc. (LSA), an independent environmental consulting firm, has prepared the Draft EIR. Prior to certification, this EIR must be subjected to the City's independent review and analysis. The information and conclusions must represent the City's independent judgment. This Draft EIR has been prepared utilizing information from City planning and environmental documents, applicant-provided technical studies; and other publicly available data. This Draft EIR is intended to provide the City with relevant information to use in considering approval of the proposed project by the City, and will serve as an informational document to assess the environmental effects of the proposed project and mitigation measures recommended to avoid or minimize identified significant impacts. As a public disclosure document, the Draft EIR has been made available to public agencies and the public for review prior to the City's consideration of the discretionary actions required for project approval.

2.2.3 Incorporated Documents

CEQA *Guidelines* (§ 15150) permits the incorporation by reference of all or portions of other documents that are generally available to the public. Any documents incorporated by reference are to be made available to the public for inspection at a public place or public building and CEQA requires that the EIR state where the incorporated documents will be made available for public inspection. The following documents have been incorporated by reference:

- *City of Moreno Valley General Plan*, adopted June 11, 2006.
- *City of Moreno Valley General Plan Final Environmental Impact Report*, July 2006.

Information from these documents relates to the condition of the natural and built environment; the type and level of services provided; City objectives, goals, and policies; thresholds for the evaluation of potential environmental impacts; and mitigation measures incorporated into the analysis contained in this Draft EIR. All of the project-related documents are available for review at the following locations:

City of Moreno Valley
Community Development Department
Planning Division
14177 Frederick Street
Moreno Valley, California 92553
(951) 413-3206
e-mail: jeffreyb@moval.com
Hours:
Monday through Thursday: 7:30 a.m. to 5:30 p.m.
Friday: closed

Moreno Valley Main Library
25480 Alessandro Boulevard
Moreno Valley, California 92553
(951) 413-3880
Hours:
Monday–Thursday: 9:00 a.m. to 8:00 p.m.
Saturday: 9:00 a.m. to 5:00 p.m.
Friday and Sunday: closed

The Draft EIR and technical studies is available online at the City's website: http://www.moval.org.

2.2.4 Technical Reports

Various technical reports have been prepared to assess specific issues that may result from the construction and operation of the proposed project. As relevant, information from these technical reports has been incorporated into the Draft EIR. The technical reports and other information included as appendices to this EIR include the following:

- Appendix A: *Initial Study, NOP, and NOP Comment Letters*, August 2011.
- Appendix B: Initial Study Technical Reports
    - Appendix B-1: *General Habitat Assessment, 71± Site (APNs: 316-210-071, -073, -075, -076), Moreno Valley, Riverside County California*, Ecological Sciences, Inc., August 1, 2010.
    - Appendix B-2: *Jurisdictional Survey and MSHCP Riparian/Riverine/Vernal Pools Evaluation, 71± Site (APNs: 316-210-071, -073, -075, -076), Moreno Valley, Riverside County California*, Ecological Sciences, Inc., November 1, 2009.
    - Appendix B-3: *Focused Surveys for Selected Criteria Area and Narrow Endemic Plant Species, 71± Site (APNs: 316-210-071, -073, -075, -076), Moreno Valley, Riverside County California*, Ecological Sciences, Inc., November 9, 2009.
    - Appendix B-4: *Focused Western Burrowing Owl Survey, 71± Site (APNs: 316-210-071, -073, -075, -076), Moreno Valley, Riverside County California*, Ecological Sciences, Inc., November 11, 2009.
    - Appendix B-5: *Phase I Cultural Resources Assessment and Paleontological Records Review Perris Bouldevard Project, Moreno Valley, Riverside County, California,* Michael Brandman Associates, March 22, 2007.
    - Appendix B-6: *Geotechnical Engineering Investigation Proposed Industrial Development Southwest Corner of Perris Boulevard and Grove View Road Moreno Valley, California*, NorCal Engineering, March 7, 2007.
    - Appendix B-7: *Phase I Environmental for the Evaluation of Potentially Hazardous Materials*, Centec Engineering, February 23, 2007.
    - Appendix B-8: *Preliminary Hydrology Report and Hydraulic Analysis for PA09-004, VIP Moreno Valley, SWC Perris Boulevard and Grove View Road*, Robert A. Bebensee, R.C.E., March 27, 2009.
    - Appendix B-9: *Preliminary Water Quality Management Plan, for PA09-0004 VIP Moreno Valley, SWC Perris Boulevard and Grove View Road*, Robert A. Bebensee, R.C.E., July 24, 2009.
    - Appendix B-10: *Water Supply Assessment for City of Moreno Valley Plot Plan Application PA09-004*, Eastern Municipal Water District, January 20, 2010.
- Appendix C: *LESA Modeling Worksheets*, LSA Associates, Inc., August 2011.
- Appendix D-1: *Air Quality Analysis VIP Moreno Valley*, LSA Associates, Inc., August 2011.
- Appendix D-2: *Health Risk Assessment VIP Moreno Valley*, LSA Associates, Inc., August 2011.
- Appendix E: *Greenhouse Gas Emissions and Global Climate Change Study*, LSA Associates, Inc., August 2011.
- Appendix F: *Noise Impact Analysis VIP Moreno Valley*, LSA Associates, Inc., August 2011.

- Appendix G: *Traffic Study VIP Moreno Valley*, LSA Associates, Inc., January 2012.

In addition to these technical studies, this Draft EIR includes the Initial Study, NOP, Distribution List, and public responses to the NOP, which are included as Appendix A.

2.3 PUBLIC REVIEW OF THE DRAFT ENVIRONMENTAL IMPACT REPORT

This Draft EIR will be distributed to responsible and trustee agencies, other affected agencies, and interested parties. Additionally, in accordance with Public Resources Code 21092(b)(3), the Draft EIR will be provided to all parties who have previously requested copies. Notice of Completion and Availability of the Draft EIR will be distributed as required by CEQA. During the 45-day public review period, the Draft EIR and technical appendices will be made available for review.

Written comments regarding this Draft EIR should be addressed to:

Jeff Bradshaw, Associate Planner
City of Moreno Valley, Planning Division
14177 Frederick Street
Post Office Box 88005
Moreno Valley, California 92553
Phone: (951) 413-3224
e-mail: jeffreyb@moval.com

After the 45-day public review period, written responses to all significant environmental issues raised will be prepared. These responses will be available for review for a minimum of 10 days prior to the public hearing before the Planning Commission, at which time the certification of the Final EIR will be considered. The Final EIR, which includes the Draft EIR, the public comments and responses to the Draft EIR, and findings will be included as part of the environmental record for consideration by the City decision-makers.

2.3.1 Initial Study and Notice of Preparation

The City formally initiated the environmental process with circulation of an NOP, which it sent to responsible agencies and interested individuals for a 30-day review period from August 26 to September 26, 2011. At the close of the public review period, the City had received 12 letters on the NOP. Summaries of the comments received during the NOP comment period have been previously identified in Section 1.3.1 of this Draft EIR. The NOP and the responses to the NOP from agencies and individuals are included in Appendix A of this EIR.

2.3.2 Public Scoping Meeting

A public scoping meeting was held to solicit public comment as to the scope of the EIR. This meeting was held on September 19, 2011, at 6:00 p.m. at the City of Moreno Valley City Council Chambers. Other than City staff and the EIR consultant, two members of the public attended and only one question was asked regarding the location of the project's soil export site.

2.4 POTENTIAL SIGNIFICANT IMPACTS OF THE PROPOSED PROJECT DISCUSSED IN THE EIR

As identified in the NOP, this Draft EIR includes an analysis of potential environmental effects associated with the following issues:

- Agricultural and Forest Resources
- Air Quality
- Greenhouse Gases and Global Climate Change
- Noise
- Transportation

2.5 EFFECTS FOUND NOT TO BE SIGNIFICANT

As required under CEQA (§ 15128), an EIR is to contain a statement supporting the Lead Agency's determination that some of the possible effects of a project are not significant and, therefore, are not discussed in detail in the EIR. The City has determined that potential impacts related to the following issue areas are either no impact, less than significant, or less than significant with implementation of mitigation measures (as indicated in the Initial Study (Appendix A). Mitigation that is identified for issues that were determined to be less than significant with the implementation of mitigation measures will be identified in the Mitigation Monitoring Plan that will be attached to the Final EIR and adopted by the City. The discussion below addresses each significance threshold as indicated in Appendix G of the CEQA Guidelines to make it clear to the reader which impacts are no impact, less than significant and less than significant with the implementation of mitigation measures.

2.5.1 Aesthetics

Would the project:

a) Have a substantial adverse effect on a scenic vista?

Less Than Significant Impact. According to the Moreno Valley General Plan EIR, much of the existing development within the planning area is limited to the flat valley floor, preserving the views of the largely undeveloped surrounding hillsides. Existing urbanized development consists of residential, business park, commercial, office, and public uses, with single-family residential uses comprising the great majority of urbanized land. Non-residential urban uses are concentrated along major transportation corridors and around the joint civilian and military use March Air Reserve Base. The proposed project is not within a scenic vista identified by the City's General Plan or Specific Plan 208. Although the General Plan identifies major scenic resources (i.e., surrounding mountains, San Jacinto/Hemet Valley, buildings, landscaping, and signs) in Moreno Valley as being visible from SR-60, the project would not affect views of these major scenic resources. In addition, the proposed project is consistent with development envisioned in the General Plan and Specific Plan 208, and based on the narrow definition of what constitutes a scenic vista as described in the City's General Plan EIR,[1] the potential impact to scenic vistas would be less than significant

b) Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?

No Impact. The proposed project is not located along a state scenic highway, nor are any state scenic highways located in the project vicinity.[2] As noted in the discussion above, the City's General Plan identifies major scenic resources as being visible from SR-60 and the project would not affect views of these major scenic resources. In addition, the proposed site does not contain rock outcroppings,

[1] *Figure 5.11-1 Major Scenic Resources*, City of Moreno Valley General Plan Final Program EIR, July 2006.
[2] Caltrans California Scenic Highway Program, http://www.dot.ca.gov/hq/LandArch/scenic/cahisys.htm, website accessed June 8, 2011.

historic buildings of significance, or other features that have been identified as scenic resources by either the City or State. The site does contain several ornamental trees (Eucalyptus, pine, and Peruvian pepper). Prior to development of the site, the developer will be required to replace all mature trees 4 inches in diameter or greater in accordance with the City's tree removal replacement policy. As no impact to an identified scenic resource within a state scenic highway would result from development of the proposed on-site uses, no impact associated with this issue would occur.

c) Substantially degrade the existing visual character or quality of the site and its surroundings?

Less Than Significant Impact. Visual impacts associated with changes to the general character of the *project site (e.g., loss of open area), the components of the visual settings (e.g., landscaping and* architectural elements), and the visual compatibility between proposed site uses and adjacent land uses would occur. The significance of visual impacts is inherently subjective as individuals respond differently to changes in the visual characteristics of an area. The project site is currently undeveloped with existing warehousing and industrial uses to the north, east, and west. Implementation of the proposed project would result in the construction and operation of approximately 1,616,133 square feet of warehouse distribution uses with associated parking areas, landscaping, and roadway infrastructure within approximately 71 acres. Therefore, development of the proposed project would change the character of the project site from open space to a more urbanized setting. The change in the character of the site would constitute an alteration of the existing visual character of the project site.

The proposed project features a variety of architectural elements including façade accents such as corner treatments and roof trim. The project would also provide variation in wall planes that serve to avoid an institutional appearance and break up the bulk of the buildings. This variation creates shadow lines at various times of the day. The proposed landscaping would replace the scattered weedy vegetation with a consistent and integrated vegetation palette. Landscaping on site would be provided in accordance with City Municipal Code Chapter 9.17, which requires the installation of landscaping on site and the planting of one tree for every 30 linear feet of building dimension that is visible from the parking lot or public right-of-way. The proposed project would also be required to install landscape and irrigation and provide screen walls to block view of activity in truck court. Additionally, the proposed project would include the installation of water-efficient landscaping throughout the development with landscaping proposed along the project perimeter, internal drives, and throughout the on-site parking areas. The City's Municipal Code (Section 19.05 and Table 9.05.040-8) establishes the number, location, height, and style of signage permitted within industrial zones. The submittal and approval of signs are required for all development in the City; therefore, it is reasonable to conclude that any on-site signs are internally compatible and consistent with the City's current signage standards. Adherence to City requirements would result in a less than significant level.

Although the visual characteristic of the project site would change, there would be no demonstrable negative aesthetic effect to the existing visual character or quality of the project site or its surroundings. The proposed project would replace the existing vacant parcel with development that is visually compatible with existing development in the vicinity as well as the proposed future urbanization of the area through the use of architectural elements, landscaping, and project design. In addition, the proposed project would be designed and constructed per applicable City Municipal Code and General Plan standards. Therefore, because no demonstrable negative aesthetic effect to the existing visual character or quality of the project site or its surroundings is anticipated to result from the proposed project, no significant impact related to this issue would occur.

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Less Than Significant Impact. Currently, there are no sources of light or glare on the project site. Existing sources of light and glare from surrounding areas include streetlights, exterior lighting from the nearby warehouse buildings, and vehicle headlights from motorists driving along Perris

Boulevard. Development of the project site would introduce a new source of light and glare into the area in the form of street lighting, parking lot lighting, and security lighting for the buildings. It is anticipated that the materials utilized in the construction of the proposed lighting fixtures would be generally similar to those utilized in nearby warehouse uses within the City. Lighting within loading areas will be directed downward so as to not project lighting into the sky.

Exterior surfaces of the concrete tilt-up structure would be finished with a combination of architectural coatings, trim, glazing, and other building materials such as concrete and brushed metal. The proposed project is not expected to significantly increase the amount of daytime glare in the project area. All development in the City, which includes light generated from warehouse buildings and parking lots, is required to adhere to lighting requirements contained in the City's Municipal Code (Section 9.08.100 Lighting), which states that any outdoor lighting associated with nonresidential uses shall be shielded and directed away from the surrounding residential uses. Such lighting shall not exceed one-half foot-candle at all property lines and shall not blink, flash, oscillate, or be of unusually high intensity or brightness. Lighting in parking areas and drive aisles must be at least 1.0 foot-candle and cannot exceed a maximum of 8 foot-candles. Adherence to the City's Zoning Code would ensure that any building or parking lighting would not significantly impact adjacent uses. Therefore, impacts associated with this issue are less than significant

2.5.2 Biological Resources

Would the project:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Potentially Significant Unless Mitigation Incorporated. The following discussion is based in part on the *General Habitat Assessment*[1] prepared for the proposed project, including focused burrowing owl, special status plant, and wetland determination studies contained in its appendices. Biological resources surveys were conducted on the project site in February, May, June, and July 2007, and August and October 2009.

The proposed project site was last used for agricultural purposes in 2005 and currently lies fallow. The site is disked annually to reduce weed growth and fire hazards. Portions of the site have also been scraped by earthmoving equipment associated with adjacent development, roadway work, construction equipment staging, and stockpiling. Non-native, ornamental trees are located in the southeast portion of the site. Four small depressions created by construction activities are located on the eastern edge of the site. A north-south ditch is located through the center of the site.

In general, the existing condition on site is characterized as a regularly disked field that supports little to no standing vegetation. Ruderal (weedy) herbs and grasses occupy portions of the site perimeter, the ditch, and depressions. Ruderal, invasive species observed on the site included Palmer's amaranthus (*Amaranthus palmeri*), Russian thistle (*Salsola tragus*), pigweed (*Chenopoium album*), cheeseweed (*Malva parviflora*), foxtail chess (*Bromus madritensis*), ripgut grass (*Bromus diandrus*), barely (*Hordeum murinum*), common sow thistle (*Sonchus oleraceus*), prickly lettuce (*Lactuca serriola*), five-hook bassia (*bassia hysopifolila*), knotweed (*Polygonum arenastrum*), and short-pod mustard (*Hirschfeldia incana*). Ornamental trees include gum tree (*Eucalyptus* sp.), pine (*Pinus* sp.), and Peruvian pepper (*Schinus molle*). Native plant species present on the site include common sunflower (*Helianthus annuus*), Rancher's fireweed (*Amsinckia menziesii*), California-aster (*Lessingia filaginifolia*), horseweed (*Conyza canadensis*), a few mule fat (*Baccharis salicifolia*), and one broom baccharis (*Baccharis sarothroides*). The ditch supports many of the ruderal species cited above as well as scattered nightshade (*Solanum* sp.), pineapple weed (*Chamomilla suaveolens*), dog

[1] *General Habitat Assessment, 71-acre Site, APNs 316-210-071, -073, -075, -076*, Ecological Sciences, Inc. August 1, 2010.

mayweed (*Anthemis cotula*), curly dock (*Rumex crispus*), tarplant (*Centromadia pungens* ssp. *pungens*), willow-herb (*Epilobium ciliatum*), salt heliotrope (*Heliotropium curassavicum*), fleabane (*Conyza bonariensis*), thistle (*Cirsium* sp.), Rancher's fireweed, decaying stalks of cattails (*Typha latifolia*), one willow (*Salix* sp.), and invasive salt cedar (*Tamarix* sp.). The four depressions are dominated by brome grasses, filaree (*Erodium cicutarium*), mustards (*Brassica/Hirschfeldia* sp.), Russian thistle, Bermuda grass (*Cynodon dactylon*), aster, mayweed, telegraph weed (*Heterotheca grandiflora*), common sunflower, Australian saltbush (*Atriplex semibaccata*), fleabane, and nettle-leaved goosefoot (*Chenopoium murale*).

Birds observed on the site included the red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), common raven (*Corvus corax*), American crow (*Corvus brachyrhynchos*), Brewer's blackbird (*Euphagus cyanocephalus*), European starling (*Sturnus vulgaris*), rock dove (*Columbia livia*), Say's phoebe (*Sayornis saya*), northern mockingbird (*Mimus polyglottos*), western kingbird (*Tyrannus verticalis*), western meadowlark (*Sturnella neglecta*), morning dove (*Zenaida macroura*), house finch (*Carpodacus mexicanus*), and house sparrow (*Passer domesticus*). Reptiles observed on the site included the side-blotched lizard (*Uta stansburiana*) and western fence lizard (*Sceloporus occidentialis*). Mammals observed on the site included the California ground squirrel (*Spermophilus beecheyi*), desert cottontail (*Sylvilagus audubonii*), and pocket gopher (*Thomomys bottae*).

Thirty-one species in western Riverside County have special status under the Federal Endangered Species Act (FESA) and/or the California Endangered Species Act (CESA). These include species that are listed as "endangered" or "threatened" under the FESA or that have been "proposed" or are "candidates" for such listing. These also include species that are listed as "endangered," "threatened," or "rare" under the CESA or that have been petitioned (i.e., are "candidates") for listing. The Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) provides for the long-term survival of protected and sensitive species by designating a contiguous system of habitat to be added to existing public/quasi-public lands. The Plan includes an impact fee collected by the 16 member cities and other local agencies, including the City of Moreno Valley, used to acquire these lands. Depending on the location of a private or public development project, certain biological studies may be required to comply with the MSHCP. The MSHCP defines two distinct consistency processes for development projects based on their location within the MSHCP Plan Area, with separate processes for projects located outside of Criteria Areas and those within a Criteria Area. Through implementation of these requirements, development projects are found to be consistent with the MSHCP, and impacts to covered species are considered less than significant. The project site is not located within an MSHCP Criteria Area, but is located in an area requiring habitat assessments for burrowing owl (*Athene cunicularia*), five Narrow Endemic Plant Species (NEPS), and nine Criteria Area Plant Species (CAPS). A Jurisdictional Delineation is required to assess potential jurisdiction of the ditch running north/south through the center of the project site.

Species Status Avian and Burrowing Owl Species

Burrowing owls or their sign (pellets, fecal material, or prey remains) were not observed during the habitat assessment surveys (February 2007) or focused surveys (August 2009) conducted on site. Due to intensive disking that had occurred on site, only a few marginally suitable potential burrows were identified. Although burrowing owl is known to occur on land that has been disturbed, it tends to avoid heavily disked areas because potential burrows occlude/collapse. However, burrowing owls, and other native bird species protected under the Migratory Bird Treaty Act (MBTA), are very mobile and opportunistic species that can occupy a site. For this reason, **Mitigation Measures BIO-1** through **BIO-4** requiring pre-construction surveys will be implemented to reduce impacts to nesting birds and burrowing owl.

- **Mitigation Measure BIO-1:** No more than 72 hours prior to initiation of ground-disturbing activities, a pre-construction survey shall be completed by a qualified biologist. The survey will identify special status avian species (if any) within the area of intended disturbance. In the event no special status avian species are identified within the limits of disturbance, no further

mitigation is required. In the event such species are identified within the limits of ground disturbance, **Mitigation Measure BIO-3** shall apply.

- **Mitigation Measure BIO-2:** No more than 72 hours prior to initiation of ground-disturbing activities, a pre-construction burrowing owl survey shall be completed by a qualified biologist for the planned disturbance area. The pre-construction burrowing owl surveys may be conducted as part of the survey required in **Mitigation Measure BIO-1**. A report detailing the findings of the pre-construction survey shall be submitted to the City prior to the initiation of ground-disturbing activities. In the event no burrowing owls are identified within the limits of ground disturbance, no further mitigation is required. In the event burrowing owls are identified within the limits of ground disturbance, **Mitigation Measures BIO-3** and **BIO-4** shall apply.
- **Mitigation Measure BIO-3:** If nesting special status avian or burrowing owl species are determined to occupy a proposed area of disturbance, no construction activity shall take place within 500 feet of an active nest/burrow until it has been determined that the nest/burrow is no longer active, and all juveniles have fledged the nest/burrow.
- **Mitigation Measure BIO-4:** If active burrowing owl burrows are detected outside the breeding season, then passive and/or active relocation may be approved following consultation with the CDFG and/or USFWS. One-way doors may be installed as part of a passive relocation program. Burrowing owl burrows shall be excavated with hand tools by a qualified biologist when determined to be unoccupied, and backfilled to ensure that animals do not re-enter the holes/dens.

Implementation of the above-listed mitigation measures would reduce impacts to burrowing owl and special status avian species to a less than significant level.

Special Status Plant Species

The five NEPS and nine CAPS were not observed during the general survey (February 2007) and focused surveys (May, June, and July 2009) conducted on site. Overall, the project site lacks suitable habitat for these species due to historic agricultural activities. Nonetheless, focused surveys were conducted to cover the four depressed areas and the ditch. No special status plants were observed during the focused surveys. Because of the absence of members of the species and suitable habitat, a less than significant impact to special status plants would occur.

b) Have a substantially adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Wildlife Service?

Less than Significant Impact. Assessment of the MSHCP objectives associated with Riparian/Riverine Areas, Vernal Pools, and Fairy Shrimp is required because of the presence of the four depressions on the eastern project boundary and the ditch that runs north-south through the center of the site. This assessment was included in the *Jurisdictional Survey and MSHCP Riparian/Riverine/Vernal Pools Evaluation* prepared for the project.[1] No evidence of a natural stream course, riparian area, or vernal pool was observed during the February 2007 general site survey. Subsequent field survey in October 2009 identified mud cracks in the four depressions along the eastern project boundary. In 2007, this area had been recently scraped as part of the City's Perris Boulevard widening project. As part of the biological resources assessment for the roadway widening project, dry season fairy shrimp surveys yielded the presence of the common Lindahl's (versatile) fairy shrimp (*Branchinecta lindahli*), which is a non-listed species. The City mitigated impacts to the vernal pool by purchasing mitigation bank credits toward an off-site wetland mitigation bank. Complete mitigation of impacts to these vernal pools has been satisfied. No further analysis of this issue in the EIR is required.

[1] Jurisdictional Survey and MSHCP Riparian/Riverine/Vernal Pools Evaluation, Ecological Sciences, Inc., November 1, 2009.

As stated in the jurisdictional survey report, water does not appear to remain in the ditch long enough to support wetland hydrology and extensive hydrophytic vegetation. The drainage ditch was created approximately 20 years ago in order to receive off-site drainage flows from the property to the north. That property and Grove View Road were developed last year, and drainage from the property to the north now flows into a storm drain located in Grove View Road. The ditch no longer accepts off-site flows and now only accepts minimal amounts of drainage from on-site sheet flow. In accordance with the MSHCP definition of a wetland habitat or a natural stream, the ditch was artificially created for the purposes of drainage and is therefore not defined as a wetland habitat or an altered natural stream course. For this reason, the proposed project would have a less than significant impact on riparian/riverine areas, vernal pools, and fairy shrimp.

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Less than Significant Impact. The potential for agency jurisdiction of the on-site drainage ditch was assessed as part of the previously referenced *Jurisdictional Survey and MSHCP Riparian/Riverine/Vernal Pools Evaluation* prepared for the project. The ditch does not meet the three-parameter test for jurisdiction (vegetation, hydrology, and soils). The jurisdictional survey report notes the ditch contains only one riparian indicator species, a willow tree. The ditch is not part of a remnant blue line stream or connected upstream or downstream from a known natural stream or modified natural drainage way. Soil samples at three locations indicated a lack of hydric soils. The proposed project would have a less than significant impact on protected wetlands.

d) Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established native resident migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less than Significant Impact. Habitat fragmentation occurs when a proposed action results in a single, unified habitat area being divided into two or more areas, such that the division isolates the two new areas from each other. Isolation of habitat occurs when wildlife cannot move freely from one portion of the habitat to another or from one habitat type to another. An example is the fragmentation of habitats within and around clustered residential development. Habitat fragmentation may occur when a portion of one or more habitats is converted into another habitat, as when scrub habitats are converted into annual grassland habitat because of frequent burning.

Upon completion, implementation of the MSHCP will create an interconnected link of natural habitat areas by utilizing existing public and quasi-public areas and acquiring additional areas to establish this interconnected link of natural habitats using fees collected by the member agencies as private land is developed. The resulting habitat areas will result in the protection of sensitive and special status species, partly through the interconnected habitat areas. Because the proposed project is not covered by a proposed or existing Core or Linkage as identified in the MSHCP, development of the site will not impede wildlife movement. The project site is not in proximity to any known wildlife corridors. Intervening development (industrial uses) and roadways adjacent to the project site separate the project site from surrounding areas. These features already restrict wildlife movement in the project vicinity. Due to the disturbed condition of the project site, the nature of adjacent development, and the intervening presence of roadways and infrastructure, development of the proposed project would not result in significant habitat fragmentation or substantially affect established wildlife corridors or wildlife movement. Therefore a less than significant impact associated with this issue would occur.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

No Impact. City policies or ordinances identified in the General Plan protecting biological resources include mitigation of impacts to riparian areas or other natural sensitive communities (Policy 7.4.1), preservation of natural drainage courses in their natural hydrological state (Policy 7.4.3), and City fulfillment of obligations set forth within any agreements and permits related to MSHCP implementation (Policy 7.4.5). Adherence to Policy 7.4.5 was discussed previously in response to Questions a), b), and d) above.

The drainage ditch running north-south through the center of the project site does not contain the vegetation, hydrology, or soils characteristics associated with a wetland or natural drainage. As previously identified, the ditch is not considered a riparian area and therefore the project would not conflict with the City's polices to protect natural drainages and sensitive communities. Therefore, the proposed project would not conflict with local policies or ordinances protecting biological resources and a less than significant impact would occur.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan?

Potentially Significant Impact Unless Mitigation Incorporated. See responses to Questions a), b), and d) above. The proposed project is located within the boundaries of the Stephens' Kangaroo Rat Habitat Conservation Plan (SKR HCP). Also, the City is participating in the MSHCP, a comprehensive habitat conservation-planning program addressing multiple species' needs, including preservation of habitat and native vegetation in western Riverside County. The project is not within any MSHCP Criteria Areas or Public/Quasi-Public Land. The project as designed and conditioned is consistent with the MSHCP and will have not conflict with the MSHCP or SKR HCP. The SKR HCP will require a fee of $500.00 per acre to be paid by the developer to assist in setting aside established protection areas for said habitat. This project will also be subject to fees to support the implementation of the MSHCP. The fee is currently $6,597 per acre.

2.5.3 Cultural Resources

Would the project:

a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?

Less than Significant Impact. Based on the Phase I Cultural Resources Assessment and Paleontological Records Review prepared for the proposed project, the site contains a historic site and a historic isolate, which were recorded and evaluated for significance in accordance with CEQA. Based on the study, it was determined that the historic resource and historic isolate were not considered to be significant. Consequently, construction and grading of the proposed project site will not affect significant historic resources, resulting in a less than significant impact.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?

Less than Significant Impact. Based on the Phase I Cultural Resources Assessment and Paleontological Records Review prepared for the proposed project, the site has a low potential for containing archeological resources due to the lack of such resources previously discovered in the surrounding area and the disturbed nature of the project site. Consequently, construction and grading of the proposed project site will have a low probability of damaging archeological resources. Impacts to archeological resources are considered to be less than significant.

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Potentially Significant Impact Unless Mitigation Incorporated. Based on the Phase I Cultural Resources Assessment and Paleontological Records Review prepared for the proposed project, the

site has a high potential to contain significant fossil resources due to the presence of early to middle Pleistocene alluvial fan deposits. These resources are the fossilized biotic remains of ancient environments valued for the information they yield about the history of the earth and its past ecological settings. These resources have the potential for being unearthed and damaged during grading and construction activities and are estimated to lie at approximately 4 feet below ground surface. Construction and grading of the proposed project site will result in soil disturbance below 4 feet, which may unearth previously undetected subsurface paleontological resources. **Mitigation Measure CUL-1** has been identified to reduce the significance of paleontological resource impacts.

Mitigation Measure CUL-1: Prior to construction involving excavation four feet or more below existing surface grade, the construction contractor shall provide evidence that a qualified paleontologist has been retained, and that the paleontologist(s) shall be present during all grading and other significant ground-disturbing activities that reach four feet or more below existing surface grade. If the paleontologist(s) do not find evidence for Pleistocene-era deposits once the maximum excavation depth is reached, monitoring shall be discontinued. In the event fossiliferous deposits are encountered, the following measures shall be implemented:

- Monitoring shall be conducted by qualified paleontological monitor(s) of excavation in areas identified as likely to contain paleontological resources, including undisturbed older Pleistocene alluvium. Paleontological monitors shall be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors shall be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring may be reduced if the potentially fossiliferous units are determined upon exposure and examination by qualified paleontological personnel to have low potential to contain fossil resources.
- Paleontological monitoring of any earthmoving will be conducted by a monitor, under direct guidance of a qualified paleontologist. Earthmoving in areas of the parcel where previously undisturbed sediments are buried, but not otherwise disturbed, will not be monitored.
- If too few fossil remains are found after 50 percent of the planned-for earthmoving has been completed, monitoring can be reduced or discontinued in those areas at the project paleontologist's direction.
- Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates.
- Identification and curation of specimens into a professional, fully accredited museum repository with permanent retrievable storage. The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities.
- Preparation or a report of findings with and appended itemized inventory of specimens. The report and report and inventory, when submitted to the City of Moreno Valley along with confirmation of the curation of recovered of recovered specimens into an established, accredited museum repository, will signify completion of the program to mitigate impacts to paleontological resources.

Adherence to this measure would reduce impacts to paleontological resources to a less than significant level.

d) Disturb any human remains, including those interred outside of formal cemeteries?

Less Than Significant Impact. No evidence is in place to suggest the project site has been used for human burials.[1] The California Health and Safety Code states that if human remains are discovered on site, no further disturbance shall occur until the County Coroner has made a determination of origin and disposition.[2] Disposition of the human remains should occur in the manner provided in §

[1] *Chapter 5.10 Cultural Resources*, City of Moreno Valley General Plan Final EIR, July 2006.
[2] Division 7, *Dead Bodies;* Chapter 2, *General Provisions*, § 7050.5, California Health and Safety Code.

5097.98 of the Public Resources Code. If the Coroner determines that the remains are not subject to his or her authority and if the Coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission. As adherence to State regulations is required for all development, no mitigation is required in the unlikely event that human remains were discovered on the site. Therefore, impacts associated with the discovery of human remains would be less than significant.

2.5.4 Geology and Soils

Would the project:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving:

(i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?

No Impact. The proposed project site is not located within the boundaries of an earthquake fault zone for fault-rupture hazard as defined by the Alquist-Priolo Earthquake Fault Zoning Act. The nearest faults are those that form the San Jacinto Fault Zone,[1] located approximately 7.0 miles from the project site. As such, the potential for fault ground rupture at the site is considered low; therefore, no impact related to this issue would occur

(ii) Strong seismic ground shaking?

Less Than Significant Impact. Like all of Southern California, the project site is located in a seismically active area and is subject to ground shaking resulting from activity on local and regional faults. The maximum event on the San Jacinto Fault zone affecting the project site would measure magnitude 7.2.[2] The maximum credible earthquake (MCE) is generally less than or equal to design levels as defined by the Uniform Building Code (UBC). The California Building Code (California Code of Regulations, Title 24) established engineering standards appropriate for the seismic zone in which development may occur. Adherence to the UBC and the California Building Code standards would ensure potential ground shaking impacts are reduced to a less than significant level.

(iii) Seismic-related ground failure, including liquefaction?

Less Than Significant Impact. Liquefaction is a phenomenon that occurs when strong earthquake shaking causes soils to collapse from a sudden loss of cohesion and undergo a transformation from a solid to a liquefied state. Factors influencing a site's potential for liquefaction include area seismicity, the type and characteristics of on-site soils, and the level of groundwater. Liquefaction typically occurs in areas where groundwater is shallower than approximately 30 feet, and where there is the presence of loose, sandy soils. According to the City's General Plan, liquefaction is not considered to be a local hazard since groundwater levels in Moreno Valley are far below the surface.[3] The project's geotechnical analysis[4] indicates that the depth of groundwater within the project vicinity is in excess of 100 feet. The proposed project site is not located in an area identified as being prone to liquefaction. The potential for earthquake-induced liquefaction within

1 California Geological Survey, 2002 and 2005.
2 *Table 5.6-1 Potential Earthquake Scenarios for Moreno Valley*, Moreno Valley General Plan Final Program EIR, July 2006.
3 *Chapter 6 Safety*, City of Moreno Valley General Plan, July 11, 2006.
4 *Geotechnical Engineering Investigation Proposed Industrial Development Southwest Corner of Perris Boulevard and Grove View Road Moreno Valley, California*, NorCal Engineering, March 7, 2007.

the proposed project is considered very low.[1] Because liquefaction at the project site is considered to be very low, a less than significant impact related to liquefaction would occur

(iv) Landslides?

No Impact. Landslides are rock, earth, or debris flows on slopes as a result of gravity. They occur on any terrain given the right conditions of soil, moisture, and the angle of slope and are triggered by rains, floods, earthquakes, and other natural causes as well as human-made causes, such as grading, terrain cutting and filling, excessive development.[2] The topography of the site is generally flat with a gentle slope from east to west and does not present any significant topographical features that would result in any landslide occurrences. No landslide impact would result from the development of the proposed on-site uses.

(b) Result in substantial soil erosion or the loss of topsoil?

Less Than Significant Impact. Based on a review of the Soil Survey, Western Riverside Area, California,[3] the proposed project site is mapped as containing Exeter sandy loam, 0–2 percent slopes (EnA), Exeter sandy loam, deep (EpA), Exeter very fine sandy loam (EwB), Exeter very fine sandy loam, deep (EyB), Greenfield sandy loam (GyA), Ramona sandy loam (RaA), Ramona very fine sandy loam (ReC2), and Travor loamy fine sand, eroded (Tp2). The erosion hazard for EnA, EpA, GyA, and RaA soils is slight, while EwB, EyB, and Tp2 soils have a slight to moderate erosion hazard. ReC2 soils have a moderate erosion hazard. Development would require the movement of on-site soils and the import of fill material. Prior to the issuance of grading permits, the project proponent would be required to prepare and submit detailed grading plans for the project site. These plans must be prepared in conformance with applicable standards of the City's Grading Ordinance.

Development of the site would involve more than one acre; therefore, the proposed project is required to obtain a National Pollutant Discharge Elimination System (NPDES) permit. A Storm Water Pollution Prevention Plan (SWPPP) would also be required to address erosion and discharge impacts associated with the proposed on-site grading. In addition to preparation of an SWPPP, new development projects submitted to the City would be required to submit a project-specific Water Quality Management Plan (WQMP). The WQMP would identify measures to treat and/or limit the entry of contaminants into the storm drain system. The WQMP is required to be incorporated by reference or attached to the project's SWPPP as the Post-Construction Management Plan.

As soils covering the majority of the project site have a slight to moderate erosion hazard potential, imported fill material would be approved by a soils engineering firm, and because the project would be required to adhere to the City's Grading Ordinance, obtain an NPDES Permit, and prepare an SWPPP, construction and operational, impacts associated with soil erosion hazards are less than significant.

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-site or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Potentially Significant Impact Unless Mitigation Incorporated. The project's geotechnical analysis[4] performed in-place density tests, which revealed that soil shrinkage that may occur would be approximately 10 percent to 15 percent due to excavation and recompaction. This is based on the assumption that the fill would be compacted to 90 percent of the dry density per ASTM standards. As a result subsidence is estimated at 0.2 feet due to earthwork operations. Impacts are considered potentially significant and mitigation measures are required. The geotechnical analysis determined that there is no potential for landslides or liquefaction. Additionally, potential impacts related to lateral

1 *Figure 5.6-2 Seismic Hazards*, Moreno Valley General Plan Final Program EIR, July 2006.
2 American Planning Association Research, http://www.planning.org/landslides/docs/whatare.html, October 2007.
3 Soil Survey Geographic database (SSURGO)/Soil Data Mart, 2003.
4 *Geotechnical Engineering Investigation Proposed Industrial Development Southwest Corner of Perris Boulevard and Grove View Road Moreno Valley, California*, NorCal Engineering, March 7, 2007.

spreading would be reduced to less than significant level through adherence to the UBC.The following mitigation measure would reduce potential impacts associated with unstable soils to a less than significant level.

Mitigation Measure GEO-1: Prior to the issuance of grading permits, any existing low density soils and/or saturated soils shall be removed to competent natural soil under the inspection of the Soils Engineering Firm. After the exposed surface has been cleansed of debris and/or vegetation, it shall be scarified until it is uniform in consistency, brought to the proper moisture content and compacted to a minimum of 90 percent relative compaction (in accordance with ASTM: D-1557). In any area where a transition between fill and native soil or between bedrock and soil are encountered, additional excavation beneath foundations and slabs will be necessary in order to provide uniform support and avoid differential settlement of the structure.

The on-site soils or approved import soils may be utilized for the compacted fill, provided they are free of any deleterious materials and shall not contain any rocks, brick, asphaltic concrete, concrete, or other hard materials greater than eight inches in maximum dimensions. Any import soil must be approved by the Soils Engineering firm a minimum of 24 hours prior to importation to the site.

The approved fill soils shall be placed in layers not in excess of six inches in thickness. Each lift shall be uniform in thickness and thoroughly blended. The fill soils shall be brought to within 2 percent of the optimum moisture content, unless otherwise specified by the Soils Engineering firm. Each lift shall be compacted to a minimum of 90 percent relative compaction (in accordance with ASTM: D-1557) and approved prior to the placement of the next layer of soil. Compaction tests shall be obtained at the discretion of the Soils Engineering firm but to a minimum of one test for every 500 cubic yards placed and/or for every two feet of compacted fill placed.

The minimum relative compaction shall be obtained in accordance with accepted methods in the construction industry. The final grade of the structural areas shall be in a dense and smooth condition prior to placement of slabs-on-grade or pavement areas. No fill soils shall be placed, spread, or compacted during unfavorable weather conditions. When the grading is interrupted by heavy rains, compaction operations shall not be resumed until approved by the Soils Engineering firm.

d) Be located on expansive soil, as defined in Table 18-a-B of the Uniform Building Code (1994), creating substantial risks to life or property?

Potentially Significant Impact Unless Mitigation Incorporated. Expansive soils generally have a significant amount of clay particles, which can give up water (shrink) or take on water (swell). The change in volume exerts stress on buildings and other loads placed on these soils. The extent of shrink/swell is influenced by the amount and kind of clay in the soil. The occurrence of these soils is often associated with geologic units having marginal stability. The distribution of expansive soils can be widely dispersed, and they can occur in hillside areas as well as low-lying alluvial basins.

As discussed above, soils on site include Exeter sandy loam, 0–2 percent slopes (EnA), Exeter sandy loam, deep (EpA), Exeter very fine sandy loam (EwB), Exeter very fine sandy loam, deep (EyB), Greenfield sandy loam (GyA), Ramona sandy loam (RaA), Ramona very fine sandy loam (ReC2), and Travor loamy fine sand, eroded (Tp2).[1] As detailed in the project's geotechnical analysis,[2] expansive soils were observed on the project site. Exploratory trenches revealed the existing earth materials on site to consist of a disturbed soil/fill and natural soil. A fill/disturbed natural soil classifying as a brown, sandy to clayey silt to a silty sand was encountered across the site and ranged in depth from 1 foot to 1½ feet. These soils were noted to be soft to loose and damp. An undisturbed alluvium soil classifying as a brown sandy to clayey silt to a silty sand was encountered beneath the disturbed top soils and fill. These native soils were noted to be firm to stiff, medium dense to dense, and moist.

[1] Soil Survey Geographic database (SSURGO)/Soil Data Mart, November 23, 1998.
[2] *Geotechnical Engineering Investigation Proposed Industrial Development Southwest Corner of Perris Boulevard and Grove View Road Moreno Valley, California*, NorCal Engineering, March 7, 2007.

Development of the proposed project site would be required to adhere to UBC and City design and engineering standards. However, because expansive soils are present on site, impacts associated with this issue are potentially significant and mitigation measures are required. The following mitigation measure would reduce potential impacts associated with expansive soils to a less than significant level.

Mitigation Measure GEO-2: Prior the issuance of grading permits, the project proponent shall inform the project engineers, architects, owner, maintenance personnel, and other interested parties of the Expansive Soil Guidelines provided in the project's geotechnical analysis. The recommendations identified in the project's Expansive Soil Guidelines shall be reviewed and considered by the project engineers, architects, owner, maintenance personnel, and other interested parties to determine applicable design guidelines. Applicable design guidelines shall be included and implemented in the project's grading plans.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

No Impact. The proposed project would connect to the existing sanitary sewer system. Because septic or alternative waste disposal systems would not be utilized, no impact related to this issue would occur.

2.5.5 Hazards and Hazardous Materials

Would the project:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Less Than Significant Impact. The proposed project would result in the construction of industrial uses. Potentially hazardous materials such as fuel, paint products, lubricants, solvents, and cleaning products may be used and/or stored on site during the construction and/or occupancy of the proposed industrial facilities. The transport, use, and storage of hazardous materials during the construction and operation of the site would be conducted in accordance with all applicable state and federal laws. Compliance with all applicable laws and regulations would reduce the potential impact associated with the routine transport, use, storage, or disposal of hazardous materials to a less than significant level.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?

Less Than Significant Impact. Exposure to hazardous materials during the construction and operation of the proposed on-site uses would result from (1) the improper handling or use of hazardous substances; (2) transportation accident; or (3) an unforeseen event (e.g., fire, flood, or earthquake). The severity of any such exposure is dependent upon the type, amount, and characteristic of the hazardous material involved; the timing, location, and nature of the event; and the sensitivity of the individual or environment affected.

The transport, storage, and handling of hazardous material is governed by existing local, state, and federal regulations, including applicable sections of the California Code of Regulations. In Moreno Valley, the Riverside County Community Health Agency, Department of Environmental Health is the local agency that has been certified by the California Environmental Protection Agency (CalEPA) to implement and ensure compliance with six state environmental and emergency programs. These programs include Hazardous Materials Business Plan/Emergency Response Plan, Hazardous Waste/Tiered Permitting, Underground Storage Tanks, Aboveground Storage Tanks, California

Accidental Release Program, and the Uniform Fire Code Hazardous Materials Management Plan and Hazardous Material Inventory Statements. The Riverside County Community Health Agency, Department of Environmental Health, as the local agency charged with implementing these programs, will provide permitting, inspections, and enforcement with the required regulations. Hazardous wastes produced on site are subject to requirements associated with accumulation time limits, proper storage locations and containers, and proper labeling. Additionally, for removal of hazardous waste from the site, hazardous waste generators are required to use a certified hazardous waste transportation company, which must ship hazardous waste to a permitted facility for treatment, storage, recycling, or disposal.

As with any operation in which hazardous materials are utilized, any on-site activity involving hazardous substances must adhere to applicable local, state, and federal safety standards, ordinances, or regulations. Businesses engaged in the use, storage, or transport of hazardous substances are monitored by various local (e.g., Riverside County Fire Department) and State (e.g., Department of Toxic Substance Control) entities. Compliance with applicable regulations will ensure impacts associated with the use, transport, storage, and sale of hazardous materials will be less than significant.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Less Than Significant Impact. The nearest existing school to the project site is Rancho Verde High school, which is located at 17750 Lasselle Street, approximately 1.0 mile to the east and El Potrero Elementary School at 16820 Via Pamplona Drive located approximately 1.0 mile to the northeast. There are no proposed schools located within a quarter mile of the project site. In the absence of an existing or proposed school within a quarter mile of the project site, no impact would occur.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Less Than Significant Impact. The Department of Toxic Substance Control (DTSC), which designates the sites for the Hazardous Waste and Substance Site (Cortese) List, does not indicate any underground storage tanks, hazardous waste generators, landfills, or other potentially hazardous materials located on the site.[1] The project site and adjacent sites were not listed in any of the databases searched, including the Cortese list. Although past agricultural activity, which included the use of pesticides, was occurring as recent as 2005, the Phase I Site Assessment concluded that common practices in the application of these pesticides, including the ordinarily limited quantities in which they are applied and limited lifespan of these materials, no significant environmental concerns remain on the site from the past use of these materials. The proposed project site is not noted on public records reviewed in the Phase I Site Assessment as a known source of hazardous materials contamination. As such, impacts are less than significant.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

[1] *Phase I Environmental Assessment for the Evaluation of Potentially Hazardous Materials for Approximately 75 Acres Between Indian Avenue and Perris Boulevard, North of the Perris Valley Storm Drain, Moreno Valley, California 92551*, Centec Engineering, Inc., February 23, 2007/

Less Than Significant Impact. The nearest airport, March Reserve Base Airport, is located approximately 0.5 mile northwest of the proposed project site. The proposed project is located outside of the Accident Potential Zones (APZ) of the March Air Reserve Base Air Installation Compatibility Use Zone Study.[1] The proposed uses and building structure are therefore compatible with the permitted uses and building structure height restrictions for the March Reserve Base. The proposed project is also consistent with the permitted uses and building height restrictions contained in Specific Plan 208. No other airport exists within the City of Moreno Valley. The development of the proposed project uses would not result in a safety hazard to persons residing or working in the project area. A less than significant impact would occur.

g) Impair implementation of, or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Less Than Significant Impact. The proposed project is consistent with the General Plan Circulation Element and Specific Plan 208. The proposed project would be required to design, construct, and maintain structures, roadways, and facilities in accordance with applicable standards associated with vehicular access, resulting in the provision of adequate vehicular access that would provide for adequate emergency access and evacuation. Construction activities that may temporarily restrict vehicular traffic would be required to implement adequate and appropriate measures to facilitate the passage of persons and vehicles through/around any required road closures. Adherence to these measures would reduce potential impacts related to this issue to a less than significant level.

h) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

Less Than Significant Impact. The project site is not located within a Fire Hazard Area or within an area susceptible to wildfires identified by the City of Moreno Valley.[2] Areas surrounding the project site consist of urban, built, and open space. Because of lack of abundant vegetation and the moderate amount of development within the vicinity of the project site, on-site and adjacent areas do not have the capability to support a wildfire. Because of the low probability that the project site would be subject or susceptible to wildland fires, no significant impact related to this issue would occur.

2.5.6 Hydrology and Water Quality

Would the project:

a) Violate any water quality standards or waste discharge requirements?

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or surface runoff in a manner that would result in flooding on site or off site?

e) Create or contribute runoff which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

f) Otherwise substantially degrade water quality?

Potentially Significant Impact Unless Mitigation Incorporated. Development of the project site is in excess of one acre; therefore, the project is required to obtain coverage under an NPDES permit, which includes the submittal of a Notice of Intent (NOI) application to the State Water Resources

[1] Air Installation Compatibility Use Zone Study for March Air Reserve Base, August, 2005. http://www.rcaluc.org/filemanager/plan/old//March%20Air%20Reserve%20Base%20(MARB).pdf. Accessed June 8, 2011.

[2] *Figure 5.5-2 Floodplains and Fire Hazard Areas,* City of Moreno Valley General Plan Final Program EIR, July 2006.

Control Board (SWRCB), the receipt of a Waste Discharge Identification Number (WDID) from SWRCB, and the preparation of an SWPPP for construction discharges. During the construction period, the project would use a series of Best Management Practices (BMPs) to reduce erosion and sedimentation. These measures may include the use of gravel bags, silt fences, hay bales, check dams, hydroseed, and soil binders. The construction contractor would be required to operate and maintain these controls throughout the duration of on-site activities. In addition, the construction contractor would be required to maintain an inspection log and have the log on site to be reviewed by the City and representatives of the RWQCB.

The implementation of NPDES permits ensures that the state's mandatory standards for the maintenance of clean water and the federal minimums are met. Coverage with the permit would prevent sedimentation and soil erosion through implementation of an SWPPP and periodic inspections by RWQCB staff. An SWPPP is a written document that describes the construction operator's activities to comply with the requirements in the NPDES permit. The SWPPP is intended to facilitate a process whereby the operator evaluates potential pollutant sources at the site and selects and implements BMPs designed to prevent or control the discharge of pollutants in stormwater runoff.

The construction and grading phases of the project site would require the disturbance of surface soils and removal of existing vegetative cover. During the construction period, grading and excavation activities would result in exposure of soil to storm runoff, potentially causing erosion and sediment in runoff. If not managed through BMPs, the runoff could cause erosion and increased sedimentation in local drainage ways. By volume, sediment is the principal component in most storm runoff. Sediments also transport substances such as nutrients, hydrocarbons, and trace metals, which are conveyed to the receiving waters. The potential for chemical releases is present at most construction sites in the form of fuels, solvents, glues, paints, and other building construction materials. Once released, substances such as fuels, oils, paints, and solvents could be transported to nearby surface waterways and/or to groundwater in stormwater runoff, wash water, and dust control water, potentially reducing the quality of the receiving waters and potentially result in impairment of downstream water sources.

The NPDES permit program was established under Section 402 of the Clean Water Act, which prohibits the unauthorized discharge of pollutants, including municipal, commercial, and industrial wastewater discharges. An NPDES permit would generally specify an acceptable level of a pollutant or pollutant parameter in a discharge (for example, a certain level of bacteria). The permittee may choose which technologies to use to achieve that level. Some permits, however, do contain certain generic BMPs. Table 2.A lists BMPs for runoff control, sediment control, erosion control, and housekeeping that may be used during the construction and operations phases of the proposed project.

Table 2.A: General Best Management Practices

Runoff Control	Sediment Control	Erosion Control	Good Housekeeping
• Minimize clearing • Preserve natural vegetation • Stabilize drainage ways	• Install perimeter controls • Install sediment trapping devices • Inlet protection	• Stabilize exposed soils • Protect steep slopes • Complete construction in phases	• Create waste collection area • Put lids on containers • Clean up spills immediately

Source: National Pollutant Discharge Elimination System, Construction Site Storm Water Runoff Control, http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm, website accessed June 8, 2011. More detailed Best Management Practices are available at this web site.

Adherence to NPDES requirements is required of all development within the City. Incorporation of **Mitigation Measures HYD-01** through **HYD-03** is designed to track both standard requirements and mitigation measures as part of the project's MMRP. On-site grading activities and the development of the proposed on-site uses would increase the potential for the erosion of soils. However, adherence to the BMPs identified by the above mitigation measures would reduce impacts associated with short-

term (construction) stormwater discharges during project construction. Therefore, impacts associated with this issue are reduced to a less than significant level.

The proposed project would result in the conversion of existing on-site permeable surfaces to impermeable surfaces, thereby altering the current drainage pattern. Upon development of the proposed on-site uses, storm runoff from the roadways, parking lots, and buildings may carry a variety of pollutants. As identified in the Preliminary WQMP[1] prepared for the proposed project, expected pollutants are trash, debris, oil, and grease. Potential pollutants of concern include organic compounds (specifically solvents), metals, sediment/turbidity, nutrients, oxygen-demanding substances, and pesticides if landscaping or open area exists on the project site. Since the parking area is greater than 5,000 square feet, expected pollutants from parking lots include organic compounds (specifically petroleum hydrocarbons), trash, debris, oil, grease, and metals. Potential pollutants of concern associated with parking areas greater than 5,000 square feet include sediment/turbidity, nutrients, oxygen-demanding substances, pesticides, and bacteria and viruses (bacterial indicators are routinely detected in pavement runoff).

The site's "first flush" storm runoff will be directed to five (5) Austin sand filters at appropriate locations of the site. Hydro-dynamic clarifiers, equipped with oil absorptive and/or screening devices will be placed upstream of the filters where appropriate to provide initial removal of trash, debris, and sediment. Three (3) of the storage areas of these filters will be lined with concrete to prevent recontamination of sediment. The fourth Austin sand filter located at the south property line opposite the center of the building will accept flows from a flat gradient, landscaped swale, which is intended to allow sediment to drop out of suspension prior to being treated by that Austin sand filter. The fifth Austin sand filter will utilize a combination of both approaches (clarifier and settling). Once the required treatment quantities have been captured, bypass designs will allow the excess runoff to be discharged into adjacent off-site storm drain facilities. The design will not incorporate infiltration due to excessively low percolation rates.

The storm water for the proposed project will discharge into existing storm drains located in Perris Boulevard (Perris Valley ADP Lateral B-1) and Indian Street (Perris Valley ADP Lateral B-3), as well as directly into the Perris Valley Storm Drain Lateral B channel. From the Perris Boulevard and Indian Street storm drains, the storm water will be discharged into the Perris Valley Storm Drain Lateral B channel and on to the proximate receiving water, which is Reach 3 of the San Jacinto River. This water body segment flows into Canyon Lake, Reach 1 of the San Jacinto River, and Lake Elsinore. Both Canyon Lake and Lake Elsinore are on the Federal 303(d) list of Impaired Water Bodies. Downstream receiving waters include Reach 3 of the Santa Ana River, Reach 2 of the Santa Ana River, Reach 1 of the Santa Ana River, and the Pacific Ocean. The waters on this list do not meet Water Quality Standards associated with Beneficial Uses for the listed water bodies. Canyon Lake is impaired for nutrients and pathogens, Lake Elsinore is impaired for nutrients, organic enrichment/low dissolved oxygen, sedimentation/siltation, and unknown toxicity. Santa Ana River is impaired for pathogens. Lake Elsinore is considered a closed system and is not discharged regularly. Only during severe storm events do flood waters discharge into Temescal Creek.

The implementation of the identified treatment controls is planned to further supplement the pollution prevention and source control measures by treating the water to remove pollutants before it is released from the project site. Basins constructed on the site would be anticipated to function as extended detention basins. The proposed project also includes the use of vegetated swales and sand filters, which would filter runoff coming from the project site. The use of the detention basins, vegetated swales, and sand filters has a medium-to-high removal efficiency for the pollutants that are anticipated to occur on the project site.

Although adherence to the Riverside County Storm Water Clean Water Protection Program, which includes the preparation of a WQMP, is required of all applicable development within the City, the incorporation of this requirement as **Mitigation Measure HYD-04** is designed to track both standard requirements and mitigation measures as part of the project's MMRP.

[1] *Preliminary Water Quality Management Plan for VIP Moreno Valley, Robert* A. Bebensee, R.C.E, July 24, 2009.

The proposed project would incorporate on-site drainage that would have hydrodynamic infrastructure components that would meet the City's, as well as the County's, water quality and flow requirements. Through the use of site design BMPs, source control BMPs (e.g., street and parking lot sweeping and vacuuming), and treatment control BMPs (e.g., extended detention basins, sand filters and catch basin drain inserts), the resulting pollutant loads coming from the proposed project would be reduced, thereby ultimately reducing pollutants discharged from urban stormwater runoff to surface water bodies. Because adherence to the requirements of the NPDES permit, which include implementation of the BMPs outlined in the WQMP, would be required by the City during the operation of the proposed project, potential water quality impacts resulting from stormwater and urban runoff would be reduced to a less than significant level.

Mitigation Measure HYD-01: Prior to grading plan approval and the issuance of a grading permit by the City, the project proponent shall provide evidence to the City that a Notice of Intent (NOI) with the Regional Water Quality Control Board has been filed to be covered under the State NPDES General Construction Permit for discharge of stormwater associated with construction activities.

Mitigation Measure HYD-02: Prior to grading plan approval and the issuance of a grading permit by the City, the project proponent shall submit to the State Water Quality Control Board, a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP shall include a surface water control plan and erosion control plan citing specific measures to control on-site and off-site erosion during the entire grading and construction period. Additionally, the SWPPP shall identify structural and nonstructural BMPs to control sediment and non-visible discharges from the site. BMPs to be implemented in the SWPPP may include but shall not be limited to the following:

- Sediment discharges from the site may be controlled by the following: gravel bags, silt fences, straw wattles and temporary debris basins (if deemed necessary), and other discharge control devices. The construction and condition of the BMPs will be periodically inspected during construction, and repairs will be made when necessary as required by the SWPPP.
- Materials that have the potential to contribute non-visible pollutants to stormwater must not be placed in drainage ways and must be contained, elevated, and placed in temporary storage containment areas.
- All loose piles of soil, silt, clay, sand, debris, and other earthen material shall be protected in a reasonable manner to eliminate any discharge from the site. Stockpiles will be surrounded by silt fences.
- The SWPPP will include inspection forms for routine monitoring of the site during the construction phase to ensure NPDES compliance.
- Additional BMPs and erosion control measures will be documented in the SWPPP and utilized if necessary.
- The SWPPP will be kept on site for the entire duration of project construction and will also be available to the local RWQCB for inspection at any time.

In the event that it is not feasible to implement the above BMPs, the City of Moreno Valley can make a determination that other BMPs will provide equivalent or superior treatment either on or off site.

Mitigation Measure HYD-03: Prior to the issuance of grading permits, the project proponent shall provide evidence to the City that the following provisions have been added to construction contracts for the project:

- The Construction Contractor shall be responsible for performing and documenting the application of BMPs identified in the SWPPP. Weekly inspections shall be performed on sediment control measures called for in the SWPPP. Monthly reports shall be maintained by the Contractor and submitted to the City for inspection. In addition, the Contractor will also be required to maintain an inspection log and have the log on site to be reviewed by the City of Moreno Valley and the representatives of the Regional Water Quality Control Board.

Mitigation Measure HYD-04: Prior to grading plan approval and the issuance of a grading permit by the City, the project proponent shall receive approval from the City of Moreno Valley for a Final Water Quality Management Plan (F-WQMP). The F-WQMP shall specifically identify pollutants of concern, site design, source control, and treatment control BMPs that shall be used on site to control predictable pollutant runoff in order to reduce impacts to water quality to the maximum extent practicable.

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

Less Than Significant Impact. The availability of groundwater and issues involving the adequacy of recharge capability are regional in nature. The Groundwater Management Act[1] (AB 3030) provides a systematic procedure for an existing local agency to develop a groundwater management plan. AB 3030 allows a local agency whose service includes a groundwater basin that is not already subject to groundwater management pursuant to law or court order to adopt and implement a groundwater management plan and includes plans to mitigate overdraft conditions, control brackish water, and to monitor and replenish groundwater. There are currently few domestic uses for groundwater in the area as the City primarily relies upon imported water from the Eastern Municipal Water District **(**EMWD).[2] Water sources for the EMWD include imported water purchased from the Metropolitan Water District (Metropolitan), groundwater sources, and recycled water from the EMWD's five regional water reclamation facilities. Approximately 75 percent of the EMWD's water is imported from Metropolitan, with the remaining 25 percent supplied by groundwater wells.[3] Groundwater supplies are drawn from the EMWD wells located in the Hemet, San Jacinto, Moreno Valley, Perris Valley, and Murrieta areas.

The EMWD adopted the West San Jacinto Groundwater Basin Management Plan (Plan) in June 1995. The Plan serves to protect the interests of existing groundwater producers and to provide a framework for new water supply projects within the 256-square mile Management Plan area. This Plan encompasses more than 164,200 acres and includes the groundwater management zones, as well as essentially non-water bearing areas such as the Lakeview Mountains, the Bernasconi Hills around Lake Perris, the Double Butte area near Winchester, and areas in the extreme northern, western, and southern portions of the EMWD.[4]

Based on the Water Supply Assessment (WSA) prepared for the proposed project, water demand for the proposed on-site uses would total 49,805 gpd or 55.8 AFY.[5] The proposed project would obtain water service from the EMWD. It is anticipated that the proposed project would primarily utilize imported water purchased from Metropolitan. This imported water would be supplemented by local groundwater sources. The implementation of the existing West San Jacinto Groundwater Basin Management Plan would ensure that local groundwater resources are conserved and groundwater overdraft does not occur. Because this plan is in place, it is reasonable to conclude that the proposed project would not substantially deplete groundwater supplies in the area.

The proposed project would not interfere with groundwater recharge as the project site is not identified as a groundwater recharge area. The development of the proposed project would reduce the amount of pervious surfaces that could facilitate percolation on site. However, the proposed project would consist of other project design features such as sand filters that would be designed to offset the conversion of pervious surfaces to impervious surfaces. Because project design features

1 Sections 10750–10756 of the California Water Code.
2 *Section 5.7 Hydrology/Water Quality, Moreno Valley General Plan Final Program EIR,* City of Moreno Valley, July 2006.
3 EMWD History and Mission, http://www.emwd.org/emwd/history_water.html, Eastern Municipal Water District, web site accessed June 8, 2011.
4 *West San Jacinto Groundwater Basin Management Plan* 2006 Annual Report, Eastern Municipal Water District, June 2007.
5 Table 7- Project Demand, *Water Supply Assessment for City of Moreno Valley Plot Plan Application PA09-004,* Eastern Municipal Water District, January 20, 2010.

would be sized to accommodate increased flows on site, it is anticipated that the amount of water percolated on site would be similar to existing conditions. Therefore, the proposed project would not interfere with groundwater recharge activities. Impacts associated with this issue are less than significant.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on site or off site?

Potentially Significant Impact Unless Mitigation Incorporated. As identified in the preliminary hydrology report[1] prepared for the proposed project, storm flows generated from the northerly portion of the proposed building and truck court would be collected by a series of drop inlet catch basins. Storm water runoff generated on site would be routed to three Austin sand filters and pre-treatment hydro-dynamic clarifiers that are intended to remove and reduce the amount of oils, sediment and trash from the storm water. The treated water from these sand filters is pumped into an adjacent on-site storm drain. The on-site storm drain system has been designed to accept a full 100-year storm event and flows would ultimately be routed to the Perris Valley ADP Lateral B-1 in Perris Boulevard that connects to the Perris Valley Storm Drain Lateral B channel. Storm flows generated from the westerly side of the proposed building would be collected by a drop inlet catch basin and routed by pipe to a landscaped swale that would be located along the southerly portion of the property. In the event that the landscape swale receives excess flows, the excess flows would be then routed to a second drop inlet catch basin. From the second drop inlet catch basin, flows would continue to an off-site catch basin and ultimately be routed to the Perris Valley ADP Lateral B-3 in Indian Street, which connects to the Perris Valley Storm Drain Lateral B channel. Storm water runoff generated from the easterly side of the building would be collected by a drop inlet catch basin and route via pipe to a hydro-dynamic clarifier then to an Austin sand filter located in the southeasterly corner of the project site. In the event that the clarifier and sand filter receive excess storm flows, these excess storm flows would be routed to an off-site catch basin and ultimately routed to the Perris Valley ADP Lateral B-1 in Perris Boulevard, which connects to the Perris Valley Storm Drain Lateral B channel. Storm flows generated from would also be routed to a landscaped swale running along the southerly portion of the project site. Flows would then be routed to an Austin sand filter located near the center of the site and ultimately routed to four existing 36-inch diameter reinforced concrete pipes (RCPs) that connect to Lateral B of the Perris Valley Channel. The Austin sand filter located in the southeasterly corner of the project site would also accept stormwater flows from the project site. In the event that flows are in excess of what the sand filter can handle, the excess flows would be directed back to the southerly landscaped swale, and ultimately to an existing 30-inch diameter RCP that connects to Lateral B of the Perris Valley Channel.

To reduce the flows to below or equal to pre-development conditions, the anticipated on-site flows would be routed to the water quality features such as vegetated swales, clarifiers, and sand filters to reduce flows leaving the site to pre-development flow rates. While the increase in impervious surfaces attributable to the proposed project would contribute to a greater volume and higher velocity of storm water flows, the proposed project's drainage system would accept and accommodate runoff that would result from project construction at or below pre-project conditions. Therefore, the post-development flows generated on the project site would not exceed the capacity of the planned storm water drainage systems. To ensure that long-term drainage capacity issues are reduced to a less than significant level, **Mitigation Measure HYD-05** has been identified. With adherence to this mitigation measure, impacts associated with this issue are less than significant.

Mitigation Measure HYD-05: Prior to grading plan approval and the issuance of a grading permit, the project proponent shall submit a detailed grading plan and drainage report, with supporting engineering calculations, to the City Engineer for review and approval. The plan and report shall incorporate relevant requirements identified by the City and/or site-specific geotechnical

[1] *Preliminary Hydrology Report and Hydraulic Analysis for APA09-0004 VIP Moreno Valley,* Robert A. Bebensee, R.C.E, March 27, 2009.

investigations. The plan and report shall provide evidence that the storm drainage system would be adequate to convey water for the 100-year storm event from the project site and that the post-development flows exiting the proposed project site are less than or equal to pre-development flows.

g) Place housing within a 100-year floodplain, as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

No Impact. The project does not include a residential component; therefore, it would not place housing within a 100-year flood hazard area, as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map. No impact related to this issue is anticipated to occur with the implementation of the proposed project.

h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?

Less Than Significant Impact. Flooding in the City of Moreno Valley could result from intense storms resulting in rapid runoff. The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) identify areas subject to flooding during the 100-year storm.[1] Based on these FIRM maps, the project site does not fall within a 100-year flood zone.[2] The proposed project is industrial in nature and the implementation of the proposed project would not result in the placement of structures within a 100-year floodplain. Because the project site does not lie within a 100-year floodplain, impacts related to this issue are less than significant.

i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

No Impact. The nearest dam to the project site is the Lake Perris Dam located approximately 1.6 miles east of the project site. The project site is not identified as being located within the City's mapped inundation area;[3] therefore, the proposed project would not result in the exposure of people or structures to risk of loss, injury, or death involving flooding as a result of failure of the Lake Perris Dam. No impacts related to this issue would occur.

j) Expose people or structures to inundation by seiche, tsunami, or mudflow?

Less Than Significant Impact. A tsunami is a series of waves generated in a body of water by a pulsating or abrupt disturbance that vertically displaces water. Inundation of the proposed project's site by a tsunami is highly unlikely as the project site is approximately 40 miles northeast of the Pacific Ocean. Seiches are oscillations in enclosed bodies of water that are caused by a number of factors, most often wind or seismic activity. The nearest water feature is Lake Perris approximately 1.5 miles east of the project site. Any seiche-related events would likely be of a lesser extent than the failure of the Lake Perris Dam. Therefore, although the proposed project site is located near Lake Perris, seiche-related flooding is not anticipated to occur on site[4] because the proposed site outside of the Lake Perris Dam inundation zone. The project site is not located within an area that is susceptible to mudslide. For these reasons, a less than significant impact associated with this issue would occur.

2.5.7 Land Use

Would the project:

[1] The term "100-year" is a measure of the size of the flood, not how often it occurs. The "100-year flood" is a flooding event that has a one percent chance of occurring in any given year.
[2] FEMA DFIRM Flood Data, 2008.
[3] *Figure 5.5-2 Floodplains and Fire Hazard Areas*, City of Moreno Valley General Plan Final Program EIR. July 2006.
[4] *Figure 5.5-2 Floodplains and Fire Hazard Areas*, City of Moreno Valley General Plan Final Program EIR. July 2006.

a) Physically divide an established community?

No Impact. As previously stated, the project site is currently undeveloped and is a fallow field. There are no structures existing on site. The Perris Valley Storm Drain Lateral B forms the southern boundary of the site and is also the City's southern limits. Adjacent land uses include primarily vacant land to the south across the Perris Valley Storm Drain Lateral B intermixed with warehouse uses, vacant land and an industrial warehouse use to the west, and industrial and warehouse uses to the north and east. Existing homes are located at the northwest corner of Indian Street and Gove View Road and an existing plant nursery is located at the southeast corner of Perris Boulevard and the Perris Valley Storm Drain Lateral B channel. There are no other residential uses in the vicinity of the proposed project site. The site would not be located within or divide an existing neighborhood, nor would it introduce a barrier between residential uses.

b) Conflict with an applicable land use plan, policy or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

Less Than Significant Impact. The applicable land use plans governing the proposed project site are the City of Moreno Valley General Plan (Moreno Valley 2006) and the Moreno Valley Industrial Area Specific Plan 208 (Moreno Valley 2002). Other applicable regional plans developed by the Southern California Association of Governments (SCAG) include the Regional Comprehensive Plan [SCAG 2008b: (RCP)], and Regional Transportation Plan [SCAG 2008a: (RTP)]. The existing General Plan land use designation underlying the proposed project site is Business Park/Industrial with an existing Zoning designation of Industrial per Specific Plan 208, with supporting commercial permitted at the Perris Boulevard/Grove View Road intersection. The proposed warehouse use is consistent with the City's General Plan land use designation as well as the Zoning identified in Specific Plan 208. Consistency with existing General Plan land use designation and Zoning designations ensure compatibility with the City of Moreno Valley General Plan Goals and Policies.

Other applicable land use plans underlying the proposed project site include the March Air Reserve Base AICUZ Study) and the Southern California Association of Governments Regional Comprehensive Plan and Regional Transportation Plan.

As described in the City's General Plan Final EIR,[1] the three proposed General Plan Alternatives would result in the development of land surrounding the March Air Reserve Base. Based on the allowable uses identified in the AICUZ, the proposed development under any of the three General Plan Alternatives would be consistent with the AICUZ guidelines for land uses within the areas most susceptible to air crashes. The project is outside of the APZ crash zones identified in the AICUZ, but is within the noise contours. Because the proposed project is consistent with the existing General Plan, the proposed project would be consistent with the AICUZ. No significant land use impact would occur.

The SCAG has prepared the 2008 RCP to serve as a framework to guide decision-making with respect to the growth and changes that can be anticipated in the region. The RCP is a major advisory plan prepared by the SCAG that addresses important regional issues like housing, traffic/transportation, water, and air quality. The RCP serves as an advisory document to local agencies in the Southern California region for their information and voluntary use for preparing local plans and handling local issues of regional significance.

The RCP's overall goal is to reinvigorate the region's economy, avoid social and economic inequities and the geographical dislocation of communities, and to maintain the region's quality of life. The document is described as a regional policy framework for future land use decisions in the SCAG area that respects the need for strong local control, but that also recognizes the importance of regional comprehensive planning for issues of regional significance.

[1] *Moreno Valley General Plan Final EIR*, City of Moreno Valley, July 2006.

Formulation of the RCP is based on input from local jurisdictions based on what is contained within their respective General Plans. The proposed project is consistent with the City's existing General Plan. As such, implementation of the proposed project would not result in unanticipated growth documented in the RCP. Impacts are less than significant.

The 2008 RTP adopted by the SCAG in May 2008 contains a set of existing socioeconomic projections used as the basis for the SCAG's transportation planning efforts. They include projections of population, housing, and employment at the regional, county, sub-regional, jurisdictional, Census tract, and transportation analysis zone levels. The RTP includes policies and regulations set forth to ensure development within the SCAG regional area is within planned and forecast socioeconomic projections.

The proposed project is consistent with the RTP in that it would be required to adhere to the City of Moreno Valley's General Plan and the City's Industrial Area Plan. The General Plan and Industrial Area Plan contain goals and policies that aim to minimize traffic congestion, provide adequate transportation facilities, and require development to pay its share of costs. The goals and policies identified in the City's General Plan and Industrial Area Plan resemble those of the RTP that address mobility, traffic safety, environmental concerns, and land use consistency as the major traffic study factors to identify existing traffic conditions and to assess the future effects on area traffic patterns/flow. Furthermore, the project will be consistent with the General Plan and Industrial Area Plan and, since the General Plan and Industrial Area Plan is required to be consistent with the RTP, it is reasonable to infer that the project is consistent with policies set forth in the RTP.
Impacts are less than significant.

c) Conflict with any applicable habitat conservation plan or natural community conservation plan?

Refer to the discussion on the Western Riverside County MSHCP in Section 2.5.2.

2.5.8 Mineral Resources

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

No Impact. There are no identified Mineral Resource Zones (MRZ) located with the General Plan Study Area.[1] The project site has been historically been utilized for agricultural production and does not harbor any known mineral resource. Implementation of the proposed project would not result in the loss of availability of a known mineral resource. No impact related to this issue would occur.

2.5.9 Population and Housing

Would the project:

a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

[1] *Section 5.14 Mineral Resources*, City of Moreno Valley General Plan EIR, July 2006.

Less Than Significant Impact. The California Department of Finance (DOF) estimates the City's population at 195,216 persons as of January 1, 2011.[1] As detailed in Table 2.B, SCAG projections estimate the population of the City, the County of Riverside, and the SCAG region would continue to grow.

Table 2.B: Local and Regional Population, Housing, and Employment Projections

	2015	2020	2025	2030	2035
Population					
City of Moreno Valley	206,657	220,390	234,410	246,804	258,350
Riverside County	2,509,330	2,809,003	3,089,999	3,343,777	3,596,680
SCAG *	20,465,819	21,468,934	22,395,124	23,255,378	2,4057,292
Housing					
City of Moreno Valley	55,407	60,025	64,699	69,353	72,977
Riverside County	811,486	913,207	1,008,909	1,097,950	1,183,097
SCAG	6,474,074	6,840,331	7,156,635	7,449,484	7,710,716
Employment					
City of Moreno Valley	49,414	61,974	71,359	80,667	91,642
Riverside County	911,381	1,042,145	1,168,769	1,295,487	1,413,522
SCAG	8,811,402	9,183,026	9,546,782	9,913,372	10,287,122

*Includes Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties.
Source: *Regional Transportation Plan Growth Forecast by City,* Southern California Association of Governments, adopted April 1, 2008.

The SCAG projects the City's population would grow to 206,657 persons by the year 2015 and 258,350 persons by the year 2035. The proposed project would result in the construction and operation of approximately 1,616,133 square feet of distribution warehouse space[2]. The extent to which new jobs created by a project are filled by existing residents is a factor that tends to reduce the growth inducing effect of a project. The construction of the proposed project would create short-term construction jobs. These short-term positions are anticipated to be filled by workers who, for the most part, reside in the project area; therefore, construction of the proposed project would not generate a permanent increase in population within the project area. Utilizing 1 employee per 2,500 square feet of warehousing space, the proposed project is expected to employ 646 people.[3] As most of the new employment opportunities are anticipated to be filled by existing local area residents, a large influx of new residents to the City is not anticipated. Additionally, the project would not directly affect population growth as compared with new residential development, because it is not creating homes. While the proposed project would generate employment opportunities, the jobs created are not expected to induce substantial growth in the City or region over and above the growth anticipated by the City's General Plan and the SCAG's regional growth forecasts. Infrastructure, including roads, sewers, water, and electricity, already exists around the project site. These impacts are considered less than significant.

b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

1 E-5 Population and Housing Estimates, for Cities, Counties, and the State, 2010–2011, with 2010 Benchmark, State of California Department of Finance, http://www.dof.ca.gov/research/demographic/reports/estimates/e-5/2011-20/documents/E-5_2011_Internet_Version.xls, May 2011, website accessed June 7, 2011.

2 Inland Empire Distribution Center Operations Profile, WCL Consulting, June 10, 2008. 2,500 square feet per employee is an average of the Inland Empire rates.

3 1 employee per 2,500 square feet, 1,616,133 sf ÷ 2,500 sf = 646 employees.

c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

No Impact. The proposed project site consists of undeveloped land with no residential structures located within the project limits. Therefore, no displacement of housing or residents would occur and construction of replacement housing is not required.

2.5.10 Public Services

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

a) Fire Protection

Less Than Significant Impact. The City of Moreno Valley contracts with the Riverside County Fire Department to provide fire protection, fire prevention, and emergency services to its residents. The fire station nearest the project site is Station No. 65 (Kennedy Park Fire Station), located at 1511 Indian Street, 3.0 miles north of the proposed project site. The proximity of Station No. 65 to the project site is sufficient to meet the City's General Plan performance standard requiring a response time of five minutes or less. As with any new development, the proposed project would increase the need for fire protection services within the City. While the proposed project would increase the need for fire protection, it would not require the construction of new fire facilities to maintain acceptable service ratios, response times, or other performance objectives. The proposed project would be required to adhere to all standards and conditions required by the City and the Riverside County Fire Department including, but not limited to, restrictions on project design, the imposition of construction standards, and including the payment of impact fees. Adherence to these standards would reduce potential impacts related to the provision of fire protection services and the need for the construction of new facilities which would result in adverse physical impacts to a less than significant level.

b) Police Protection

Less Than Significant Impact. The City of Moreno Valley contracts police services from the Riverside County Sheriff's Department. The Moreno Valley Police Department (MVPD) operates out of the Central Police Station, located at 22850 Calle San Juan de Los Lagos. The MVPD has 143 authorized sworn personnel and 45.5 authorized civilian personnel.[1] As with any new development, the proposed project would increase the need for police protection services within the City. The proposed project would be required to adhere to all standards and conditions required by the City and the MVPD, including the payment of impact fees. Adherence to conditions and standards identified by the City and the MVPD are required of all development within the City. While the proposed project would increase the need for police protection, it would not require the construction of new facilities to maintain acceptable service ratios, response times, or other performance objectives. The proposed project would result in a less than significant impact, and no additional mitigation is required. With adherence to City and MVPD requirements, no need for the construction of police facilities which would result adverse physical impacts would occur.

c) Schools

Less Than Significant Impact. The proposed project site is located within the Moreno Valley Unified School District (MVUSD). The proposed project does not include the construction of residential

[1] *Section 5.13 Public Services and Utilities*, The City of Moreno Valley General Plan Final EIR, July 2006.

dwelling units. There is a potential for the employees to move within the vicinity of the project; however, it is not anticipated that the growth would significantly impact existing school services or facilities.

Per California Government Code (§ 65995[h]), "The payment or satisfaction of a fee, charge, or other requirement levied or imposed … are hereby deemed to be full and complete mitigation of the impacts … on the provision of adequate school facilities." MVUSD requires the payment of 47 cents per square foot of industrial development.[1] With the payment of required fees and with no additional students generated from the proposed project, no significant impacts related to the provision of school services would occur. Upon payment of required fees, a less than significant impact to school services and/or facilities would occur. In the absence of a significant impact, the construction of new facilities that would result in a significant environmental impact would not occur.

d) Parks

*No Impact***.** The project does not include recreational facilities. Neighborhood or regional parks are not associated with industrial projects; therefore, there will be no impacts associated on these facilities from the proposed project.

e) Other Public Facilities

Less Than Significant Impact. The proposed project is an industrial project and, as a result, would not cause in an increase in population resulting in a significant impact on other public facilities such as libraries and hospital services. The local library serving the City is the Moreno Valley Public Library located at 25480 Alessandro Boulevard approximately 4.0 miles north of the project site. The nearest health service facility is the Moreno Valley Community Hospital located at 27300 Iris Avenue in the City of Moreno Valley approximately 3.5 miles northeast of the project site. The proposed project does not include a residential component and would not contribute to a direct increase in population. As there is no direct increase in population resulting from the proposed project, no new significant demand on library or medical facilities would occur. In the absence of a significant impact, the construction of new facilities that would result in a significant environmental impact would not occur.

All on-site access, parking areas, utilities, and structures would be maintained by the project applicant or operator of the proposed facility. Maintenance of public facilities and infrastructure would not be significantly altered by the development of the proposed project. The proposed project would not add any significant new public facilities that would require maintenance. In addition, the project proponent would be required to pay all developmental fees required by the City of Moreno Valley. Additionally, as with any industrial operation, the proposed project would provide revenue to the City in the form of fees, property taxes, etc. It is anticipated that the payment of such monies would offset any increased maintenance burden associated the development of the project site; therefore, potential impacts associated with this issue are anticipated to be less than significant.

2.5.11 Recreation

Would the project:

a) Increase the use of existing neighborhood or regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

Less Than Significant Impact. The proposed project does not include a residential component and is unlikely to significantly increase local or regional populations; therefore, the proposed project would not cause a significant increase in the use of existing neighborhood or regional parks or other

[1] *School Developer Impact Fees*, Moreno Valley Unified School District, http://www.mvusd.net/, website accessed June 7, 2011.

recreational facilities in the area. Impacts associated with this issue are considered less than significant.

b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

Less Than Significant Impact. The proposed project would result in the construction and operation of a warehouse distribution facility. Implementation of the proposed project does not include the construction or expansion of recreational facilities. Therefore, no impacts associated with this issue would occur.

2.5.12 Utilities and Service Systems

Would the project:

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

Less Than Significant Impact. The proposed project would be required to comply with the applicable waste discharge prohibitions and water quality objectives established by the Santa Ana RWQCB. The project proponent would also be required to satisfy City and EMWD requirements related to the payment of fees and/or the provision of wastewater conveyance features, and installation and maintenance prior to the issuance of building permits. Adherence to requirements included in the NPDES permit, SWPPP, WQMP, and EMWD wastewater conveyance standards would reduce potential wastewater quality impacts to a less than significant level.

b) Require or result in construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

e) Result in a determination by the wastewater treatment provider which serves or may serve the project determined that it has adequate to serve the project's projected demand in addition to the provider's existing commitments?

Less Than Significant Impact. Wastewater flows from the proposed project site would be handled by the EMWD and would be conveyed to the Moreno Valley Regional Water Reclamation Facility (MVRWRF) located in the southwestern portion of the City. Current capacity at this facility is 16 million gallons per day (mgd) with an existing average inflow of approximately 11.2 mgd per day.[1] The MVRWRF will ultimately be expanded to accommodate 41 mgd. Under current conditions, the average daily surplus treatment capacity is approximately 4.5 mgd. Generally, water use and wastewater flows are related in that wastewater is generated from indoor water uses. For industrial uses, typical wastewater generation factors are 1,700 gallons per day (gpd) for every acre of gross industrial uses.[2] Based on this generation factor, up to 63,070 gallons (0.063 mgd) of wastewater would be generated from the project site.[3] The additional wastewater treatment demand of 0.063 mgd resulting from development of the proposed project totals approximately 1.4 percent of current surplus treatment capacity. Because the amount of wastewater generated would be within the existing surplus treatment capacity, the proposed project would not require the construction of a new water or wastewater treatment facilities or expansion of existing facilities, which could cause

[1] Eastern Municipal Water District Moreno Valley Regional Water Reclamation Facility. http://www.emwd.org/news/Insights/insights_moval.pdf, accessed June 7, 2011.

[2] *Table 1 – EMWD System Design and Loading Criteria – Average Daily* Flow, Eastern Municipal Water District Sanitary Sewer System Planning & Design Principle Guidelines Criteria, September 2006.

[3] 1,616,133 square feet of warehouse uses ÷ 43,560 square feet/acre = 37.10 acres of warehouse uses; 1,700 gallons per acre of industrial use per day × 37.10 acres = 63,070 gallons per day (0.19 acre-foot) or 0.063 million gallons per day (mgd).

significant environmental effects; and impacts related to this issue would be considered less than significant.

c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Less Than Significant Impact. There is existing storm drain infrastructure in the vicinity of the proposed project that is capable of accommodating most existing storm water flows. Approvals of drainage features/improvements are made through the plan check process. As part of this process, all project-related drainage features would be required to meet the City's Public Works Division and RCFCWCD standards. The installation of project-related storm drain systems would occur within an existing urbanized area and the on-site storm drain system would be designed, installed, and maintained per Public Works Division and RCFCWCD standards. Because the project would be required to design and install drainage systems according to standards and provisions set forth by the City of Moreno Valley and RCFCWCD, impacts related to this issue are anticipated to be less than significant.

d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

Less Than Significant Impact. There has been a shift in the water demand patterns in the last 15 years, as a residential market has replaced an agricultural market. Metropolitan, based on the IRP update and IRPSIM[1] model, has stated that with the addition of all water supplies existing and planned, it would have the ability to meet all of its member agencies' projected supplemental demand through 2030 even under a repeat of a worst drought scenario and with a reduction in deliveries from the SWP as imported sources of water will be supplemented by an increase in desalination of brackish groundwater, recycled water use, and water use efficiency. Based on this assertion, the EMWD has stated in the WSA prepared for the project it is able to meet an increased demand for water over the next 20 years, even during drought conditions. This is based on continued commitment to conservation programs, additional water recycling, and continued development of local water resources.

To develop the projections used in the WSA, EMWD used a development-tracking database that assesses future water demands for specific projects. EMWD uses this database to help plan for future water supply and infrastructure needs by monitoring new projects through various stages of development. Changes in density and land use are also tracked in this database for planning purposes. The supply for dry years is driven by demand. Demand increases slightly (less than 2%) during dry years, primarily due to the increased demand in winter for landscaping or agricultural water, and can be decreased up to 10 percent due to conservation as dry periods are extended. Neither groundwater production nor recycled water deliveries are expected to increase or decrease significantly during dry years. For water shortages and interruptions, the plans and policies outlined in the Regional Urban Water Master Plan (RUWMP) will be implemented.

Based on the WSA conducted for the proposed project, water demand for the proposed on-site uses would total 49,805 gpd or 55.8 acre-feet per year (AFY). Based on the information contained in the WSA for the project site and the assurance that MWD is engaged in a planning process that will ensure a reliable long-term water supply for its member agencies, EMWD has determined that it will be able to provide adequate water supply to meet the potable water demand for the project in addition to existing and future users. Impacts are less than significant.

f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

[1] IRPSIM is a sophisticated water supply and demand-balancing model that utilizes 77 sequential hydrologies to determine variations in supply and demand due to changes in weather conditions.

Less Than Significant Impact. Solid waste collection is a "demand-responsive" service and current service levels can be expanded and funded through user fees without difficulty. Based on a solid waste generation of approximately 3.6 pounds per employee per day,[1] and 646 employees estimated for the project (See Population and Housing, Checklist Response 12a), the proposed on-site warehouse uses, in their entirety would generate approximately 2,326 pounds (1.16 tons) of waste per day.[2] Solid waste from the proposed project would be hauled by Waste Management of Inland Valley[3] and transferred to the Badlands Landfill, located to the northeast of the City's limits. The Badlands Sanitary Landfill has a daily permitted throughput of 4,000 tons per day, a remaining capacity of 14,730,025 cubic yards, and an estimated closure date of 2024.[4] Average daily throughput as of 2010 is estimated at 1,667 tons/day.[5] Current surplus capacity totals 2,333 tons/day. The volume of solid waste generated by the proposed project per day represents 0.029 percent of the current permitted throughput and 0.049 percent of the current surplus capacity at the Badlands Sanitary Landfill. As adequate daily surplus capacity exists at the receiving landfill, development of the proposed project would not significantly affect current operations or the expected lifetime of the landfill serving the project area. No significant solid waste disposal impact would occur.

g) Comply with federal, state, and local statues and regulations related to solid waste?

Less Than Significant Impact. The proposed project would be required to comply with applicable elements of AB 1327, Chapter 18 (California Solid Waste Reuse and Recycling Access Act of 1991) and other applicable local, state, and federal solid waste disposal standards, thereby ensuring that the solid waste stream to the Badlands Sanitary Landfill is reduced in accordance with existing regulations. Impacts are considered less than significant.

2.6 MITIGATION MONITORING AND REPORTING PROGRAM

A Mitigation Monitoring and Reporting Program (MMRP) will be prepared to comply with the requirements of State law (Public Resources Code, Section 21081.6). State law requires the adoption of an MMRP when mitigation measures are required to avoid significant impacts or reduce impacts to a less than significant level. The MMRP is intended to ensure compliance with mitigation measures during implementation of the proposed project. The MMRP will be adopted by the Planning Commission concurrent with certification of the Final EIR for the proposed project.

2.7 CUMULATIVE PROJECTS

Substantial changes are anticipated to occur as the result of population and employment as well as the development of other projects in the City and region. *CEQA Guidelines* (Section 15130) require that an EIR include a discussion of the potential cumulative impacts of a proposed project. Cumulative impacts are defined as two or more individual affects that, when considered together, are considerable or that compound or increase other environmental impacts. The cumulative impact from several projects is the change in the environment that results from the incremental impact of the development when added to the impacts of other closely related past, present, and reasonably foreseeable or probable future developments. Cumulative impacts can result from individually minor, but collectively significant, developments taking place over a period of time. The *CEQA Guidelines*, state:

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1 Inland Empire Distribution Center Operations Profile, WCL Consulting, June 10, 2008

2 646 employees × 3.6 lbs per employee per day = 2,326 lbs per day or 1.16 tons per day.

3 Trash service in the City of Moreno Valley is mandatory and Waste Management of Inland Valley is the only solid waste service provider.

4 *Badlands Sanitary Landfill Facility/Site Summary Details*, CalRecycle, http://www.calrecycle.ca.gov/profiles/Facility/Landfill/LFProfile1.asp?COID=33&FACID=33-AA-0006, website accessed on June 8, 2011.

5 Communication with Ryan Ross, Riverside County Waste Management Department, June 6, 2011.

(a) Cumulative impacts shall be discussed when the project's incremental effect is cumulatively considerable.

(b) The discussion of cumulative impacts shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided of the effects attributable to the project. The discussion should be guided by the standards of practicality and reasonableness.

The cumulative baseline for this project includes past, present, and probable future projects, which are either approved or being considered for approval, or anticipated to be submitted for consideration, including projects in the design phase or under construction. In determining the cumulative impacts of a proposed project with other area projects, an EIR may either consider a list of past, present, and probable future projects, or it may consider a summary of projections method or a combination of both.[1] This EIR utilizes the list method.

Information was collected and compiled from the Cities of Moreno Valley, Riverside, Perris, and Riverside County. The list of cumulative projects is based on project lists provided by staff from the City of Moreno Valley.[2] The project listings provided by the cities identify projects for which applications either have been submitted or are "foreseeable." As noted by the respective development reports, some of the identified applications are "inactive," "on-hold," or pending Planning Commission approval. It is not possible to determine with a reasonable level of certainty which or how many of the projects listed on the respective development inventories will complete the entitlement process and be issued permits for construction and occupancy; therefore, the figures cited represent a conservative scenario of what may be developed and interact with the project site. Because of market demands, demographic and economic conditions, and local development trends, it is reasonable to conclude that the number and amount of uses developed may vary from the total potential cumulative development identified in Table 2.C. The list of cumulative projects is illustrated in Figure 2.1.

Table 2.C: Cumulative Project List

Map No	Project	Location	Type
M-1	First Industrial Realty Trust (PA06-0152, PA06-0153)	NEC Heacock St. and Nandina Ave.	1,183,000 SF of high cube warehouse uses
M-2	Moreno Valley Industrial Park (PA07-0035, PA07-0039)	Northeast corner of Heacock Street and Iris Avenue	205,000 SF of light industrial uses; 410,000 SF of high cube warehouse uses
M-3	Indian Business Park (PA07-0079)	Southwest corner of Indian Street/Iris Avenue	1,560,000 SF of high cube warehouse uses
M-4	Komar Investments	NEC of Heacock Street and San Michele Road	2,057,000 SF of high cube warehouse uses
M-5	Ivan Devries (PA06-0017)	Northeast corner of Perris Boulevard and Edwin Road	569,000 SF of industrial park uses
M-6	TM34748 (PA06-185, PA06-184, PA06-0183)	Southeast corner of Heacock Street and Gentian Avenue	135 single family homes
M-7	San Michele Logistics Center (PA07-0166)	North side of Nandina Avenue west of Perris Boulevard	866,000 SF of high cube warehouse uses

[1] State *CEQA Guidelines*, Section 15130(b) (1).
[2] Input from Jeff Bradshaw, City of Moreno Valley Community Development – Planning Division, dated April 2011.

Table 2.C: Cumulative Project List

Map No	Project	Location	Type
M-8	TM 33810 (PA05-0089)	South of Iris Avenue between Indian Street and Emma Lane	16 single family homes
M-9	TM 34151 (PA05-0174)	East of Indian Street and north of Krameria Street	37 single family homes
M-10	TM 32716 (PA05-0148)	East of Indian Street, north of Perris Valley Channel	57 single family homes
M-11	TM 32917 (PA04-0051)	NEC of Lasselle Street and Krameria Street	227 condominiums
M-12	P05-0113	Northwest corner of Markham Street and Perris Boulevard	1,743,000 SF of high cube warehouse uses
M-13	Oakmont I (P05-0192)	Southwest corner of Markham Street and Perris Boulevard	698,000 SF of high cube warehouse uses
M-14	P05-0477	Northwest corner of Markham Street and Redlands Avenue	462,000 SF of high cube warehouse uses
M-15	P06-0425	North of Nance Street and west of Indian Street	6,300 SF of light industrial uses
M-16	P07-09-0018	NEC of Heacock Street and Nance St.	170,000 SF of warehousing uses
M-17	Oakmont II (P07-07-0029)	North of Ramona Expressway between Heacock Street and Indian Street	1,600,000 SF of high cube warehouse uses
M-18	TR 32707	Southeast corner of Harley Knox Boulevard and Evans Road	137 single family homes
M-19	TR 34716	Northwest corner of Markham Street and Redlands Avenue	318 single family homes
M-20	Ridge II	Northeast corner of Rider Street and Indian Street	2,000,000 SF of high cube warehouse uses
M-21	Jordan Distribution	Northeast corner of Rider Street and Redlands Avenue	378,000 SF of high cube warehouse uses
M-22	Aiere	Northwest corner of Rider Street and Redlands Avenue.	642,000 SF of high cube warehouse uses
M-23	Starcrest (08-11-0005, 08-11-0006)	Southeast corner of Ramona Expressway and Webster Street	454,000 SF of high cube warehouse uses
M-24	—	Northeast corner of Indian Street and Markham Street	189,000 SF of high cube warehouse uses

Table 2.C: Cumulative Project List

Map No	Project	Location	Type
P-25	Stratford Ranch Industrial	NEC of Redlands Avenue and Perry Street (extended)	1,725,411 SF of high-cube warehouse uses
M-26	Rados Distribution Center	Northeast corner of Webster Avenue and Rider Street	1,191,000 SF of high cube warehouse uses
M-27	Ridge I (P 05-07-0493)	South of Ramona Expressway between Perris Boulevard and Indian Street	700,000 SF of high cube warehouse uses
M-28	—	North of Rider Street between Perris Boulevard and Redlands Avenue	40,000 SF of warehousing uses
M-29	IDS II	SWC of Redlands Avenue and Rider Street	350,000 SF of high cube warehousing uses
M-30	—	Northeast of Indian Avenue and San Michele Road	408,000 SF of light industrial uses
M-31	—	Northeast of Perris Boulevard and San Michele Road	681,000 SF of light industrial uses
M-32	—	Southwest of Perris Boulevard and Nandina Avenue	482,000 SF of high cube warehouse uses
M-33	—	Northwest of Indian Avenue and Harley Knox Boulevard	360,000 SF of light industrial uses
A-34	March Lifecare Specific Plan	SWC Heacock & Cactus	190,000 SF medical offices, 210,000 SF commercial retail, 200,000 SF research & education, 50 hospital beds, 660 beds institutional residential
A-35	Airport Master Plan	March ARB	559,000 SF airport use
C-36	Majestic Freeway Business Center (SP 341, PP 20699, PP21027, PP21552)	West of 215, south of Nandina, north of Cajalco	6,200,000 SF high-cube warehouse
M-37	Oleander Business Park	West of I-215 at Harley Knox Boulevard	1,206,710 SF of warehousing
M-38	Cemex Materials	24365 Nandina Ave (west of Indian St.)	Concrete batch plant on 5 ac
M-39	06-0411	East of Patterson Avenue, south of Nandina, north of Harley Know	Concrete batch plant, 400 SF office, 1,600 SF maintenance shop
M-40	Pierce Hardy Limited Partnership (PA06-0014)	SEC Heacock St. & Nandina Ave.	67,000 SF retail lumber yard complex
P-41	P05-0302	South of Markham St., east of I-215	900 SF office

Table 2.C: Cumulative Project List

Map No	Project	Location	Type
M-42	March Business Center (PA11-0001)(P11-004)(PA11-0007)(PA11-0002, -0003, -0004, -0005, -0006)	SE corner of Heacock Street and Iris Avenue	Business center totaling 1,484,407 SF of building space on 75 acres.
C-43	Ramona Metrolink Station	NEC Cajalco and Harvill	Light rail station; 300 parking spaces
M-44	Centrepointe Buildings 8 and 9 (PA04-0063)	SEC Heacock St. & Alessandro Blvd.	361,384 SF general light industrial
M-45	Komar Cactus Plaza (PA08-0047, PA08-0048, PA08-0049, PA08-0050, PA08-0051, PA08-0052)	N side of Cactus Ave. & W of Elsworth St.	110 hotel rooms, 8,000 SF fast food w/drive thru, 42,400 SF commercial
M-46	MV Centerpointe Business Ctr. (PA07-0147, PA07-0157)	NEC Cactus Ave. & Frederick St.	353,859 SF warehousing
M-47	Centerpointe Business Park (PA08-0002, PA08-0003)	Corner of Brodiaea Ave & Graham St.	391,231 SF warehousing
M-48	Centerpointe Business Park (PA08-0093)	Corner of Heacock St. and Brodiaea Ave.	99,988 SF light industrial
M-49	Highland Fairview Corporate Park (PA07-0088, PA07-0089, PA07-0090, PA07-0091)	Immediately south of Hwy 60, between Redlands Blvd. and Theodore St.	2,620,000 SF industrial warehouse/commercial
M-50	Alessandro and Laselle - Winco Foods (PA08-0079, PA08-0080, PA08-0081)	NEC of Alessandro Blvd. and Laselle St.	110,240 SF shopping center (anchored by 95.440 TSF WinCo Foods)
M-51	Yoon Byun (PA09-0031)	NEC Alessandro and Graham	5,044 SF retail center w/ convenience store, restaurant and carwash
M-52	Classic Opportunities Group/Optiflex - Moreno Valley Medical Plaza (PA09-0033, PA09-0034, PA09-0035, PA09-0036, PA09-0037, PA09-0038, PA09-0039, PA09-0019, PA09-0020)	East side of Nason, south of Brodiaea Ave.	311,633 SF commercial medical plaza
M-53	TM 32505 (PA05-0017)	SWC Bay Avenue & Morrison Street	72 detached single-family units
M-54	TM 33417 (PA05-0142)	NWC Perris Blvd. & Delphinium Ave	60 condominiums
M-55	TM 33607 (PA06-0096)	NEC Perris Blvd. & Delphinium Ave	52 condominiums
M-56	TM 34988 (PA06-0141)	NEC Perris Blvd. & Brodiaea	251 townhomes
M-57	TM 34216 (PA05-0193)	NEC of Kitching and Alessandro	40 condominiums
M-58	TM 34681 (PA06-0052)	South of Alessandro, west of Lasselle	49 townhomes
M-59	Moreno Valley Medical Campus	North side of Iris Ave., west of Moreno Valley Community Hospital	75,000 SF medical office complex
M-60	Overton Moore Properties (PA08-0072)	NWC Cactus Ave. & Frederick St.	520,000 SF high-cube warehouse

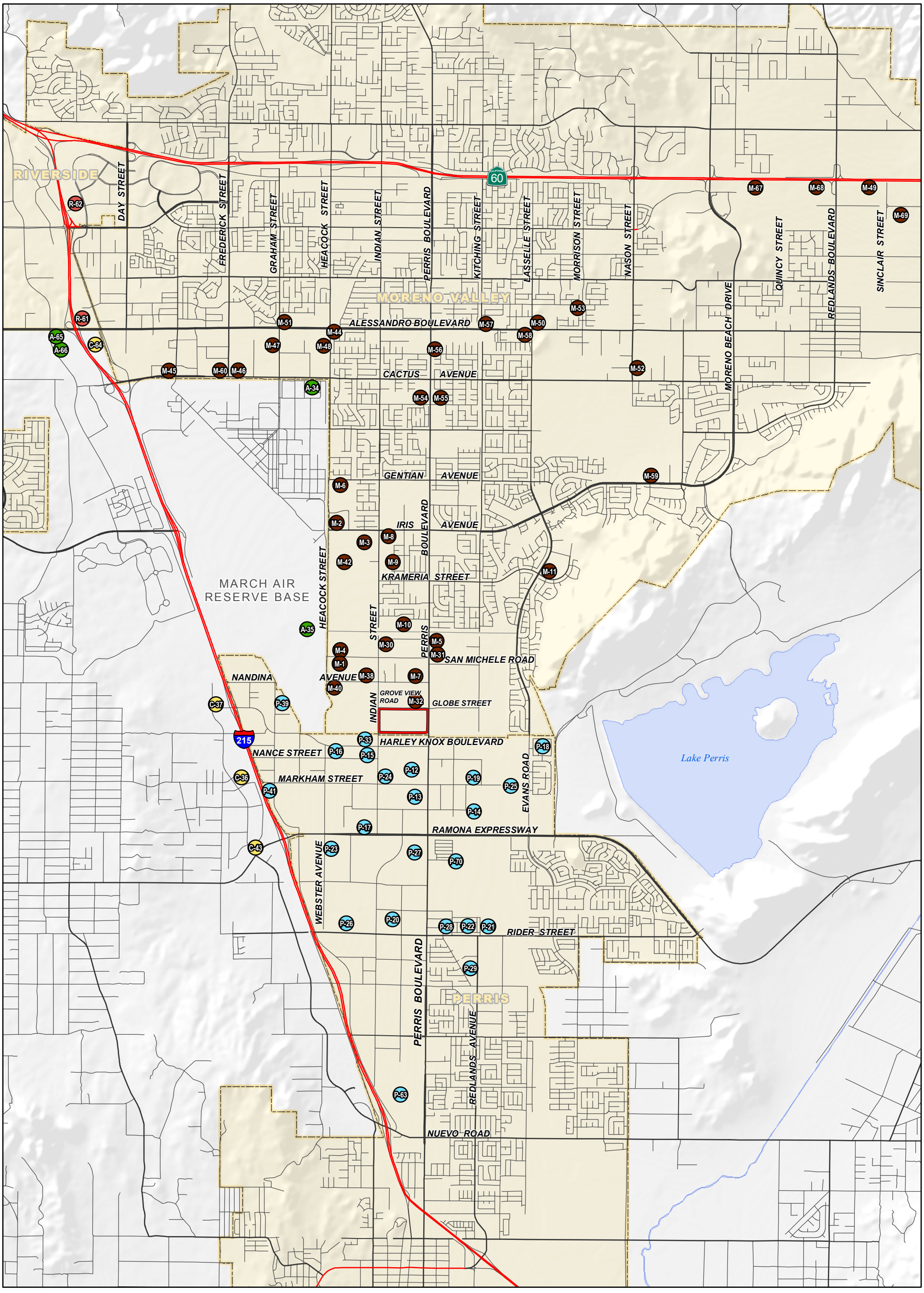
Table 2.C: Cumulative Project List

Map No	Project	Location	Type
R-61	Alessandro Business Park (P07-1028)	North of Alessandro, west of I-215 frontage road	652,018 SF general light industrial
R-62	P06-1408	East of I-215, north of Gateway Dr.	73,500 SF office
P-63	Harvest Landing Specific Plan	East of I-215, south of Placentia, west of Perris Blvd, north of Nuevo	1860 single family dwelling units, 1,306,582 SF multiple use business park
C-64	Amstar/Kaliber Development (PP 22925)	South of Alessandro Blvd, west of I-215 Frontage Road	258,102 SF office, 409,312 SF warehousing, 42,222 SF general light industrial, 10,000 SF retail
A-65	Alessandro Metrolink Station	South of Alessandro, east of Frontage Road	Light rail station; 300 parking spaces
A-66	Meridian Business Park	North West of 215, south of Alessandro	5,985,000 SF industrial park
A-67	Eucalyptus Industrial Park	East of Moreno Beach Drive, west of Quincy channel, south of SR-60	2,244,638 SF of high cube warehouse uses
A-68	West Ridge Commerce Center	West of Redlands Boulevard, south of SR-60	937,260 SF of high cube warehouse uses
A-69	World Logistics Center	East of Redlands Avenue, south of SR-60	41,500,000 SF high cube warehouse uses
A-70	Perris Valley Commerce Center Specific Plan	3,500 acres in north Perris	Various Light Industrial, business park, and commercial uses

Notes: NWC = northwest corner; SWC = southwest corner; NEC = northeast corner; SEC = southeast corner; SF=square feet
Sources: City of Moreno Valley, August 2011

The cumulative analyses are provided following the discussion of the individual impacts associated with the proposed project in Section 4.0. For example, the cumulative impact for air quality is provided in Section 4.1, and so forth. Depending on the issue discussed, the area addressed in the cumulative analysis varies. For example, because of the cumulative nature of regional air quality emissions, the cumulative area for air quality impacts would encompass the South Coast Air Basin; while the cumulative area associated with noise would be limited to areas in the proximity of the project site. Because of the nature of the various cumulative discussions, the consideration of all the cumulative projects in every cumulative analysis is not warranted.

The traffic study is based on existing count data taken in 2007. For this reason, projects that were approved subsequent to 2011 were added to the background trip generation in the TIA. These are listed as cumulative projects 1 through 44 in Table 2.C and Figure 2.1.



L S A

FIGURE 2.1

Cumulative Projects

- Proposed Project Location
- City Boundaries
- City of Moreno Valley
- City of Perris
- City of Riverside
- County of Riverside
- March JPA

N

0 2,400 4,800

FEET

VIP Moreno Valley
Environmental Impact Report

Cumulative Project Locations

SOURCE: City of Moreno Valley, August 2011; Riverside County, 2011
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3.0 PROJECT DESCRIPTION

The project description is provided in this section of the EIR in conformance with *CEQA Guidelines* §15124. It discusses the geographic setting, project location, project setting, City of Moreno Valley General Plan and zoning designations, project characteristics, discretionary actions, and project objectives. The project description is used as the basis for analysis in Section 4.0 of the EIR.

3.1 GEOGRAPHIC SETTING

As illustrated in previously referenced Figure1.1, the proposed project is located within the southwestern portion of the City of Moreno Valley, in Riverside County, California, east of Interstate 215 (I-215) and south of State Route 60 (SR-60). The City is located within the Perris Block geologic unit, which in turn lies within the Peninsular Ranges Geomorphic Province of southern California. The Peninsular Ranges Geomorphic province is characterized by a series of north westerly trending mountain ranges extending from the coast of California eastward into the California desert and south to the tip of Baja California. The Perris Block is bounded on the northeast by the San Jacinto Fault, on the north by the Cucamonga Fault and the San Gabriel Mountains, and on the southwest by the Elsinore Fault and the Santa Ana Mountains. The City of Perris borders Moreno Valley to the south and the City of Riverside to the west, with unincorporated areas of Riverside County bordering the City to the north and east. The Box Springs Mountains border the City to the north.

3.2 PROJECT LOCATION

The project site consists of four parcels (APNs 316-210-71, 316-210-73, 316-210-75, and 316-210-76) totaling approximately 71 net acres located on the southwest corner of Perris Boulevard and Grove View Road. The Perris Valley Storm Drain Lateral B channel forms the southern boundary of the site while Indian Street forms the western boundary. The site is located approximately 1.3 miles east of I-215, 4.5 miles south of SR-60, and 1.75 miles west of Lake Perris. March Air Reserve Base is located approximately one half mile west of the project site.

3.3 PROJECT SETTING

The project site is relatively level, descending gradually from northwest to southeast, at an elevation ranging from approximately 1,465 to 1,461 feet above sea level. On-site soils consist of disturbed top soil/fill and natural soils, classified as brown clayey silts to silty sands.

The project vicinity is characterized by a mix of developed and undeveloped properties, as can be seen in previously referenced Figure 1.1. Developed properties in the vicinity include a waste transfer station and an industrial/warehouse to the north, industrial/warehouse and undeveloped property to the south, industrial/warehouses and a self storage facility to the east, and warehouses, vehicle storage, residences, and undeveloped property to the west.

The proposed project site has been used historically for agricultural purposes but currently lies fallow. It was most recently used as a sod farm growing that ceased operating in August 2005. Within the past two years, the proposed Project site has received approximately 80,000 cubic yards of fill as part of an approved stockpile permit previously issued by the City. The major roads that provide access to the project are Perris Boulevard, Indian Street, Grove View Street, and Harley Knox Boulevard, with the nearest I-215 interchanges at Harley Knox Boulevard and Ramona Expressway.

3.4 CITY OF MORENO VALLEY GENERAL PLAN AND ZONING DESIGNATIONS

A review of the Cities of Moreno Valley and Perris General Plans reveals the site and surrounding area is designated Business Park/Light Industrial to the north, east and west in the City of Moreno Valley (City) and Light Industrial and Community Commercial south of the Lateral B channel in Perris. Similarly, zoning for the site and surrounding area in the City is governed by Specific Plan (SP) 208. SP 208, which is known as the Moreno Valley Industrial Area Plan, was originally adopted in 1989, amended in 2001 and 2002.

As illustrated in Figure 3.1, SP 208 encompasses approximately 1,540 acres in the southwest portion of the City covering an "L" shaped area. South of Mariposa Avenue/Lateral A channel, the SP area is bordered by City of Perris to the south, the Perris Valley Storm drain to the east, and Heacock Street to the west. North of Mariposa Avenue/Lateral A channel, the SP is bordered by Indian Street to the east, Heacock Street to the west, and Iris Avenue to the north. The SP also includes the area north of Iris Street bordered by Gentian Avenue to the north, Indian Street to the east, and Heacock Street to the west. SP 208 functions as the zoning for the applicable planning area, defining permitted uses and establishing design guidelines.

The proposed project site as well as the surrounding areas are planned for industrial development per SP 208. The SP also permits supporting commercial land uses at key intersections in its planning area, including the intersection of Perris Boulevard and Grove View Road. Zoning for the area to the south across the Lateral B channel in Perris is Light Industrial and Community Commercial. Table 3.A provides a summary of existing on-site and adjacent land use, zoning, and General Plan designations. Figure 3.2 illustrates existing on-site and adjacent General Plan Land use designations and zoning for the site.

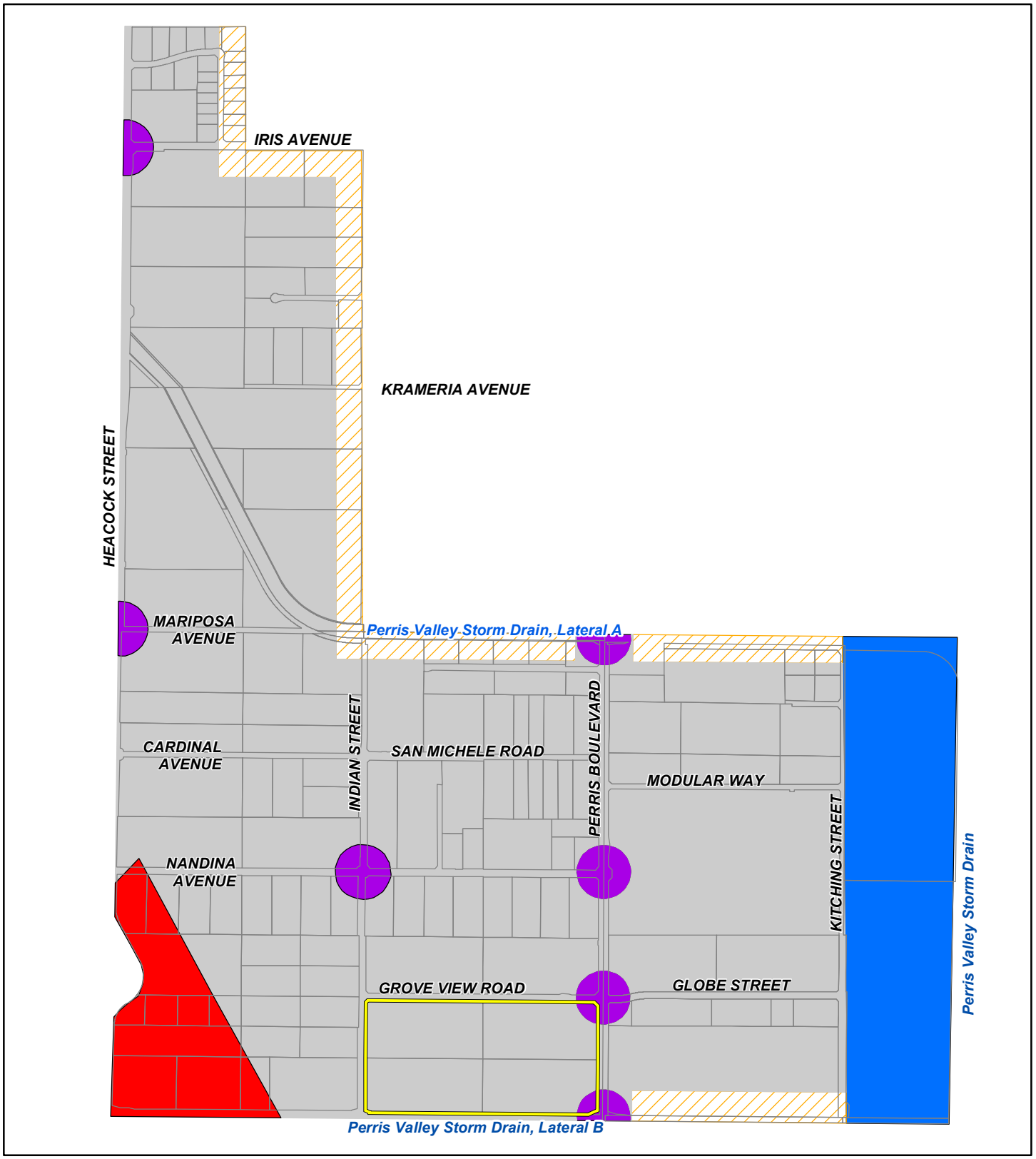
Table 3.A: On-Site and Adjacent Land Use Designations

Location	Current Land Uses	General Plan Land Uses	Zoning Designations
On-site	Vacant/Fallow	Business Park/Light Industrial	SP 208
North	industrial	Business Park/Light Industrial	SP 208
South[1]	industrial and vacant	Community Commercial and Light Industrial	Light Industrial and Community Commercial
East	industrial	Business Park/Light Industrial	SP 208
West	industrial and vacant	Business Park/Light Industrial	SP 208

[1] Land use, General Plan, and Zoning information shown is in the City of Perris.
Sources: City of Moreno Valley General Plan Land Use Map, adopted August 2010; City of Moreno Valley Zoning, accessed April 7, 2011; City of Perris General Plan Land Use Map, approved February 2008; City of Perris Zoning February 2009.

3.5 PROJECT CHARACTERISTICS

The proposed project would result in the construction and operation of approximately 1,616,133 square feet of distribution warehouse space on an approximately 71 acre site. The single building will be constructed with 264 vertical-lift dock-high roll up doors on the long (north and south) sides of the building to allow access for the loading and unloading of products from diesel truck/trailers. Building interiors are typically large and open to accommodate the temporary storage of the products to be distributed. The building will include a total of approximately 44,000 square feet of business office space for the management of the warehouse. Parking at the warehouse will be provided for 368 truck trucks and trailers as well as 589 parking stalls for passenger vehicles in accordance with City standards for light industrial uses. Previously referenced Figure 1.2 provides a conceptual site plan for the proposed project.



LSA

N

0 750 1,500

FEET

Project Boundary

Moreno Valley Industrial Area Plan Boundary

Industrial

Public

Clear Zone

Commercial (Industrial/Business Support)

300' Residential Buffer

FIGURE 3.1

VIP Moreno Valley
Environmental Impact Report

Moreno Valley Industrial Area Plan Boundaries (SP 208)

SOURCE: City of Moreno Valley (Specific Plan 208), 2002.

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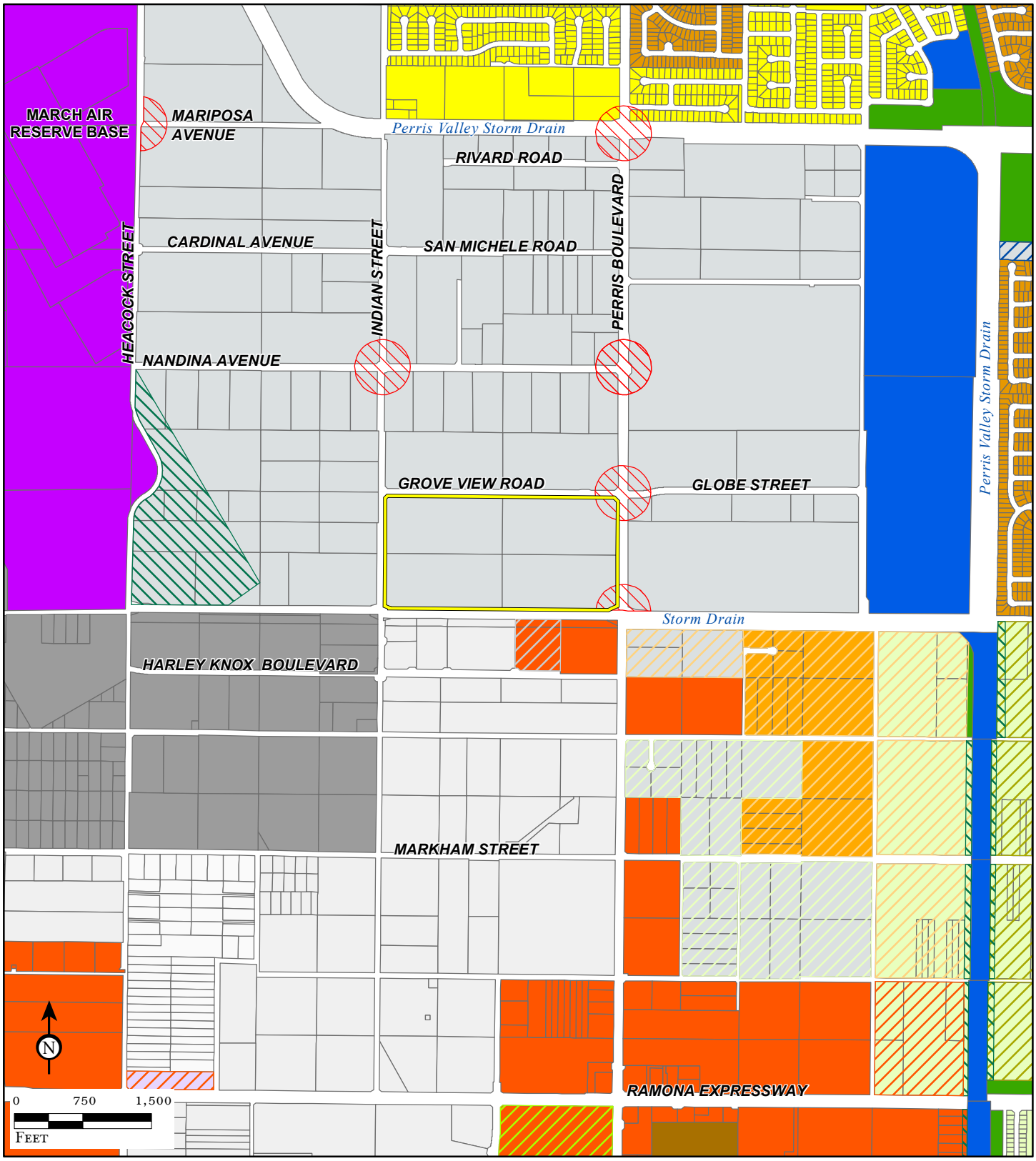

LSA

Project Boundary

Zoning
- Public Facilities
- NC - Neighborhood Commercial
- Commercial
- SP - Specific Plan
- LI - Light Industrial
- A1 - Light Agriculture
- OS - Open Space
- R - 6,000 - Residential
- R - 10,000

General Plan - Land Use
- March Air Reserve Base
- BP - Business Park
- CC - Community Commercial
- GI - General Industrial
- LI - Light Industrial
- MFR - 14
- NC - Neighborhood Commercial
- OS - Parks/Recreational/Natural Open Space
- P - Public/Semi-Public Facilities/Utilities
- Residential: Max. 5 du/ac
- R - 6000
- Residential: Max. 10 du/ac
- Residential: Max. 15 du/ac
- R - 20,000
- SP

SOURCE: City of Moreno Valley Land Use Map, August 12, 2010; City of Perris - General Plan, February 19, 2009; City of Moreno Valley - Zoning, April 20, 2011; City of Perris - Zoning, February 19, 2009.

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FIGURE 3.2

VIP Moreno Valley Environmental Impact Report

Existing General Plan Land Use Designations and Zoning

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The proposed project features a variety of architectural elements including façade accents such as corner treatments and roof trim (refer to Figure 3.3). The project would also provide variation in wall planes that serve to avoid an institutional appearance and break up the bulk of the buildings. This variation creates shadow lines at various times of the day.

Access to the project site will be provided via two driveways on Indian Street, three driveways on Grove View Road, and two driveways on Perris Boulevard. The northern driveway on Perris Boulevard will be for passenger vehicle and emergency access only. The southern driveway on Perris Boulevard will align with the existing signalized intersection at the Ross Distribution Warehouse entrance. The north project driveway on Indian Street will be for passenger vehicle and emergency access only; all other driveways will be used by both passenger vehicles and trucks. The proposed project is anticipated to be constructed by the year 2013.

The proposed project will function as a trucking distribution hub for several types of items. Goods imported from the ports of California as well as other locations will be delivered via truck to the proposed distribution centers and distributed via truck to both in and out of state locations, thus benefiting both local and interstate commerce.

Due to the project site's topography and drainage requirements, approximately 220,000 additional cubic yards of fill will be required. The specific location of the fill import site is not known at this time. It is reasonable to estimate that the fill will be obtained from a site located within 10 miles of the proposed project in order to reduce import hauling costs, consistent with soil import/export hauling distances for projects in Moreno Valley.

In addition to construction of required street frontage improvements on Indian Street, Perris Boulevard, and Grove View Road, the proposed project includes construction of necessary infrastructure to provide water, sewer, phone, cable, natural gas, and electricity service. Drainage will be handled by a system of on-site collection/routing pipes, landscaped swales, sand filters, and paved landscape features. All utilities hook ups are immediately available, with no off-site improvement required.

Site and building design attributes for the proposed project will incorporate many sustainability and Green Building concepts. Green Building is the practice of increasing building efficiency through site planning, water and energy management, material use, control of indoor air quality and the use of innovative design concepts. These practices help to improve building operational efficiency, conserve water, reduce waste, and lessen the heat island effect of development.

Green building designs typically exhibit the following features:

- More natural ventilation or, at least, a mixture of natural ventilation and air conditioning, and/or increased fresh air via the mechanical ventilation system.
- Narrow plan forms, often within the 15m limits of natural ventilation and daylight access, the corollary of which is less 'deep' space in the middle, which users dislike.
- Better utilization of daylight.
- More user controls for windows, blinds, lights, and ventilators. This can mean that needs (like thermal comfort) are met more quickly even though the conditions may only be 'good enough'. Users preferred rapid response when things go wrong or need changing, and will tolerate conditions which are reasonable.
- Higher floor to ceiling heights, which helps, e.g., with daylight penetration.
- More open plan workspaces (usually desks) close to or next to windows.

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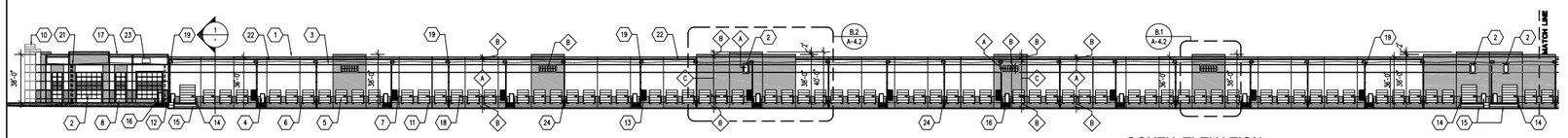
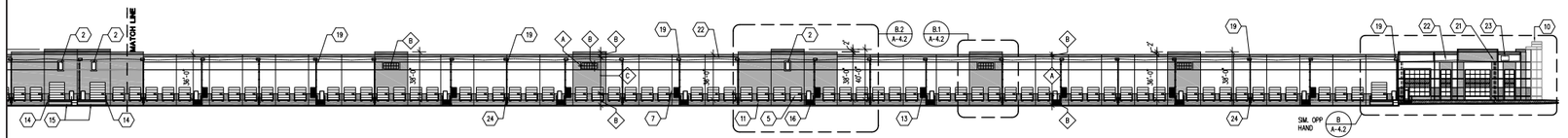
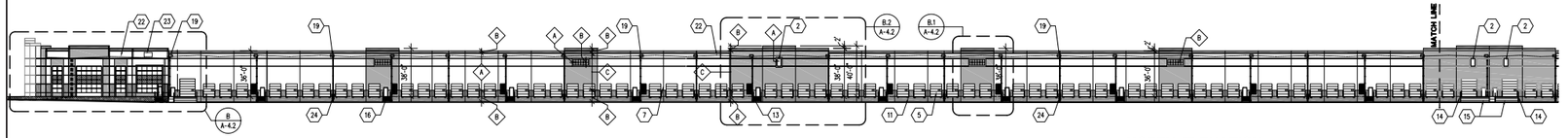


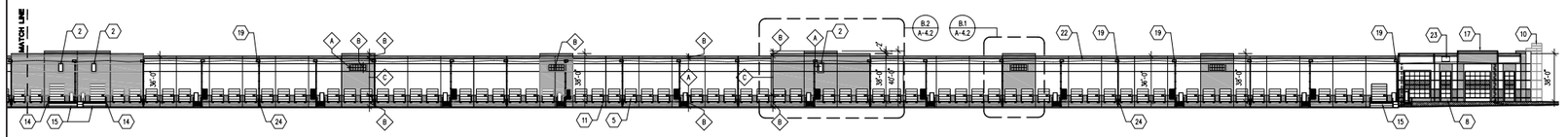
SOUTH ELEVATION
SCALE: 1" = 40'-0"



SOUTH ELEVATION
SCALE: 1" = 40'-0"



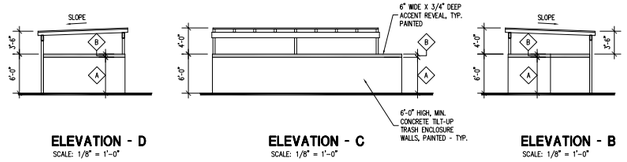
NORTH ELEVATION
SCALE: 1" = 40'-0"



NORTH ELEVATION
SCALE: 1" = 40'-0"

EAST ELEVATION
SCALE: 1" = 40'-0"

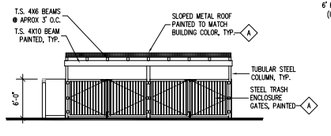
WEST ELEVATION
SCALE: 1" = 40'-0"



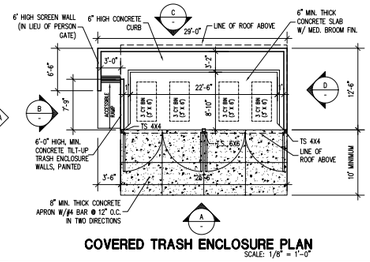
ELEVATION - D
SCALE: 1/8" = 1'-0"

ELEVATION - C
SCALE: 1/8" = 1'-0"

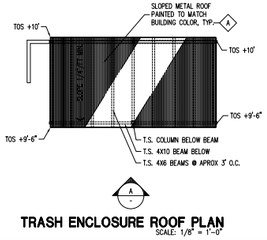
ELEVATION - B
SCALE: 1/8" = 1'-0"



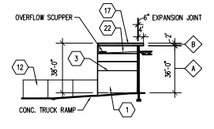
ELEVATION - A
SCALE: 1/8" = 1'-0"



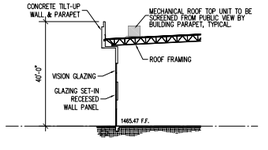
COVERED TRASH ENCLOSURE PLAN
SCALE: 1/8" = 1'-0"



TRASH ENCLOSURE ROOF PLAN
SCALE: 1/8" = 1'-0"



SIDE WALL AT RAMP - TYP. - "1"
SCALE: 1" = 40'-0"

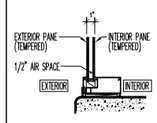


ENTRY SECTION - '2'
SCALE: 1" = 20'-0"

KEYNOTES

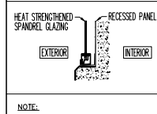
1. SMOOTH FINISH CONCRETE TILT-UP PANEL PAINTED PER THE EXTERIOR COLOR SCHEDULE.
2. GLAZING – SEE GLAZING NOTES BELOW
3. 2" WIDE X 3/4" DEEP HORIZONTAL REVEAL, PAINTED. TYPICAL
4. HOLLOW CORE METAL DOOR. PAINT TO MATCH BUILDING COLOR.
5. METAL VERTICAL LIFT DOOR. PAINT TO MATCH BUILDING COLOR.
6. 5'-0" HIGH STEEL PLATE JAMB GUARD PAINT TO MATCH BUILDING COLOR.
7. PANEL JOINT
8. 3/4" CHAMFER REVEAL WITH RECESSED AREA, PAINTED ACCENT COLOR.
9. FULLY TEMPERED GLASS AT STOREFRONT FLOOR LEVEL, AROUND DOORS TO WITHIN 36" INCLUDING THE DOOR.
10. LINE OF BUILDING PARAPET BEYOND.
11. RUBBER DOCK BUMPERS.
12. CONCRETE TILT-UP SCREEN WALL PAINTED TO MATCH BUILDING COLOR. (VARIES IN HEIGHT BASED ON GRADES) SEE SCREEN WALL ELEVATIONS SHEETS A-5 & A-6
13. 4' WIDE x 8' HIGH LOUVERS FOR MAKE-UP AIR, PAINTED TO MATCH BUILDING
14. 42" HIGH TRUCK RAMP WALL, ABOVE HIGH SIDE OF FINISH GRADE, PAINTED TO MATCH BUILDING
15. CONCRETE TRUCK RAMP
16. CONCRETE STAIRS WITH CONCRETE TILT UP GUARDRAILS, PAINTED
17. DECORATIVE 1 1/2" DEEP BY 24" HIGH REVEAL AT TOP OF PANEL, PAINTED.
18. 5' X 20' TEMPERED VISION LITE WITH TYPE "D" NEOPRENE GASKET, MOUNTED AT +5'-0" A.F.F.
19. GALVANIZED METAL DOWNSPOUT & OVERFLOW SCUPPER WITH SHIELD – PAINTED
20. 8'-0" HIGH TUBULAR STEEL ROLLING GATE – PAINTED EPOXY GLOSS BLACK
21. INTERIOR ROOF DRAIN AND INTERIOR OVERFLOW PIPES
22. ROOF LINE
23. FUTURE HVAC EQUIPMENT TO BE SCREENED FROM VIEW BY THE PARAPET
24. DOWNSPOUT PROTECTION – BENT STEEL PLATE, PAINTED TO MATCH BLDG. COLOR

GLAZING NOTES



INSULATED VISION GLAZING (DUAL PANE)

- EXTERIOR PANE: 1/4" THICK VISTEON VERSALUX GREEN 2000R (REFLECTIVE)
- INTERIOR PANE: 1/4" THICK CLEAR LOW-E #3 BY PPG
- SHADING COEFFICIENT: 0.31
  WINTER U-FACTOR: 0.47
  SOLAR HEAT GAIN COEFFICIENT: 0.26
- 2" x 4 1/2" FULLY CAPTURED OFFSET GLAZING SYSTEM AS MANUFACTURED BY ARCADIA ALUMINUM PRODUCTS OR EQUAL. CLEAR ANODIZED CLASS-1 FINISH



RECESSED GLAZING

- GLASS PANE: 1/4" THICK VISTEON VERSALUX GREEN 2000R (REFLECTIVE)
- SHADING COEFFICIENT: 0.45
- FRONT GLAZED, SILICONE BUTT JOINT SET IN CLEAR ANODIZED ALUMINUM FRAMES.
- HEAT STRENGTHENED SPANDREL GLASS.

NOTE:
1. VISION GLASS SHALL BE TEMPERED AT LOCATIONS REQUIRED PER CODE AND PER KEY NOTE #9 THIS SHEET
2. ALL STOREFRONT CONSTRUCTION, GLASS, METAL ATTACHMENTS, JAMBS, SILLS AND LINTELS SHALL BE DESIGNED TO WITHSTAND 90 MPH MINIMUM WIND LOADS PER CBC CHAPTER 16, TABLE 16-G.

GLAZING LEGEND

T	= TEMPERED VISION GLASS – SEE GLAZING NOTES ABOVE
	= AT HATCHED AREAS, USE 1/4" HEAT STRENGTHENED GREEN 2000R SPANDREL GLASS, SET IN 4" RECESSED (U.N.O.) CONCRETE PER STRUCTURAL PLANS.

EXTERIOR COLORS

A	DUNN EDWARDS #DE6143 "ALMOND LATTE"	(FIELD)
B	DUNN EDWARDS #DE6145 "ROCKY RIDGE"	(BASE / CAP)
C	DUNN EDWARDS #DE6172 "BUNGALOW TAUPE"	(ACCENT)

NOTE:
1. WALL HEIGHTS ARE PRELIMINARY AND SUBJECT TO CHANGE PENDING THE STRUCTURAL ENGINEERS REVIEW.

RKZ, INC.
3002 DOW AVENUE SUITE 226
TUSTIN, CALIFORNIA 92780
PH: 714.731.1140 FAX: 714.731.1090
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OWNER/DEVELOPER:
VOGEL ENGINEERS, INC.
300 PASEO TESORO
WALNUT, CA 91789-2791
PHONE: 909 598-7066
FAX: 909 598-2917

VIP MORENO VALLEY
XXXXX & XXXXX PERRIS BOULEVARD
XXXXX & XXXXX INDIAN STREET
MORENO VALLEY CALIFORNIA 92551

VIP
VOGEL INDUSTRIAL PARK
MORENO VALLEY CA

B	PLANNING DEPT CORR 07-08-09
A	PLANNING DEPT CORR 04-05-09
REVISIONS	
CONSTR.	
BID	
PLAN CHECK	
DRAWN	05-12-08
JOB NO.	06-28

SHEET NAME
EXTERIOR ELEVATIONS

SHEET NO.
A-4.1
OF SHEETS
PROJECT #PA09-0004 & PA09-0012

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-1183-

LSA FIGURE 3.3

VIP Moreno Valley
Environmental Impact Report
Building Elevations

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SOURCE: RKZ, Inc., 2011

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- More care taken in design of achieving comfortable conditions, especially in summertime. Examples of green building features include

Sustainable commercial buildings have been described to have the following building elements:

- Site which optimizes the building orientation, the natural lighting, shading, and ventilation it can capture.
- The building fabrics and materials use low embodied energy materials; use of recycled materials; and the use of high performance material.
- The building has efficient operational and maintenance costs.
- The building is efficient with the use of energy and water managed through a Building Management System. For example, use of photovoltaic array on its roof or façade; rainwater collection and storage tanks.

In recognition of the trend towards Green Building, the proposed project will pursue the Leadership in Energy and Environmental Design (LEED) Core & Shell rating program. LEED is a voluntary, consensus-based standard to support and certify successful green building design, construction, and operations. LEED programs evaluate the complete life cycle of projects and associated buildings through design, construction, and operations. The Core & Shell rating system is for designers, builders, developers, and new building owners of new core and shell construction where the tenants and needs for inside the building are not known. The rating system covers the base building elements including the structure, building envelope, and HVAC system.

Projects seeking LEED compliance are given points for compliance with specific concepts promoting green building. The points rating for a project increases as the number of policies that the project complies with increases. A point scale is applied and projects are rated on this scale. The scale is broken down into four levels, LEED Certified, Silver, Gold, and Platinum, with Platinum being the highest attainable certification available for a given project. The proposed project will incorporate Green Building concepts and is expected to reach the LEED “Certified” rating.

3.6 PROJECT OBJECTIVES

The purpose of the proposed project is to provide a new facility specializing in warehouse distribution services. Upon development, the proposed project will achieve the following:

- Create employment-generating opportunities for the citizens of Moreno Valley and surrounding communities;
- Encourage industrial development as attractive and productive uses while minimizing conflicts with the surrounding existing uses;
- Encourage warehouse distribution services that take advantage of the area’s close proximity to various freeways and transportation corridors;
- Provide the infrastructure improvements required to meet project needs in an efficient and cost-effective manner;
- Encourage new development consistent with the capacity and municipal service capabilities;
- Provide a high density, high-quality large-scale industrial development to provide jobs for residents at a variety of income levels;
- Facilitate the efficient and cost-effective movement of goods in and through the City, which, in turn, allows the City to compete economically on a domestic and international scale;

- Provide an industrial warehouse facility that meets the substantial and unmet demands of businesses located in the City and County;
- Cluster industrial warehouse uses near efficient access points to the state highway system to reduce traffic congestion on surface streets and to reduce associated air pollutant emissions from vehicle sources;
- Implement the City's General Plan Industrial/Business Park Land Use designations that are applicable to the site;
- Accommodate new development that channels land uses in a phased, orderly manner and is coordinated with the provision of necessary infrastructure and public improvements;
- Provide new development that will assist the City in obtaining fiscal balance in the years and decades ahead; and
- Address community circulation, both vehicular and pedestrian, utilizing available capacity within the existing circulation system, and provide fair share improvements to various future-year deficient intersections or road segments.

3.7 REQUIRED PERMITS AND DISCRETIONARY ACTIONS

The following discretionary actions are anticipated to be taken by the City of Moreno Valley as part of the proposed project:

- Tentative Parcel Map approval (TPM 36162);
- Certification of Environmental Impact Report; and
- Site Plan approval.

Other non-discretionary actions anticipated to be taken by the City at the Staff level as part of the proposed project include the following:

- Approval of a Storm Water Pollution Prevention Plan (SWPPP) to accommodate site runoff during construction. Approval of a Water Quality Management Plan (WQMP) to mitigate for post-construction runoff flows.
- Issuance of a Grading permit that requires approval of a grading plan, approval of the final drainage study, approval of the Final WQMP, obtaining an NOI and WDID number, and satisfying those conditions of approval required prior to grading.
- Issuance of an Encroachment permit for any construction work done in any City-controlled right-of-way. Encroachment permit issuance requires approval of improvement plans, public improvement agreement execution with securities posted, and satisfying those conditions of approval required prior to grading.
- Issuance of a Building permit. The comprehensive building permit includes building, plumbing, mechanical, and electrical permits.

Approvals and permits required by other agencies include:

- A National Pollutant Discharge Elimination System (NPDES) permit from the Regional Water Quality Control Board (RWQCB) to ensure that downstream water quality is not worsened;
- Approval of water and sewer improvement plans by the Eastern Municipal Water District.

- Approval from the City and Riverside County Flood Control and Water Conservation District to ensure that construction site drainage velocities are equal to or less than the pre-construction conditions.

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4.0 ENVIRONMENTAL IMPACT EVALUATION

As stated previously, there are five environmental topic areas that are analyzed in this EIR with respect to the proposed project. These topics are:

4.1 Agricultural Resources

4.2 Air Quality

4.3 Climate Change and Greenhouse Gas Emissions

4.4 Noise

4.5 Transportation and Traffic

Within each subsection described in Section 4.0, the following information is presented relative to each environmental issue described:

- Description of the existing setting as it relates to the specific environmental issue;
- A summary of policies and regulations relevant to the specific environmental issue;
- Identification of the thresholds of significance;
- Evaluation of project-specific impacts and a determination of significance based on identified threshold levels;
- Identification of mitigation measures;
- A determination of the level of significance after mitigation measures are implemented; and
- Cumulative impacts.

The following environmental analysis provided in Sections 4.1 through 4.5 focuses on changes in the existing physical environment and identifies direct and indirect and short-term and long-term significant effects associated with the proposed project. The cumulative impacts for each of the proposed project components are analyzed within the discussion of each component for each threshold.

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4.1 AGRICULTURE AND FORESTRY RESOURCES

This chapter discusses agricultural and forest resource impacts attributable to the proposed project. It describes existing agricultural resources, respective State farmland classifications for the project site, and existing forest resources. This chapter focuses on discussions involving applicable State, regional, and local policies regarding agricultural and forest resources and the conversion of farmland and forest to non-agricultural and non-forest uses. This section is based in part on the following reference documents:

- *A Guide to the Farmland Mapping and Monitoring Program*, California Department of Conservation, Division of Land Resources Protection, 2004 Edition.
- *California Land Evaluation and Site Assessment Model, Instruction Manual*, California Department of Conservation, Office of Land Conservation, 1997.
- *City of Moreno Valley General Plan*, City of Moreno Valley, July 2006.
- *City of Moreno Valley General Plan Final Environmental Impact Report*, P & D Consultants, July 2006.
- *Economic Viability of Agriculture in the East Inland Empire,* CB Richard Ellis, March 18, 2009.
- *Riverside County Land Use Conversions, 1998–2008*, California Department of Conservation, Division of Land Resources Protection.
- *Riverside County 2009 Agricultural Production Report, 2009.*
- *Soil Survey Western Riverside County Area, California*, United States Department of Agriculture, November 1971.

The California Land Evaluation and Site Assessment (LESA) Model worksheets prepared for the proposed project are included as Appendix B to this EIR.

4.1.1 Existing Setting

4.1.1.1 Agricultural Resources

As described in the City's General Plan (July 2006), land used for agricultural production is generally concentrated in the eastern portion of the City. Farmland within the City at the time of the preparation of the General Plan was most often used for grazing, citrus orchards, and potato and dryland farming.[1] However, in recent years the City and region have faced and still face urbanization and development pressures contributing to the decline of agricultural uses in the project area and region. Of the land in the City that is utilized for agricultural use, few parcels are owner-operated with the majority of the properties being leased for agricultural use. Many agricultural fields within the City have been out of production for a number of years and are dominated by disturbed ruderal (weedy) vegetation. This condition is also true of the proposed project site. Various forms of disturbance related to agricultural uses include frequent disking, pesticide application, and irrigation. The project vicinity is characterized by a mix of developed and undeveloped properties, as can be seen in previously referenced Figure 1.1. Developed properties in the vicinity include a waste transfer station and an industrial/warehouse to the north; industrial/warehouse and undeveloped property to the south; industrial/warehouses and a self storage facility to the east; and warehouses, vehicle storage, residences, and undeveloped property to the west. Active agricultural operations (alfalfa) take place on properties located to the southwest of the project site, west of Indian Street and south of Harley Knox Boulevard.

[1] *5.8 Agricultural Resources,* City of Moreno Valley General Plan Final Environmental Impact Report, July 2006.

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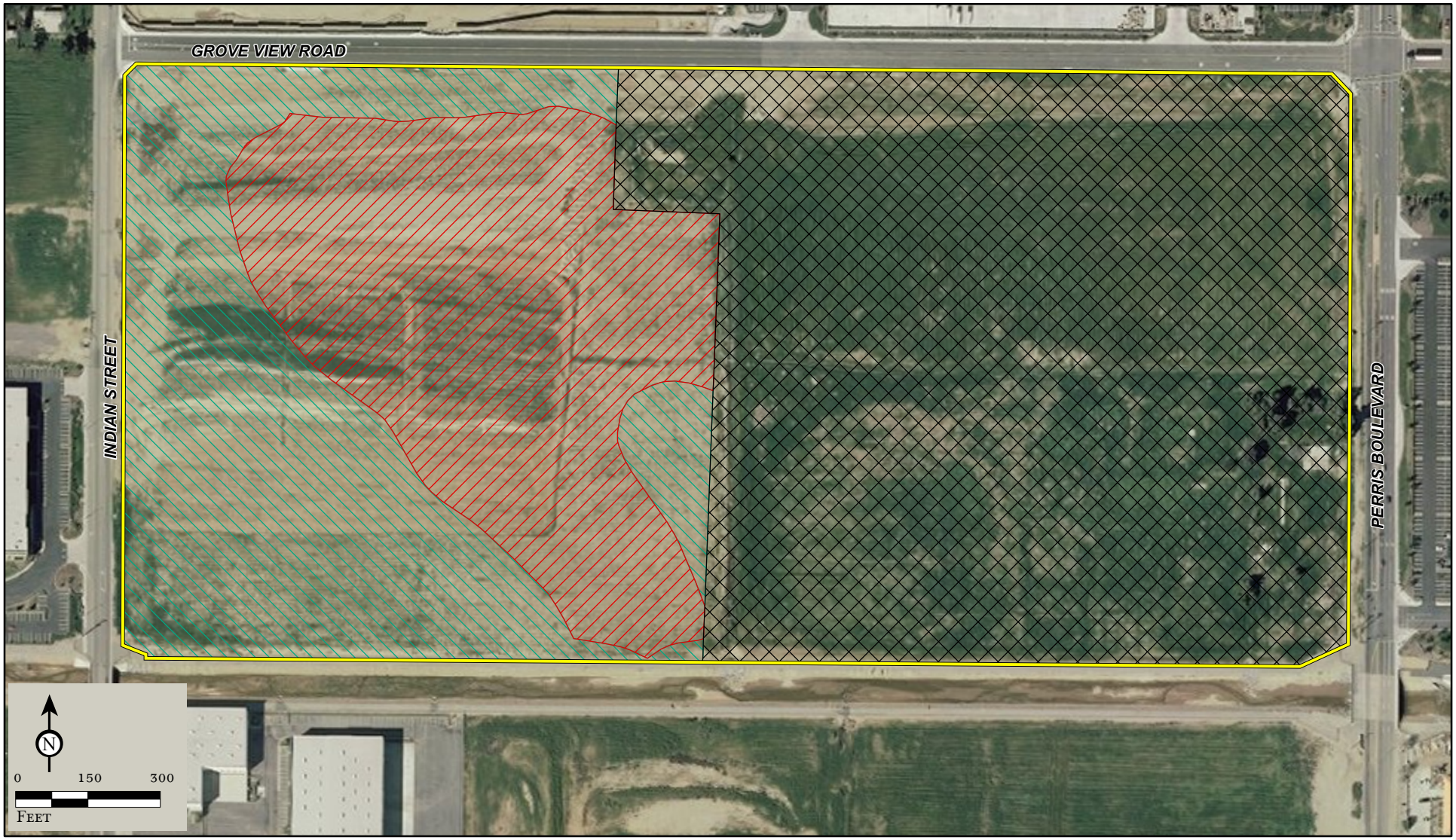

LSA

FIGURE 4.1.1

Project Boundary

State Designated Farmland

Farmland of Local Importance

Farmland of Statewide Importance

Prime Farmland

VIP Moreno Valley
Environmental Impact Report

SOURCE: ESRI World Imagery: Aerials Express, 2010; Farmland Mapping and Monitoring Program, 2008.

State Designated Farmland

I:\VOG1001\Reports\EIR\fig4-1-1_farmland.mxd (10/11/11)

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The proposed project site has been used historically for agricultural purposes but currently lies fallow and has been fallow for a number of years. It was most recently used as a sod farm that ceased operating in August 2005 and has not been in agricultural production since that time. Within the City, approximately 1,639 acres are designated as Prime Farmland.[1] As illustrated in Figure 4.1.1, the project site is identified as Prime Farmland, Farmland of Statewide Importance, and Farmland of Local Importance. Approximately 16.89 acres (23%) of the project site is designated as Prime Farmland,[2] 16.23 acres (23%), is designated Farmland of Statewide Importance, and 38.69 acres (54%) is designed Farmland of Local Importance.

4.1.1.2 Forestry Resources

Based on data from the Fire and Resource Assessment Program, Riverside County does not have land set aside for timber production.[3] In addition, no land is currently identified as suitable for timber sale production in Southern California. Therefore, there are currently no areas within the City designated for timber production. Harvesting of trees may occur to meet wildlife, fuel, watershed, or other needs.[4]

4.1.1.3 General Plan and Zoning Designations

The City of Moreno Valley's General Plan policies support agriculture as an interim use. No land in the City is dedicated for agricultural use. The site and surrounding area is designated Business Park/Light Industrial to the north, east and west in the City and Light Industrial and Community Commercial south of the Lateral B channel in Perris. Similarly, zoning for the site and surrounding area in the City is governed by Specific Plan (SP) 208. SP 208, the Moreno Valley Industrial Area Plan, was originally adopted in 1989, amended in 2001 and 2002, and encompasses approximately 1,540 acres in the southwest portion of the City covering an L-shaped area. SP 208 functions as the zoning for the applicable planning area, defining permitted uses and establishing design guidelines. The proposed project site, as well as the surrounding areas, is planned for industrial development per SP 208. The SP also permits supporting commercial land uses at key intersections in its planning area, including the intersection of Perris Boulevard and Grove View Road. Zoning for the area to the south across the Lateral B channel in Perris is Light Industrial and Community Commercial.

4.1.2 Existing Policies and Regulations

The preservation of agricultural activities and soils has been an explicit goal of the United States Department of Agriculture (USDA) and California Department of Conservation (CDC). Agricultural soils are limited non-renewable resources that are usually confined to particular locations; however, not all agricultural activities occur on soils suitable for agriculture and not all soils highly suited for farming are used for crop production. Generally, policies implemented to preserve agriculture are aimed at either protection of agricultural areas or the protection of the soils most suitable for agricultural production.

4.1.2.1 Federal Regulations

Federal regulations, such as the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA) and National Forest Management Act of 1976 (NFMA), authorize long-range planning by the

1 *5.8 Agricultural Resources,* City of Moreno Valley General Plan Final Environmental Impact Report, July 2006.
2 Important Farmland Map Riverside County, Farmland Mapping and Monitoring Program, 2004.
3 *Table 7 Timberland Production Zone (TPZ) acreage by Site Class in California as of 2000–2001*, Timberland Site Class on Private Lands Zoned for Timber Production, Fire and Resource Assessment Program, Department of Forestry and Fire Protection, http://frap.cdf.ca.gov/publications/Timberland_Site_Class_on_Private_Lands_Zoned_for_Timber_Production.pdf.
4 *Vegetation Management Standards, Land Management Plan Part 3 Design Criteria for the Southern California National Forests, Angeles National Forest, Cleveland National Forest, Los Padres National Forest, San Bernardino National Forest*, United States Department of Agriculture Forest Service, September 2005.

United States Forest Service (USFS) to ensure the future supply of forest resources, as well as to provide for the management of renewable resources on national forest lands.

4.1.2.2 State Regulations

State Designated Farmland. The California Government Code (Section 65570) requires the collection and reporting of agricultural land use acreage and conversion by June 30 of each even-numbered year. Utilizing data from the USDA Natural Resource Conservation Service (NRCS) soil survey and current land use information, the CDC and the Farmland Mapping and Monitoring Program (FMMP)[1] compile important farmland maps for each county within the State. Farmland maps and statistics are produced biannually using a process that integrates aerial photo interpretation, field mapping, and a computerized mapping system. These maps delineate land use in eight mapping categories (and one overlay category) and represent an inventory of agricultural soil resources within each county. The categories of land delineated on these maps include:

- **Prime Farmland:** Land that has the best combination of physical and chemical characteristics for the production of crops. It has the soil quality, growing season, and moisture to produce sustained high yields of crops when treated and managed, including water management, according to current farming methods.
- **Farmland of Statewide Importance:** Land that is similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to hold and store moisture.
- **Unique Farmland:** Land of lesser-quality soils used to produce specific high economic value crops. It has the special combination of soil quality, location, growing season, and moisture supply needed to produce sustained high quality or high yields of a specific crop when treated and managed according to current farming methods. It is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Examples of Unique Farmland crops include oranges, olives, avocados, rice, grape, and cut flowers.
- **Farmland of Local Importance:** Land of importance to the local agricultural economy, as determined by each county's board of supervisors and local advisory committees, e.g., dairies, dry land farming, aquaculture, and uncultivated areas with soils qualifying for Prime Farmland and Farmland of Statewide Importance. Farmland of Local Importance in Riverside County is defined[2] as:
    - Lands with soils that would be classified as Prime and Statewide Farmland but lack available irrigation water.
    - Lands planted with dryland crops of barley, oats, and wheat.
    - Lands producing major crops for Riverside County but that are not listed as Unique crops. These crops are identified as returning one million or more dollars on the 1980 Riverside County Agriculture Crop Report. Crops identified are permanent pasture (irrigated), summer squash, okra, eggplant, radishes, and watermelons.
    - Dairylands, including corrals, pasture, milking facilities, and hay and manure storage areas if accompanied with permanent pasture or hayland of 10 acres or more.
    - Lands identified by city or county ordinance as Agricultural Zones or Contracts, which includes Riverside City "Proposition R" lands.
    - Lands planted to jojoba, which are under cultivation and are of producing age.

[1] A Guide to the Farmland Mapping and Monitoring Program, California Department of Conservation, Division of Land Resources Protection, 2004 Edition.

[2] *Farmland of Local Importance, Local Definitions,* http://www.conservation.ca.gov/dlrp/fmmp/Documents/Local_definitions_00.pdf, website accessed February 16, 2011.

- **Grazing Land:** Land on which the existing vegetation, whether grown naturally or through management, is suitable for grazing or browsing of livestock.
- **Urban and Built-Up Land:** Land used for residential, industrial, commercial, construction, institutional, public administrative purposes such as railroad yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment plants, water control structures, and other development purposes. Highways, railroads, and other transportation facilities also are included in this category.
- **Other Land:** Land not included in any of the other mapping categories. Common examples include low-density rural developments, brush, timber, wetland, and riparian areas not suitable for livestock grazing, confined livestock, poultry or aquaculture facilities, strip mines, borrow pits, and water bodies smaller than 40 acres.
- **Water:** Water areas with an extent of at least 40 acres.
- **Land Committed to Nonagricultural Use:** This optional designation is an overlay to the standard farmland categories and represents existing farmland and grazing land and vacant areas that have a permanent commitment for development. Examples of Land Committed to Nonagricultural Use would include an area undergoing permanent infrastructure installation or for which bonds or assessments have been issued for public utilities. Such lands represent planning areas where there are commitments for future nonagricultural developments that are not reversible by a simple majority vote by a city council or board of supervisors.

California Land Conservation Act (Williamson Act). The California Land Conservation Act of 1965, also referred to as the Williamson Act, is a non-mandated State program administered by counties and cities for the preservation of agricultural land. This program enables local governments to enter into contracts with private landowners to restrict specific parcels of land to agricultural or related open space use.

Participation in the program is voluntary on the part of both landowners and local governments. Participation is implemented through the establishment of Agricultural Preserves and the execution of Williamson Act contracts. Individual property owners enter into a contract that restricts or prohibits development of their properties to non-agricultural uses during the term of the contract in return for lower property taxes. Initially signed for a minimum ten-year period, the contracts are automatically renewed each year for a successive minimum ten-year period unless a notice of non-renewal is filed, or a contract cancellation is approved by the local government. In the City of Moreno Valley, currently there is no land currently under a Williamson Act contract.[1]

State regulations, such as the Forest Taxation Reform Act of 1976 and the Z'berg-Nejedly Forest Practice Act of 1973–California Forest Practice Act, provide for the preservation of forest lands from encroachment by other incompatible land uses and provide for oversight of the management of forest practices and forest resources in California. As no forest or timber resources are located within the project site, no further discussion of these State regulations is warranted.

4.1.2.3 Local Policies

The City of Moreno Valley General Plan recognizes the high demand for land and housing and development in the region and that many of the current agricultural operations in the City are "interim uses" or uses that will ultimately be converted to urban uses. The following objective pertains to agriculture and is applicable to the proposed project.

[1] *5.8 Agricultural Resources,* City of Moreno Valley General Plan Final Environmental Impact Report, July 2006.

Parks, Recreation, and Open Space Element

Objective 4.1 Retain agricultural open space as long as agricultural activities can be economically conducted, and are desired by agricultural interests (with some agriculture retained in long-term use), and provide for an orderly transition of agricultural lands to other urban and rural uses.

To support this objective, the City identifies policies to encourage grazing and crop production as a compatible part of a rural residential atmosphere. Additionally, where practical, the City plans to incorporate existing groves into the design of future development projects. These groves can help retain the agricultural character of the area as well as provide a buffer between different land uses.[1]

4.1.3 Methodology

Important Farmland maps for Riverside County and the City were reviewed to determine whether the proposed project site contains or consists of Prime, Unique, or Statewide Important farmland. Second, the analysis evaluates the current General Plan land use designations and zoning applicable to the site to determine the existence of any conflicts between the proposed project and any potential existing agricultural general plan and zoning designations applicable to the site.

To quantify a development project's potential impacts on agricultural resources, the CDC has developed the California Agriculture LESA Model, a method of rating the relative quality of land resources and potential impacts to agricultural resources. The LESA Model is intended to provide lead agencies with a methodology to identify potentially significant impacts that may result from agricultural land conversions.

The LESA Model uses six different factors (two based on soil resource quality and four based on on-site and adjacent land characteristics) to develop a weighted score that identifies the significance of potential impacts to agricultural resources. The Land Evaluation (LE) scoring utilizes two soil factors. The Land Capability Classification (LCC) indicates the suitability of soils for most kinds of crops, and the risk of damage when they are used in agriculture, while the Storie Index provides a numeric rating (0–100) of the relative degree of suitability or value of a given soil for intensive agriculture. The Site Assessment (SA) scoring considers the size of the site to be converted, water supply restrictions in drought and non-drought years, and the presence (or absence) of adjacent agricultural, habitat, or parkland uses.

By assessing and weighing a variety of soil, water, and land use characteristics, it is possible that the conversion of a large parcel containing poor soils and with limited access to water would not result in a significant impact, while the conversion of a much smaller well-watered parcel with quality soils could be considered significant. To ensure potential impacts to adjacent agricultural activities are appropriately considered, the LESA model requires an examination of land use on all parcels within a Zone of Influence (ZOI) that extends a minimum 0.25 mile from the boundary of the site. For any site evaluated using the LESA model, the factors are rated, weighed, and combined, resulting in a single numeric score that becomes the basis for determining a project's potential significance.[2]

This EIR utilizes the LESA model as one of the analytical tools by which to assess the proposed project's impacts on agricultural conversion. Appendix G of the CEQA Guidelines states as follows:

> "In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland."

1 *City of Moreno Valley General Plan*, City of Moreno Valley, July 2006.
2 California Land Evaluation and Site Assessment Model, Instruction Manual, State of California Department of Conservation, Office of Land Conservation, 1997.

Further, as stated above, the LESA model was specifically created by the CDC in order to provide "specific guidance concerning how agencies should address farmland conversion impacts."[1] Because of its use of localized inputs as part of the model, the LESA model is generally considered the preferred methodological tool by which to assess the significance of a proposed project's impacts related to agricultural resources.

4.1.4 Thresholds of Significance

Appendix G of the State CEQA Guidelines recognizes the following significance thresholds related to agricultural resources. Based on these significance thresholds, potential impacts to agricultural resources could be considered significant if the proposed project:

- Conflicts with existing zoning for agricultural use, or a Williamson Act contract;
- Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220[g]), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104[g])?
- Result in the loss of forest land or conversion of forest land to non-forest use?
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?
- Converted Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use; and/or

4.1.5 No Impact/Less than Significant Impacts

The following potential impacts were determined to be less than significant. In each of the following issues, either no impact would occur (therefore, no mitigation would be required) or adherence to established regulations, standards, and policies would reduce potential impacts to a less than significant level.

4.1.5.1 Conflict with existing zoning or a Williamson Act Contract

Threshold	Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

The California Land Conservation Act of 1965, commonly referred to as the Williamson Act, enables local government to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agriculture or related open space uses. In return, landowners receive property tax assessments much lower than normal because they are based upon farming and open space uses as opposed to full market value. The purpose of the Williamson Act is to encourage property owners to continue to farm their land and to prevent the premature conversion of farmland to urban uses. The project site is not located within a Williamson Act contract area;[2] therefore, no impact would result from implementation of the project.

It should be noted that the Moreno Valley General Plan policies and zoning designations support agriculture only as an interim use, and no land in the City is designated solely for agricultural use or for agricultural preservation. The uses proposed for the project site are consistent with the existing

[1] California Agricultural Land Evaluation and Site Assessment Model, Instruction Manual, 1987, p. 3.
[2] Williamson Act Geographic Information Systems data, Riverside County, 2006.

underlying General Plan and Zoning designations. The project site is not zoned for agricultural uses. No impact would occur and no mitigation is required.

4.1.5.2 Conflict with/Loss of Existing Forest Land or Timberland Zoning

Threshold	Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))? Would the project result in the loss of forest land or conversion of forest land to non-forest uses?

The project site is currently vacant and fallow although it was previously utilized for sod farming up until August 2005. As previously identified, no forest or timberland resources are located within the project site nor is the project site zoned for forest land or timberland. Implementation of the proposed project would not require any rezoning or General Plan Amendments as the proposed uses are consistent with the existing underlying General Plan land use designation and zoning designation. The proposed project would not conflict with existing forest zoning, cause rezoning of forest land, or result in the loss or conversion of forest lands to non-forest uses as no such resources exist in the City. No impacts associated with this issue would occur and no mitigation is required.

4.1.6 Significant Impacts

4.1.6.1 Conversion of State Designated Farmland

Threshold	Would the proposed project result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program (FMMP) of the California Resources Agency, to non-agricultural use?

As discussed above, the CDC, as part of the FMMP process, publishes a Farmland Conversion Report every two years. This report documents land use conversion by acreage for each county in the State. The amount of Prime Farmland inventoried in Riverside County during the last countywide survey of farmland (2008) totaled 122,936 acres. The amount of Farmland of Statewide Importance totaled 44,651 acres. The amount of Farmland of Local Importance totaled 229,157 acres. The most recent data are for the 2006–2008 survey period, during which Riverside County experienced a net loss of 5,569 acres of Prime Farmland, 2,265 acres of Farmland of Statewide Importance, and 2,050 acres of Farmland of Local Importance.[1]

As previously stated, approximately 16.89 acres of the proposed project site are designated as Prime Farmland, 16.23 acres are designated as Farmland of Statewide Importance, and 38.69 acres are designated as Farmland of Local Importance. The conversion of the 16.89 acres of on-site Prime Farmland would be equivalent to 0.03 percent of the total loss of Prime Farmland in the County during this period. Similarly, the conversion of the 16.23 acres of on-site Farmland of Statewide Importance would be equivalent to 0.07 percent of the total loss of Farmland of Statewide Importance in the County during this period. The conversion of the 38.69 acres of on-site Farmland of Local Importance would be equivalent to 1.89 percent of the total loss of Farmland of Local Importance in the County during this period. Because Prime Farmland, Farmland of Statewide Importance, and Farmland of Local Importance are considered to be a finite resource, its conversion to a non-agricultural use is a significant impact.

[1] Table A-25 Riverside County 2006–2008 Land use Conversion, Farmland Mapping and Monitoring Program, California Department of Conservation Division of Land Resource Protection, http://redirect.conservation.ca.gov/dlrp/fmmp/pubs/2006-2008/conversion_tables/rivcon08.xls; website accessed August 17, 2011.

Demographic increases, coupled with the availability of developable land and the rising cost of water, increasingly exert pressure on the owners/operators of agricultural operations to sell and/or convert agricultural lands to non-agricultural uses. The CDC has identified potential "conservation tools" available to mitigate for the loss of agricultural land. These include the purchase of agricultural conservation easements; transfer of development rights; acquisition of farmland by the city or county; mitigation banking; the establishment of "urban limits," greenbelts, and buffers; the payment of in-lieu fees sufficient to a purchase and maintain farmland conservation easements; and planning tools such as clustering development, use of density bonuses, and limiting "leapfrog" development.[1]

Various techniques and programs have been utilized in selected areas of the State to mitigate for the loss of State-designated Farmland and/or to ensure the continued economic viability of agricultural operations. The City of Davis requires the granting of a farmland conservation easement or other conservation mechanism for twice the amount of agricultural land being converted to a non-agricultural uses; or the payment of in-lieu fees based upon a two-to-one mitigation requirement.[2] In its "Agricultural Lands Conversion Ordinance," Yolo County requires a one-to-one replacement of converted agricultural lands, either through the granting of a conservation easement, or payment of in-lieu fees. Generally, mitigation lands are required to have similar soil quality, water supply adequacy, and should be in relative proximity to the lands being converted.[3]

The CDC's California Farmland Conservancy Program (CFCP) seeks to encourage the long-term, private stewardship of agricultural lands through the voluntary use of agricultural conservation easements. Implementation of conservation easements is typically achieved either through (1) the outright purchase of easements or (2) the donation of mitigation fees to a local, regional, or statewide organization whose purpose includes the acquisition and stewardship of conservation easements. Additional agricultural conservation easements have been funded by various entities without the use of CFCP funds. While the amount of CFCP grants varies depending on location, farmland type, and size, CFCP grants to conservancy agencies made to offset the cost of purchasing agricultural conservation easements has averaged approximately $3,000 per acre statewide.[4]

The City does not maintain a program for mitigating impacts resulting from the conversion of farmland. Because State-designated Farmland is a finite resource, the loss of 16.89 acres of on-site Prime Farmland, 16.23 acres of Farmland of Statewide Importance, and 38.69 acres of Farmland of Local Importance is significant. While the proposed project would result in the conversion of State-designated Farmland, development of this site and the surrounding area is consistent with the long-term vision of the City as outlined SP 208 and in the General Plan. While the Moreno Valley General Plan policies support agriculture as an interim use, no land in the City is designated for agricultural preservation.

The City of Moreno Valley General Plan EIR discusses impacts related to agriculture in the City as well as potential mitigation. Potential mitigation measures exist that would reduce the impact related to the loss of agricultural resources within the City. These potential mitigation measures include:

- Enrolling productive agricultural land, not presently under contract, under a Williamson Act Contract;
- Providing protection to ongoing agricultural operations from complaints and nuisance complaints from adjacent new development;
- Protecting productive agricultural land subject to conversion through the purchase of or transfer of its development rights;

1 Discussion Paper, Agricultural Land Conservation Tools, California Department of Conservation.
2 Chapter 40 (Right to Farm and Farmland Preservation), City of Davis Municipal Code.
3 Yolo County General Plan Agricultural Element, November 2002.
4 http://www.consrv.ca.gov/dlrp/cfcp/stories/easement_projects.htm, site accessed August 17, 2011.

- Purchasing conservation easements on existing agricultural land to ensure that the land is never converted to urban uses; and
- Donating funds to a regional or statewide program that promotes and implements the use of agricultural land conservation easements.[1]

Mitigation measures must be feasible and fully enforceable through permit conditions, agreements, or other legally binding considerations. To be feasible, mitigation must be capable of being accomplished in a successful manner within a reasonable period of time, taking into account the economic, environmental, legal, social, and technological factors.[2]

While the City of Moreno Valley General Plan EIR identifies potential mitigation measures for impacts to agricultural resources, such mitigation measures have deemed infeasible. No mechanism for the mitigation of impacts to State-designated Farmland and/or existing agricultural operations has been enacted by either the City of Moreno Valley or the County of Riverside. Rather, the City has specifically recognized that the conversion of agricultural land under its jurisdiction is an eventual and expected outcome of current and future growth. The current General Plan does not include any agricultural designations. The City allows agricultural uses in all land use designations as an interim use until such time as the land is developed per the vision identified in the General Plan. One of the goals stated in the City's recent General Plan is the "…orderly conversion of agricultural lands." The proposed project is a continued extension of development in the surrounding area (industrial/business park). The proposed project does not interfere with the ability of other adjacent properties to be used for agricultural production should the property owner wish to do so, nor does it create any gaps of vacant or agricultural land between the proposed project and the existing adjacent development. However, the project would permanently remove State-designated Farmland, and thus is considered a significant impact on agricultural resources.

Based on input from the Riverside County Farm Bureau, the major reason why farming appears to be no longer profitable in the Moreno Valley area is due to the high cost of water, which represents over a third (38%) of the estimated cost for farming. As property values and water costs (at domestic rates) increase due to suburbanization, no crop that can be grown in this area would yield enough revenue to make farming profitable. Dry farming continues to be economical in this area only because there are no costs for water or installing/maintaining irrigation equipment. However, most of the local farming has been and is continuing to move out to the Coachella Valley as it is the only way to continue making a profit. Additionally, as documented in the *Economic Viability of Agriculture in the East Inland Empire,*[3] which examines the economic and market trends affecting agriculture operations throughout California, the following factors demonstrate the infeasibility of agricultural production in the Eastern Inland Empire:

- Urbanization in the Inland Empire, resulting in dramatically increasing land prices;
- Higher water and labor costs;
- Environmental regulation (e.g., insects, odors, groundwater contamination, and solid waste removal); and
- Competition from Kern County and the Central Valley with lower land costs and reduced regulations

As summarized in the *Economic Viability of Agriculture in the East Inland Empire,* due to competing land uses, land prices have increased dramatically in the area in excess of $250,000 per acre. It has become more profitable for farmers to sell their land for a premium and relocate to a different area. The adoption of various General Plans in the Inland Empire emphasizing significant residential and commercial development has also encouraged the farmers to sell their land and relocate.

1 Moreno Valley General Plan Final Program EIR, July 2006.
2 CEQA Guidelines, Sections 15126.4 and 15364.
3 *Viability of Agriculture in the East Inland Empire,* CB Richard Ellis, March 18, 2009.

The proximity of agriculture and urban development in the Inland Empire region bring with it many conflicts. There is an increase in the land use incompatibility with nuisance complaints from the urban neighbors regarding flies, farm odors, early morning noise, and also water and air pollution. The farmers also face pressures due to increased water and land-use restrictions.

Central Valley farmers also face few development pressures as compared to the Inland Empire and they benefit from a diverse farm economy. For example, the farmers use dairy waste to fertilize their own crops or of their neighbors. They also use agricultural waste from neighboring farms as feed. This reduces their waste disposal and feed costs.

With historic growth in commercial/industrial/residential demand throughout southern California over the past 50 years, there has been a consistent growth in residential and commercial/industrial development activity on former agricultural lands throughout Orange County, Los Angeles County and more recently into Riverside and San Bernardino Counties. Since 1990, the Inland Empire has seen population growth of over 1.5 million people, and it is projected to add another 75,000 people each year over the coming decade. In the City of Moreno Valley, there have been over 14,000 new housing units built since 2000.[1]

Industrial development in the Inland Empire region has seen similar growth with inventory increasing by 60 percent, or 92 million square feet since 2000. As a result of these trends, average land prices in the Inland Empire have increased to over $250,000 per acre, which compares to Kern County land values of less than $50,000 per acre.

Mitigation Measures. The potential mitigation measures identified by the City listed previously are not considered to be feasible by the City of Moreno Valley. Williamson Act contracts are entered into voluntarily by property owners and the City cannot force owners to participate in this program. The City does have the ability to encourage property owners to participate in Williamson Act programs; however, this is expected to result only in temporary preservation of agricultural land since property owners have the option of non-renewal of these contracts at any time after the ten-year contract period ends. The land would then be available to be developed with urban uses.

Providing protection for ongoing agricultural activities from new developments, such as requiring buffers between agricultural operation and new development or requiring the notification and disclosure of agricultural activities to the purchasers adjacent properties will not permanently protect agricultural land.

The purchase or transfer of development rights, purchase of conservation easements, or donation of funds to assist in the conservation of agricultural land would need to be implemented to ensure the preservation of agricultural land. As stated previously, the City anticipates the conversion of agricultural land within the City and does not set aside land for permanent preservation. The City expects that the majority of the land within the City will be converted to urban uses, although some agriculture will continue as interim uses, as allowed by the City's Development Code for all zoning categories. Moreno Valley has determined that these measures are economically infeasible based on the higher costs associated with land, water and labor, increased environmental regulation, and competition from neighboring regions where agricultural operations are less costly; thus, resulting in an inability to make farming profitable. Furthermore, these measures are contrary to the City's vision (as stated in its General Plan) for the project site; therefore, they are not feasible and alternative mitigation has not been identified.

[1] *State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State, 2001-2010, with 2000 Benchmark. Sacramento, California, May 2010.*

Level of Impact after Mitigation. Since the mitigation measures discussed are not consistent with the objectives of the Moreno Valley General Plan and are not economically feasible, no mitigation measures are proposed and impacts related to this issue remain significant and unavoidable.

4.1.6.2 Conversion of Farmland to a Non-Agricultural Use

Threshold	Would the proposed project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?

The proposed project would result in the development of industrial uses on land that has historically been utilized for sod production; however, no active agricultural operation has occurred on the site since August of 2005. Approximately 16.89 acres of the proposed project site are designated as Prime Farmland, 16.23 acres are designated as Farmland of Statewide Importance, and 36.69 acres are designated as Farmland of Local Importance. The conversion of the project site to a non-agricultural use is a result of various economic and demographic factors. As previously noted, increased cost for water and a continuing demand for housing and other development in the City and region are the primary reasons for this agricultural land conversion.

To further evaluate the proposed project's impacts on agricultural resources, an analysis was completed utilizing the DOC's LESA Model. The LESA model is one of the analytical tools by which to assess the proposed project's impacts on agricultural conversion. Appendix G of the CEQA Guidelines states: "In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland." Further, as stated above, the LESA model was specifically created by the CDC in order to provide "specific guidance concerning how agencies should address farmland conversion impacts." Because of its use of localized input as part of the model, the LESA model is generally considered the preferred methodological tool by which to assess the significance of a proposed project's impacts on agricultural resources.

The LESA model is a method to rate the relative quality of land resources and potential impacts to agricultural resources using six different factors (two based on soil resource quality, and four based on on-site and adjacent resources) to develop a weighted score used to identify the significance of potential impacts to agricultural resources. For a given project, the factors are rated, weighted, and combined, resulting in a single numeric score, which becomes the basis for making a determination of a project's potential significance.[1] The resulting LESA score for the project site is provided in Table 4.1.A while the scoring threshold is provided in Table 4.1.B.

Table 4.1.A: Land Evaluation and Site Assessment Model Score

Factor Name	Factor Rating (0–100 Points)	×	Factor Weighting (Total = 1.00)	=	Weighted Factor Rating
Land Evaluation					
1. Land Capabilities	83.6	×	0.25	=	20.90
2. Storie Index Rating	71.93	×	0.25	=	17.98
Land Evaluation (LE) Subscore					**38.88**
Site Assessment					
1. Project Size	80	×	0.15	=	12.00
2. Water Resources Available	90	×	0.15	=	13.50

[1] *California Land Evaluation and Site Assessment Model, Instruction Manual*, State of California Department of Conservation, Office of Land Conservation, 1997.

Table 4.1.A: Land Evaluation and Site Assessment Model Score

Factor Name	Factor Rating (0–100 Points)	×	Factor Weighting (Total = 1.00)	=	Weighted Factor Rating
3. Surrounding Agriculture	0	×	0.15	=	0
4. Protected Resource Lands	0	×	0.15	=	0
Site Assessment (SA) Subscore					**25.50**
TOTAL LESA SCORE (LE+SA)					**64.38**

Table 4.1.B: LESA Model Scoring Threshold

Total LESA Score	Scoring Decision
0–39 Points	Not Considered Significant
40–59 Points	Considered Significant only if LE and SA subscores are each greater than or equal to 20 points
60–79 Points	Considered Significant unless either LE or SA subscore is less than 20 points
80–100 Points	Considered Significant

As identified in Table 4.1.A, the proposed project's LESA score is 64.38. As indicated in Table 4.1.B, a LESA score of 64.38 is considered significant. Therefore, the proposed project would result in a significant impact to agricultural resources.

Currently, property southwest of the project site (south of Lateral B or the Perris Valley Storm Drain and west of Indian Street) is utilized for agriculture. While the proposed project will result in the construction and operation of industrial uses, it would not preclude the continuation of agricultural uses on adjacent properties, in the event the property owners elected to do so. Whether or not adjacent agricultural land is developed relies on several factors including market demand, availability of property, profitability of the agricultural use, and the landowner's interest in continuing farming. While the operation of industrial uses would increase development pressure on adjacent agricultural properties, conversion of the adjacent agricultural properties is reasonably foreseeable.

The project does not include design features that would prevent the existing agricultural operations in the area from continuing. The project would convert land that was previously used for agriculture and the development of the proposed project may contribute to the conversion of adjacent lands. However, the project is a logical extension of development in the City and does not create leapfrog development or islands of agricultural land that would be difficult to farm. The City recognizes development pressures within the City, and that these pressures will increase as the City continues to build out.

Additionally, while the project would not directly cause the conversion of adjacent agricultural land to non-agricultural uses, it would contribute to development pressure within the City that could potentially lead to the conversion of agricultural land off site. This is a significant impact requiring mitigation. However, as stated in Section 4.1.6.1, no feasible mitigation for the loss of agricultural land within the City of Moreno Valley exists; infeasibility is based on the higher costs associated with land, water and labor, increased environmental regulation, and competition from neighboring regions where agricultural operations are less costly thus resulting an inability to make farming profitable.

As with impacts associated with the conversion of State-designated Farmland, no feasible mitigation is available to mitigate for the direct impacts associated with the conversion of farmland, as previously discussed in Section 4.1.6.1. While the City has identified that the conversion of agricultural land under its jurisdiction is an eventual outcome of current and future growth, the impacts associated with this issue remain significant and unavoidable.

4.1.7 Cumulative Impacts

The cumulative area for agricultural resource impacts is Riverside County. As with the project-related impacts to Prime Farmland and Farmland of Statewide Importance, no local or regional program to mitigate for the cumulative impacts to agricultural resources is available. As stated previously, the City does not maintain a General Plan or zoning designation for agricultural uses and there are no project-level feasible mitigation measures that would help reduce cumulative impacts. During the last reporting period (2006–2008), 6,540 acres of Prime Farmland, 2,366 acres of Farmland of Statewide Importance, and 8,873 acres of Farmland of Local Importance were converted to other uses. The cumulative effect of development in the region will continue to result in the conversion of agricultural lands to non-agricultural uses. Because agricultural land, including Prime Farmland, Farmland of Statewide Importance, and Farmland of Local Importance is a finite resource, the conversion of approximately 71 acres to industrial uses, combined with planned and future development in the City and region, represents a significant cumulative impact to agricultural operations and resources.

4.2 AIR QUALITY

This section analyzes the proposed project's potential air quality impacts based on the comprehensive *Air Quality Analysis* contained in Appendix D-1 (LSA Associates, Inc. December 2011) and the *Health Risk Assessment* (LSA Associates, Inc. December 2011) contained in Appendix D-2 to this EIR. The air quality analysis evaluates potential air quality impacts and mitigation measures by examining the short-term construction and long-term operational impacts associated with the project and by evaluating the effectiveness of mitigation measures incorporated as part of the project design. Additionally, the analysis provides a discussion of the proposed project, the physical setting of the project area, and the air quality regulatory framework. Modeled air quality levels are based upon vehicle data and project trip generation included in the project's Traffic Study (LSA Associates, Inc. November 2011, Appendix G of EIR) and peak turn volumes generated for the proposed project combined with emission factors from the California Air Resources Board (ARB). The evaluation was prepared in accordance with appropriate standards, utilizing procedures and methodologies in the South Coast Air Quality Management District (SCAQMD) *CEQA Air Quality Handbook* (SCAQMD 1993). Air quality data posted by the ARB and the U.S. Environmental Protection Agency (EPA) Web sites are included to document the local air quality environment.

4.2.1 Existing Setting

The project site is located in the South Coast Air Basin (Basin), a geographic area that encompasses the coastal plain and connecting broad inland valleys and low hills. The Pacific Ocean forms the southwestern border of the Basin, with mountain ranges forming the remainder of the border. The Basin includes Orange County and the non-desert portions of Los Angeles County, Riverside County, and San Bernardino County. The Basin is under the jurisdiction of the SCAQMD.

4.2.1.1 Climate and Meteorology

Air quality in the project area is not only affected by various emission sources (mobile, industry, etc.), but also by atmospheric conditions such as wind speed, wind direction, temperature, rainfall, and amount of sunshine. The combination of topography, low mixing height, abundant sunshine, and emissions from the second largest urban area in the United States combine to give the Basin the worst air pollution problem in the nation.

Winds in the Basin are predominantly of relatively low velocities, averaging about 4.0 miles per hour (mph). These low average wind speeds, together with a persistent temperature inversion, limit the vertical dispersion of air pollutants throughout the Basin. Strong, dry, north or northeasterly winds, known as Santa Ana winds, occur during the fall and winter months, dispersing air contaminants, and these conditions tend to last for several days at a time.

During periods of low inversions and low wind speeds, air pollutants generated in urbanized areas are transported predominantly onshore into Riverside and San Bernardino Counties. In the winter, the greatest pollution problems are carbon monoxide (CO) and oxides of nitrogen (NO_X), because of extremely low inversions and air stagnation during the night and early morning hours. In the summer, the longer daylight hours and the brighter sunshine combine to cause a reaction between hydrocarbons and NO_X to form photochemical smog.

4.2.1.2 Regional Air Quality

Both the State of California and the Federal government have established health-based ambient air quality standards (AAQS) for six air pollutants:

- Carbon monoxide (CO)
- Ozone (O_3)

- Lead (Pb)
- Nitrogen dioxide (NO_2)
- Particulate matter with a diameter of 10 microns or less (PM_{10})
- Sulfur dioxide (SO_2)

Federal standards for 8-hour ozone and for fine particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) have also been adopted. In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety and are listed in Table 4.2.A.

In addition to setting out AAQS, the State has established a set of episode criteria for O_3, CO, NO_2, SO_2, and PM_{10}. These episode criteria refer to periods of short-term exposure to air pollutants that threaten public health. Health effects are progressively more severe as pollutant levels increase from Stage One to Stage Three. An alert level is that concentration of pollutants at which initial stage control actions are to begin. An alert will be declared when any one of the pollutant alert levels is reached at any monitoring site and meteorological conditions are such that the pollutant concentrations can be expected to remain at these levels for 12 or more hours or to increase; or, in the case of oxidants, the situation is likely to recur within the next 24 hours unless control actions are taken. At times, meteorological conditions are so adverse to pollutant dispersion that concentrations of ozone exceed the State air quality standard by as much as a factor of three. The California Air Resources Board (CARB) has defined Episode Levels of ozone air pollution as follows:

- **Health Advisory Levels** occur when hourly ozone concentrations equal or exceed 0.15 parts per million (ppm). At this level, residents are advised to avoid prolonged, vigorous outdoor exercise, and persons with respiratory or coronary disease should avoid exercise.
- **Stage 1 Episodes** occur when hourly ozone concentrations equal or exceed 0.20 ppm. At these times, persons with respiratory or coronary artery disease should be notified to take precautions against exposure and should stay indoors as much as possible. Schools are also notified to advise against strenuous physical activity for their students. To this end, schools are in regular communication with the SCAQMD.
- **Stage 2 Episodes** occur when hourly ozone concentrations equal or exceed 0.35 ppm. The SCAQMD requires industry to take prompt actions to reduce emissions at those times. No Stage 2 episodes occurred between 1989 and 1992.
- **Stage 3 Episodes** occur when hourly ozone concentrations equal or exceed 0.50 ppm. The last Stage 3 episode occurred in the Basin in 1974.

Pollutant alert levels:

- O_3: 392 micrograms per cubic meter ($\mu g/m^3$) (0.20 ppm), 1-hour average.
- CO: 17 milligrams per cubic meter (mg/m^3) (15 ppm), 8-hour average.
- NO_2: 1,130 $\mu g/m^3$ (0.6 ppm) 1-hour average; 282 $\mu g/m^3$ (0.15 ppm) 24-hour average.
- SO_2: 800 $\mu g/m^3$ (0.3 ppm), 24-hour average.
- Particulates, measured as PM_{10}: 350 $\mu g/m^3$, 24-hour average.

Health effects are progressively more severe as pollutant levels increase from Stage 1 to Stage 3. These health effects will not occur unless the standards are exceeded by a large margin or for a prolonged period of time. Among the pollutants, O_3 and particulate matter ($PM_{2.5}$ and PM_{10}) are considered regional pollutants, while the others have more localized effects. Table 4.2.B lists the health effects of these criteria pollutants and their potential sources.

Table 4.2.A: Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]			Footnotes
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]	
Ozone (O_3)	1-Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry	1 California standards for ozone; carbon monoxide (except Lake Tahoe); sulfur dioxide (1- and 24-hour); nitrogen dioxide; suspended particulate matter - PM_{10}, $PM_{2.5}$ and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
	8-Hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)			
Respirable Particulate Matter (PM_{10})	24-Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis	2 National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth-highest eight-hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current federal policies.
	Annual Arithmetic Mean	20 µg/m^3		—			
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis	
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15.0 µg/m^3			
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)	
	1-Hour	20 ppm (23 mg/m^3)		35 ppm(40 mg/m^3)			
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	—	
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	Gas Phase Chemiluminescence	53 ppb (100 µg/m^3) (see footnote 8)	Same as Primary Standard	Gas Phase Chemiluminescence	3 Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
	1-Hour	0.18 ppm (339 µg/m^3)		100 ppb (188 µg/m^3) (see footnote 8)	None		
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	—	Ultraviolet Fluorescence		—	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method)	4 Any equivalent procedure which can be shown to the satisfaction of ARB to give equivalent results at or near the level of the air quality standard may be used.
	24-Hour	0.04 ppm (105 µg/m^3)			—		
	3-Hour	—		—	0.5 ppm (1300 µg/m^3)		5 National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
	1-Hour	0.25 ppm (655 µg/m^3)		75 ppb (196 µg/m^3) (see footnote 9)	—		
Lead[10]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High-Volume Sampler and Atomic Absorption	6 National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
	Calendar Quarter	—		1.5 µg/m^3	Same as Primary Standard		
	Rolling 3-Month Average[9]	—		0.15 µg/m^3			7 Reference method as described by the EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the EPA.
Visibility-Reducing Particles	8-Hour	Extinction coefficient of 0.23 per kilometer - visibility of ten miles or more (0.07-30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		**No Federal Standards**			8 To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010). Note that the EPA standards are in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national standards to the California standards the units can be converted from ppb to ppm. In this case, the national standards of 53 ppb and 100 ppb are identical to 0.053 ppm and 0.100 ppm, respectively.
Sulfates	24-Hour	25 µg/m^3	Ion Chromatography				
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence				9 On June 2, 2010, the U.S. EPA established a new 1-hour SO_2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. EPA also proposed a new automated Federal Reference Method (FRM) using the ultraviolet technology, but will retain the older pararosaniline methods until the new FRM have adequately permeated State monitoring networks. The EPA also revoked both the existing 24-hour SO_2 standard of 0.14 ppm and the annual primary SO_2 standard of 0.030 ppm, effective August 23, 2010. The secondary SO_2 standard was not revised at that time; however, the secondary standard is undergoing a separate review by EPA. Note that the new standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the new primary national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
Vinyl Chloride[9]	24-Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography				10 The ARB has identified lead and vinyl chloride as “toxic air contaminants” with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
							11 National lead standard, rolling 3-month average: final rule signed October 15, 2008.
							°C = degrees Celsius EPA = United States Environmental Protection Agency □g/m^3 = micrograms per cubic meter mg/m^3 = milligrams per cubic meter ppm = parts per million

Source: California Air Resources Board, September 8, 2010.

Table 4.2.B: Summary of Health Effects of the Major Criteria Air Pollutants

Pollutants	Sources	Primary Effects
Ozone (O_3)	▪ Atmospheric reaction of organic gases with nitrogen oxides in the presence of sunlight.	▪ Breathing difficulty. ▪ Lung tissue damage. ▪ Damage to rubber and some plastics.
Nitrogen Dioxide (NO_2)	▪ Motor vehicle exhaust. ▪ Heavy construction equipment exhaust. ▪ Farming equipment exhaust. ▪ Residential heating.	▪ Lung irritation and damage. ▪ Formation of acid rain.
Carbon Monoxide (CO)	▪ Motor vehicle exhaust. ▪ Heavy construction equipment exhaust. ▪ Farming equipment exhaust. ▪ Residential heating.	▪ Reduced tolerance for exercise. ▪ Impairment of mental function. ▪ Impairment of fetal development. ▪ Death at high levels of exposure. ▪ Aggravation of some heart diseases (angina).
Suspended Particulate Matter ($PM_{2.5}$ and PM_{10})	▪ Motor vehicle exhaust ($PM_{2.5}$). ▪ Equipment and industrial sources ($PM_{2.5}$). ▪ Residential and agricultural burning ($PM_{2.5}$ and PM_{10}). ▪ Atmospheric chemical reactions ($PM_{2.5}$ and PM_{10}). ▪ Road dust (PM_{10}). ▪ Windblown dust (Agriculture [PM_{10}]) ▪ Construction (Fireplaces [PM_{10}])	▪ Reduced lung function. ▪ Aggravation of the effects of gaseous pollutants. ▪ Aggravation of respiratory and cardiorespiratory diseases. ▪ Increased cough and chest discomfort. ▪ Soiling. ▪ Reduced visibility.
Sulfur Dioxide (SO_2)	▪ Coal/oil- burning power plants. ▪ Industries, refineries, and diesel engines.	▪ Increased lung disease. ▪ Breathing problems for asthmatics. ▪ Formation of acid rain.
Lead (Pb)	▪ Metal smelters. ▪ Resource recovery. ▪ Leaded gasoline. ▪ Deterioration of lead paint.	▪ Learning disabilities. ▪ Brain and kidney damage.

Source: California Air Resources Board 2009 (http://www.arb.ca.gov/research/health/fs/fs2/fs2.htm).

Table 4.2.C: Attainment Status of Criteria Pollutants in the South Coast Air Basin

Pollutant	State	Federal
O_3 1-hour	Nonattainment	N/A
O_3 8-hour	Nonattainment	Extreme Nonattainment
PM_{10}	Nonattainment	Serious Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
CO	Attainment	Attainment/Maintenance
NO_2	Nonattainment	Attainment/Maintenance
SO_2	Attainment	Attainment
Pb	Attainment (except Los Angeles County)	Attainment (except Los Angeles County)
All others	Attainment/Unclassified	Attainment/Unclassified

Unclassified designation: a pollutant that is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.
Attainment designation: a pollutant is designated attainment if the State standard for that pollutant was not violated at any site in the area during a 3-year period.
Nonattainment: a pollutant is designated nonattainment if there was at least one violation at any site in the area during a 3-year period.
Source: California Air Resources Board website: www.arb.ca.gov/desig/desig.htm, 2010.

Indirect sources of pollution are generated when minor sources collectively emit a substantial amount of pollution. Examples of this would be the motor vehicles at intersections, malls, and on highways. The California Clean Air Act (CCAA) provides the SCAQMD with the authority to manage transportation activities at indirect sources. The SCAQMD also regulates stationary sources of pollution throughout its jurisdictional area. Direct emissions from motor vehicles are regulated by the CARB.

4.2.1.3 Air Pollution Constituents and Attainment Status

The CARB has many responsibilities with respect to air quality, including the following:

- Coordinates and oversees State and Federal air pollution control programs in California;
- Oversees activities of local air quality management agencies (e.g., the SCAQMD);
- Responsible for incorporating air quality management plans for local air basins into a State Implementation Plan (SIP) for EPA approval; and
- Maintains air quality monitoring stations throughout the State in conjunction with local air districts.

Data collected at these stations are used by the CARB to classify air basins as "attainment" or "nonattainment" with respect to each pollutant and to monitor progress in attaining air quality standards. The State is divided geographically into 15 air basins for the purpose of managing the air resources of the State on a regional basis. An air basin generally has similar meteorological and geographic conditions throughout. Significant authority for air quality control within them has been given to local air districts that regulate stationary source emissions and develop local nonattainment plans. Table 4.2.C (previous page) identifies the attainment status for the criteria pollutants in the Basin.

4.2.1.4 Local Air Quality

The SCAQMD, together with the CARB, maintains ambient air quality monitoring stations in the Basin. The air quality monitoring station closest to the project site is the Perris station. This station monitors ozone and PM_{10}. The air quality monitoring station closest to the site monitoring the rest of the criteria pollutants is the Riverside-Rubidoux station. This monitoring data for SO_2 has been omitted as attainment is regularly met for this pollutant within the Basin. These stations characterize the air quality representative of the ambient air quality in the project area.[1] The ambient air quality data in Table 4.2.D identify that CO and NO_2 levels are consistently below the relevant State and Federal standards in the project vicinity. O_3, PM_{10}, and $PM_{2.5}$ levels all exceed State and/or Federal standards regularly.

Table 4.2.D: Ambient Air Quality Monitored in the Project Vicinity

Pollutant	Standard	2008	2009	2010
Carbon Monoxide (CO) (Riverside-Rubidoux data)				
Maximum 1-hr concentration (ppm)		2.7	2.7	2.0
Number of days exceeded:	State: > 20 ppm	0	0	0
	Federal: > 35 ppm	0	0	0
Maximum 8-hr concentration (ppm)		1.86	1.85	1.20
Number of days exceeded:	State: ≥ 9.0 ppm	0	0	0
	Federal: ≥ 9.0 ppm	0	0	0

[1] Air quality data, 2008-2010; EPA and CARB websites.

Table 4.2.D: Ambient Air Quality Monitored in the Project Vicinity

Pollutant	Standard	2008	2009	2010
Ozone (O_3) (Perris Station Data)				
Maximum 1-hr concentration (ppm)		0.142	0.125	0.122
Number of days exceeded:	State: > 0.09 ppm	65	53	46
Maximum 8-hr concentration (ppm)		0.115	0.109	0.108
Number of days exceeded:	State: > 0.07 ppm	94	88	77
	Federal: > 0.075 ppm	77[1]	67	50
Coarse Particulates (PM_{10}) (Perris Station data)				
Maximum 24-hr concentration (µg/m^3)		87	76	48
Number of days exceeded:	State: > 50 µg/m^3	8	6	0
	Federal: > 150 µg/m^3	0	0	0
Annual arithmetic mean concentration (µg/m^3)		29.6	34.8	28.0
Exceeded for the year	State: > 20 µg/m^3	Yes	Yes	Yes
Fine Particulates ($PM_{2.5}$) (Riverside-Rubidoux data)				
Maximum 24-hr concentration (µg/m^3)		57.6	54.4	ND
Number of days exceeded:	Federal: > 35 µg/m^3	13[3]	13	ND
Annual arithmetic mean (µg/m^3)		16.3	15.2	ND
Exceeded for the year	State: > 12 µg/m^3	Yes	Yes	ND
	Federal: > 15 µg/m^3	Yes	Yes	ND
Nitrogen Dioxide (NO_2) (Riverside-Rubidoux data)				
Maximum 1-hr concentration (ppm)		0.092	0.078	0.052
Number of days exceeded:	State: > 0.18 ppm	0	0	0
Annual arithmetic mean concentration (ppm)		0.019	0.017	ND
Exceeded for the year	State: > 0.030 ppm	No	No	ND
	Federal: > 0.053 ppm	No	No	ND
Sulfur Dioxide (SO_2) (Riverside-Rubidoux data)				
Maximum 24-hr concentration (ppm)		0.003	0.003	0.002
Number of days exceeded:	State: > 0.04 ppm	0	0	0
	Federal: > 0.14 ppm	0	0	0
Annual arithmetic average concentration (ppm)		0.000	0.001	ND
Exceeded for the year:	Federal: > 0.030 ppm	No	No	ND

[1] The exceedances of the federal 8-hour O3 standard are based on the old 0.08 ppm standard. In April 2008, the EPA revised the standard to 0.075 ppm.
[2] No data available.
[3] The exceedances of the federal 24-hour PM2.5 standard are based on the old 65 µg/m3 standard. In 2006, the EPA revised the standard to 35 µg/m3.
µg/m3 = micrograms per cubic meter
ARB = California Air Resources Board
EPA = United States Environmental Protection Agency
ppm = parts per million
Source: South Coast AQMD (www.aqmd.gov).

4.2.1.5 Sensitive Land Uses in the Project Vicinity

Sensitive receptors include residences, schools, medical offices, convalescent facilities, and similar uses that are sensitive to air pollutants. The nearest existing sensitive receptors in the vicinity of the proposed project site are rural residential residences located approximately 1,000 feet (ft) to the north

along Nandina Avenue. There are also nonconforming residences within commercial and industrial zoned property approximately 0.5 mile southwest of the project site on the south side of Oleander Avenue between Heacock Street and Patterson Avenue.

4.2.1.6 Existing Project Area Emissions

The project site is currently vacant, and therefore does not generate emissions. Existing air quality conditions at the proposed project site reflect ambient monitored conditions as presented at the previously referenced Table 4.2.D.

4.2.2 Policies and Regulations

4.2.2.1 Federal Regulations

Clean Air Act. Pursuant to the Federal Clean Air Act (CAA) of 1970, the EPA established national ambient air quality standards (NAAQS). The NAAQS were established for six major pollutants, termed "criteria" pollutants. Criteria pollutants are defined as those pollutants for which the Federal and State governments have established ambient air quality standards, or criteria, for outdoor concentrations in order to protect public health.

The EPA established new national air quality standards for ground-level O_3 and $PM_{2.5}$ in 1997. On May 14, 1999, the Court of Appeals for the District of Columbia Circuit issued a decision ruling that the CAA, as applied in setting the new public health standards for O_3 and particulate matter, was unconstitutional as an improper delegation of legislative authority to the EPA. On February 27, 2001, the U.S. Supreme Court upheld the way that the government sets air quality standards under the CAA. The Court unanimously rejected industry arguments that the EPA must consider financial cost as well as health benefits in writing standards. The Justices also rejected arguments that the EPA took too much lawmaking power from Congress when it set tougher standards for O_3 and soot in 1997. Nevertheless, the Court threw out the EPA's policy for implementing new O_3 rules, stating that the EPA ignored a section of the law that restricts its authority to enforce such rules.

In April 2003, the EPA was cleared by the White House Office of Management and Budget (OMB) to implement the eight-hour ground-level O_3 standard. The EPA issued the proposed rule implementing the eight-hour O_3 standard in April 2003. The EPA completed final eight-hour nonattainment status on April 15, 2004. The EPA issued the final $PM_{2.5}$ implementation rule in fall 2004. The EPA issued final designations on December 14, 2004.

Effective January 22, 2010, the EPA strengthened the standard for NO_2 by setting a new 1-hour standard at the level of 100 parts per billion (ppb). This standard defines the maximum allowable concentration anywhere in an area and will protect against adverse health effects associated with short-term exposure to NO_2. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb. On January 25, 2010 the EPA issued the final rule setting the one-hour maximum standard for NO_2 at 100 ppb. The agency retained the annual standard of 53 ppb.

Additionally, effective June 2, 2010, the EPA revised the primary standard for SO_2 by establishing a new 1-hour standard at a level of 75 ppb. The EPA revoked the two existing primary standards of 140 ppb evaluated over 24-hours, and 30 ppb evaluated over an entire year as they would not provide additional public health protection given a 1-hour standard at 75 ppb. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

4.2.2.2 State Regulations

Mulford-Carrell Act. The State began to set California Ambient Air Quality Standards (CAAQS) in 1969 under the mandate of the Mulford-Carrell Act. The CAAQS are generally more stringent than the NAAQS. In addition to the six criteria pollutants covered by the NAAQS, there are CAAQS for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles.

Originally, there were no attainment deadlines for CAAQS; however, the CCAA of 1988 provided a time frame and a planning structure to promote their attainment. The CCAA required nonattainment areas in the State to prepare attainment plans and proposed to classify each such area on the basis of the submitted plan, as follows: moderate, if CAAQS attainment could not occur before December 31, 1994; serious, if CAAQS attainment could not occur before December 31, 1997; and severe, if CAAQS attainment could not be conclusively demonstrated at all. The attainment plans are required to achieve a minimum 5 percent annual reduction in the emissions of nonattainment pollutants unless all feasible measures have been implemented. The EPA has designated the Southern California Association of Governments (SCAG) as the Metropolitan Planning Organization (MPO) responsible for ensuring compliance with the requirements of the CAA for the Basin.

4.2.2.3 Regional Regulations

Lewis Air Quality Management Act. The 1976 Lewis Air Quality Management Act established the SCAQMD and other air districts throughout the State. The Federal CAA Amendments of 1977 required that each state adopt an implementation plan outlining pollution control measures to attain the Federal standards in nonattainment areas of the state.

The CARB is responsible for incorporating air quality management plans for local air basins into an SIP for EPA approval. Significant authority for air quality control within them has been given to local air districts that regulate stationary source emissions and develop local nonattainment plans.

Regional Air Quality Management Plan (AQMP). The SCAQMD and the SCAG are responsible for formulating and implementing the AQMP, which has a 20-year horizon for the Basin. The SCAQMD and SCAG must update the AQMP every three years. The current regional air quality plan is the Final 2007 Air Quality Management Plan (AQMP) adopted by the SCAQMD on June 1, 2007.

The Final 2007 AQMP proposes attainment demonstration of the Federal $PM_{2.5}$ standards through a more focused control of sulfur oxides (SO_X), directly-emitted $PM_{2.5}$, and nitrogen oxides (NO_X) supplemented with volatile organic compounds (VOC) by 2015. The 8-hour ozone control strategy builds upon the $PM_{2.5}$ strategy, augmented with additional NO_X and VOC reductions to meet the standard by 2024 assuming a bump-up[1] is obtained.

The Final 2007 AQMP proposes policies and measures currently contemplated by responsible agencies to achieve Federal standards for healthful air quality in the Basin and those portions of the Salton Sea Air Basin that are under District jurisdiction. This Final Plan also addresses several Federal planning requirements and incorporates significant new scientific data, primarily in the form of updated emissions inventories, ambient measurements, new meteorological episodes, and new air quality modeling tools. This Final Plan builds upon the approaches taken in the 2003 AQMP for the

[1] A "bump-up" is a voluntary reclassification of a nonattainment area to a higher classification allowing for an extension of an attainment deadline.

Basin for the attainment of the Federal ozone air quality standard.[1] The Basin is currently a Federal and State nonattainment area for PM_{10}, $PM_{2.5}$, and ozone.

4.2.3.4 Local Policies

City of Moreno Valley General Plan Policies. Chapter 9 of the City's General Plan defines goals and policies related to air quality within the City of Moreno Valley. The specific policies of the General Plan that are relevant to the proposed project are as follows:

Objective 6.7 Reduce mobile and stationary source air pollutant emissions.

- **Policy 6.7.1** Cooperate with regional efforts to establish and implement regional air quality strategies and tactics.
- **Policy 6.7.2** Encourage the financing and construction of park and ride facilities.
- **Policy 6.7.4** Locate heavy industrial and extraction facilities away from residential areas and sensitive receptors.
- **Policy 6.7.5** Require grading activities to comply with South Coast Air Quality Management District's Rule 403 regarding the control of fugitive dust.
- **Policy 6.7.6** Require building construction to comply with the energy conservation requirements of Title 24 of the California Administrative Code.

4.2.3 Methodology

The *Air Quality Analysis*[2] evaluated the air quality impacts associated with the development of the proposed project. Evaluation of air quality impacts associated with the proposed project includes the following:

- Determine the short-term construction air quality impacts based on SCAQMD emissions thresholds;
- Determine the long-term air quality impacts, including vehicular traffic, on both on-site and off-site air quality sensitive uses based on SCAQMD emissions thresholds; and
- Determine the required mitigation measures to reduce short-term and long-term on-site air quality impacts from all sources.

Air quality in the project area would be affected by long-term air pollutant emissions from stationary sources and mobile sources related to the proposed project. On February 3, 2011, the SCAQMD released the California Emissions Estimator Model (CalEEMod). The purpose of this new model is to more accurately calculate air quality and greenhouse gas (GHG) emissions from direct and indirect sources and quantify applicable air quality and GHG reduction achieved from mitigation measures. The latest version of CalEEMod was utilized to predict these project-related air quality impacts.

Construction-related emissions are expected from construction activities such as rough grading, infrastructure construction, asphalt paving, building construction, architectural coatings, and construction workers commuting. This estimate represents the "worst-case" scenario as construction equipment emissions would decrease with time due to technological advancements. Construction emissions for construction worker vehicles traveling to and from the project site, in addition to vendor trips (construction materials delivered to the project site) were also accounted for in the analysis. Localized air quality in the project area would be affected by both heavy-duty construction equipment

[1] *Final 2007 Air Quality Management Plan,* South Coast Air Quality Management District, June 1, 2007.
[2] *VIP Moreno Valley Air Quality Analysis*, LSA Associates, Inc., December 2011.

usage on site as well as local traffic due to the equipment delivery and construction worker commuting. The SCAQMD CEQA methodology[1] was used to analyze the criteria pollutant emissions from these activities.

Air quality in the project area would be affected by long-term air emissions from stationary sources and mobile sources related to the proposed project. The CalEEMod model was used to predict these project-related long-term impacts. Localized air quality impacts (i.e., CO concentrations [CO hot spots]) in the project area would be affected by increased traffic flow due to the proposed project. The Caltrans CALINE4 model and the CARB EMFAC 2007 model were used to assess the project's impact on the local CO concentrations.

SCAQMD has developed Local Significance Threshold (LST) methodology that can be used to determine whether or not a project may generate significant adverse localized air quality impacts. LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable Federal or State AAQS and are developed based on the ambient concentrations of that pollutant for each source receptor area. SCAQMD's current guidelines, *Final Localized Significance Threshold Methodology* (June 2003), were adhered to in the assessment of air quality impacts for the proposed project. The LST mass rate look-up tables were used to determine whether the daily emissions for the proposed construction activities could result in significant localized air quality impacts. The emissions of concern from construction activities are NOx, CO, PM_{10}, and $PM_{2.5}$ combustion emissions from construction equipment and fugitive PM_{10} dust from construction site preparation activities.

4.2.4 Thresholds of Significance

Based on Appendix G of the *CEQA Guidelines*, air quality impacts would occur if the proposed project would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; and/or
- Create objectionable odors affecting a substantial number of people.

In addition to the Federal and State AAQS, there are daily emissions thresholds for construction and operation of a proposed project in the Basin. The Basin is administered by the SCAQMD, and guidelines and emissions thresholds established by the SCAQMD in its *CEQA Air Quality Handbook*[2] are used in this analysis. It should be noted that the emissions thresholds were established based on the attainment status of the air basin with regard to air quality standards for specific criteria pollutants. Because the concentration standards were set at a level that protects public health with an adequate margin of safety (EPA), these emissions thresholds are regarded as conservative and would overstate an individual project's contribution to health risks.

1 *CEQA Air Quality Handbook*, April 1993.
2 *CEQA Air Quality Handbook*, April 1993.

4.2.4.1 Thresholds for Construction Emissions

The following CEQA significance thresholds for construction emissions have been established by the SCAQMD for the Basin:

- 75 pounds per day of reactive organic compounds (ROC).
- 100 pounds per day of NO_X.
- 550 pounds per day of CO.
- 150 pounds per day of PM_{10}.
- 150 pounds per day of SO_X.
- 55 pounds per day of $PM_{2.5}$.

Projects in the Basin with construction-related emissions that exceed any of the emission thresholds are considered to be significant under CEQA.

4.2.4.2 Thresholds for Operational Emissions

Projects with operation-related emissions that exceed any of the emission thresholds listed below are considered significant under the SCAQMD guidelines.

- 55 pounds per day of ROC.
- 55 pounds per day of NO_X.
- 550 pounds per day of CO.
- 150 pounds per day of PM_{10}.
- 150 pounds per day of SO_X.
- 55 pounds per day of $PM_{2.5}$.

4.2.4.3 Federal 1 Hour NO_2 Standard

On January 22, 2010, the EPA revised the primary nitrogen dioxide (NO_2) NAAQS in order to provide requisite protection of public health. Specifically, the EPA established a new 1-hour standard at a level of 100 ppb (188.68 $\mu g/m^3$), based on the 3-year average of the annual 98th percentile of the daily maximum 1-hour concentrations (form of the standard), in addition to the existing annual secondary standard (100 $\mu g/m^3$). EPA has also established requirements for a NO_2 monitoring network that will include monitors at locations where maximum NO_2 concentrations are expected to occur, including within 50 meters of major roadways, as well as monitors sited to measure the area-wide NO_2 concentrations that occur more broadly across communities.

The effective date of the new 1-hour standard was 60 days after the final rule was published in the Federal Register. The final rule was published in the Federal Register on February 9, 2010 with an effective date of April 12, 2010.

4.2.4.4 Air Pollutant Standards for CO with Localized Effects

The significance of localized project impacts under CEQA depends on whether ambient CO levels in the vicinity of the project are above or below State and Federal CO standards (previously referenced Table 4.2.A). If ambient levels are below the standards, a project is considered to have a significant impact if project emissions result in an exceedance of one or more of these standards. If ambient

levels already exceed a State or Federal standard, project emissions are considered significant if they increase one-hour CO concentrations by 1.0 ppm[1] or more or eight-hour CO concentrations by 0.45 ppm or more. The Basin meets State and Federal attainment standards for CO; therefore, the proposed project would have a significant CO impact if project emissions result in an exceedance of State or Federal one-hour or eight-hour standard. The following emission concentration standards for CO, based on the SCAQMD *CEQA Air Quality Handbook* (1993), apply to the proposed project:

- California State one-hour CO standard of 20.0 ppm.
- California State eight-hour CO standard of 9.0 ppm.

4.2.4.5 Localized Significance Thresholds

The SCAQMD published its *Final Localized Significance Threshold Methodology* in June 2003, revised July 2008) and Final –Methodology to Calculate Particulate Matter (PM) 2.5 and $PM_{2.5}$ Significance Thresholds (October 2006), recommending that all air quality analyses include an assessment of both construction and operational impacts on the air quality of nearby sensitive receptors. LSTs represent the maximum emissions from a project site that are not expected to result in an exceedance of the national or State AAQS. LSTs are based on the ambient concentrations of that pollutant within the project Source Receptor Area (SRA) and the distance to the nearest sensitive receptor. For this project, the appropriate SRA for the LST is the Perris Valley (SRA 24).

In the case of CO and NO_2, if ambient levels are below the standards, a project is considered to have a significant impact if project emissions result in an exceedance of one or more of these standards. If ambient levels already exceed a State or federal standard, then project emissions are considered significant if they increase ambient concentrations by a measurable amount. This would apply to PM_{10} and $PM_{2.5}$, both of which are non-attainment pollutants. For these two, the significance criteria are the pollutant concentration thresholds presented in SCAQMD Rules 403 and 1301. The Rule 403 threshold of 10.4 µg/m3 applies to construction emissions (and may apply to operational emissions at aggregate handling facilities). The Rule 1301 threshold of 2.5 $\mu g/m^3$ applies to non-aggregate handling operational activities.

To avoid the need for every air quality analysis to perform air dispersion modeling, the SCAQMD performed air dispersion modeling for a range of construction sites less than or equal to 5 acres (ac) in size and created look-up tables that correlate pollutant emissions rates with project size to screen out projects that are unlikely to generate enough emissions to result in a locally significant concentration of any criteria pollutant. These look-up tables can also be used as screening criteria for larger projects to determine whether or not dispersion modeling may be required.

Sensitive receptors include residences, schools, hospitals, and similar uses that are sensitive to adverse air quality. The nearest existing sensitive receptors are approximately 300 meters (m) (1,000 ft) away from the project site.

Following the SCAQMD LST methodology, for sites larger than 5 ac, dispersion modeling needs to be conducted. Because the project site encompasses approximately 71 ac, the localized significance for project air emissions is determined by performing dispersion modeling to see if the pollutant concentrations would exceed the ambient air quality standards, or for particulate matter, if the pollutant concentrations would exceed thresholds presented in SCAQMD Rules 403 and 1301.

For operational emissions, the localized significance for a project larger than 5 ac can be determined by performing the screening-level analysis before using the dispersion modeling because the screening-level analysis is more conservative, and if no exceedance of the screening-level thresholds

[1] ppm = parts per million.

is identified, then the chance of operational LST exceeding concentration standards is small. Therefore, for a conservative approach, the LST screening thresholds for 5 ac are used in this analysis for operational emissions. Since the project is not an aggregate handling facility, operational LSTs are assessed with the SCAQMD screening thresholds. Therefore, the following emissions thresholds apply during project operations:

- 585 lbs/day of NO_X
- 12,083 lbs/day of CO
- 32 lbs/day of PM_{10}
- 14 lbs/day of $PM_{2.5}$

4.2.4.6 Diesel Exhaust Health Risk Thresholds

For pollutants without defined significance standards or air contaminants not covered by the standard criteria cited above, the definition of substantial pollutant concentrations varies. For toxic air contaminants (TAC), "substantial" is taken to mean that the individual cancer risk exceeds a threshold considered to be a prudent risk management level. If best available control technology for toxics (T-BACT) has been applied, the individual cancer risk to the maximum exposed individual (MEI) must not exceed 10 in 1 million if an impact is to be considered less than significant.

The following limits for maximum individual cancer risk (MICR), cancer burden and non-cancer acute and chronic hazard indices (HI) from project emissions of TACs have been established for the Basin:

- **MICR and Cancer Burden.** MICR is the estimated probability of a potential maximally exposed individual contracting cancer as a result of exposure to TACs over a period of 70 years for residential and 40 years for worker receptor locations. The MICR calculations include multipathway consideration, when applicable. Cancer burden is the estimated increase in the occurrence of cancer cases in a population subject to a MICR of greater than or equal to one in one million (1.0×10^{-6}) resulting from exposure to TACs.

  The total increase in MICR that is the sum of the calculated MICR values for all TACs emitted from the project will not result in any of the following:

  (A) An increased MICR greater than 10 in 1 million (1.0×10^{-5}) at any receptor location (assumes the project will be constructed with T-BACT); or

  (B) A cancer burden greater than 0.5.

- **Chronic HI.** This is the ratio of the estimated long-term level of exposure to a TAC for a potential maximally exposed individual to its chronic reference exposure level. The chronic HI calculations include multipathway consideration, when applicable.

  The cumulative increase in total chronic HI for any target organ system due to total emissions from the project will not exceed 1.0 at any receptor location.

- **Acute HI.** This is the ratio of the estimated maximum one-hour concentration of a TAC for a potential maximally exposed individual to its acute reference exposure level.

  The cumulative increase in total acute HI for any target organ system due to total emissions from the project will not exceed 1.0 at any receptor location.

4.2.5 Less than Significant Impacts

The following impacts were determined to be less than significant. For each of the following issues either no impact would occur (therefore, no mitigation would be required) or adherence to established regulations, standards, and policies would reduce potential impacts to a less than significant level.

4.2.5.1 Air Quality Plan Management Plan Consistency

Threshold	Would the proposed project conflict with or obstruct implementation of the applicable air quality plan?

The current regional air quality management plan is the *Final 2007 Air Quality Management Plan* adopted by the SCAQMD on June 1, 2007. The Final 2007 AQMP proposes attainment demonstration of the Federal $PM_{2.5}$ standards through a more focused control of SO_X, directly-emitted $PM_{2.5}$, and NO_X supplemented with VOC by 2015. The 8-hour ozone control strategy builds upon the $PM_{2.5}$ strategy, augmented with additional NO_X and VOC reductions to meet the standard by 2024 assuming a bump-up[1] is obtained.

The Final 2007 AQMP proposes policies and measures currently contemplated by responsible agencies to achieve Federal standards for healthful air quality in the Basin and those portions of the Salton Sea Air Basin that are under SCAQMD jurisdiction. This AQMP also addresses several Federal planning requirements and incorporates significant new scientific data, primarily in the form of updated emissions inventories, ambient measurements, new meteorological episodes, and new air quality modeling tools. This AQMP builds upon the approaches taken in the 2003 AQMP for the Basin for the attainment of the Federal ozone air quality standard.[2] The Basin is currently a Federal and State nonattainment area for PM_{10}, $PM_{2.5}$, and ozone.

To assess the environmental impacts as a result of new development accurately, environmental pollution and population growth are projected by the SCAQMD in the AQMP for future scenarios. The AQMP projections are based, in part, on the growth forecasts and General Plans from cities and counties located in the Basin. As the Growth Management Chapter of the SCAG's Regional Comprehensive Plan and Guide (RCPG) forms the basis of the land use and transportation control portions of the AQMP, projects that are consistent with the projections of employment and population forecasts identified in the Growth Management Chapter are considered consistent with the AQMP growth projections. A consistency determination plays an essential role in local agency project review by linking local planning and unique individual projects to the air quality plans. It fulfills the CEQA goal of fully informing local agency decision-makers of the environmental costs of the project under consideration at a stage early enough to ensure that air quality concerns are addressed. Only new or amended General Plan elements, Specific Plans, and significantly unique projects need to undergo a consistency review due to the air quality plan strategy being based on projections from local General Plans. Projects that propose general plan amendments and changes of zone may increase the intensity of use and/or result in higher traffic volumes, thereby resulting in increased stationary area source emissions and/or vehicle source emissions when compared to the AQMP assumptions.

Another measurement tool in determining consistency with the AQMP is to determine how a project accommodates the expected increase in population or employment. Generally, if a project is planned in a way that results in the minimization of vehicle miles traveled (VMT) both within the project and the community in which it is located, and consequently the minimization of air pollutant emissions, that aspect of the project is consistent with the AQMP. The proposed project site is located in an urbanizing area of the City of Moreno Valley west of Perris Boulevard, which accommodates traffic in the area. In addition, the proposed uses would be within short travel distance of existing homes and commercial areas in the local vicinity. The proposed project would add jobs resulting from the development of the industrial uses to the City, with the potential to minimize the VMT traveled within the project site and community.

Implementation of the proposed project would not require a General Plan Amendment and zone change that would change the General Plan designations and zoning designations of the project site.

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1 A "bump-up" is a voluntary reclassification of a nonattainment area to a higher classification allowing for an extension of an attainment deadline.

2 *Final 2007 Air Quality Management Plan,* South Coast Air Quality Management District, June 1, 2007.

Since the proposed project would not require a General Plan Amendment, the project has been considered in preparation of the General Plan and therefore is consistent with the AQMP; therefore, no significant impact would occur and no mitigation measures are required.

4.2.5.2 Odors

Threshold	Would the proposed project create objectionable odors affecting a substantial number of people?

SCAQMD Rule 402 dictates that air discharged from any source shall not cause injury, nuisance, or annoyance to the health, safety, or comfort of the public. With the exception of short-term construction-related odors (e.g., equipment exhaust, paint, and asphalt odors), the proposed uses that would be developed on the proposed site do not include uses that are generally considered to generate offensive odors (e.g., agricultural uses, wastewater treatment plants, or landfills). While the application of architectural coatings and installation of asphalt may generate odors, these odors are temporary and not likely to be noticeable beyond the project boundaries. SCAQMD Rules 1108 and 1113 identify standards regarding the application of asphalt and architectural coatings, respectively.

SCAQMD Rule 1108 sets limitations on ROG (reactive organic gases), which are similar to and for the purposes of this EIR equivalent to and therefore interchangeable with volatile organic compounds (VOC) content in asphalt. This rule is applicable to any person who supplies, sells, offers for sale, or manufactures any asphalt materials for use in the Basin. Rule 1113 of the SCAQMD deals with the selling and application of architectural coatings. Rule 1113 is applicable to any person who supplies, sells, offers for sale, or manufactures any architectural coating for use in the Basin that is intended to be applied to buildings, pavements, or curbs. This rule is also applicable to any person who applies or solicits the application of any architectural coating within the Basin. Rule 1113 sets limits on the amount of VOC emissions allowed for all types of architectural coatings, along with a time table for tightening the emissions standards in the future. Compliance with Rule 1113 means that architectural coatings used during construction would have VOC emissions that comply with these limits.

Adherence to applicable provisions of these rules is standard for all development within the Basin. In addition, conditions for the design of waste storage areas on the proposed site would be established through the permit process to ensure enclosures are appropriately designed and maintained to prevent the proliferation of odors. Solid waste generated by the proposed on-site uses will be collected by a contracted waste hauler, ensuring that any odors resulting from on-site uses would be adequately managed. Therefore, impacts associated with this issue would be less than significant and no mitigation is required.

4.2.5.3 Long-Term Microscale (CO Hot Spot) Emissions

Threshold	Would the proposed project violate any air quality standard or contribute substantially to an existing or projected air quality violation? For CO, the applicable thresholds are: - California State one-hour CO standard of 20.0 ppm; and - California State eight-hour CO standard of 9.0 ppm.

Vehicular trips associated with the implementation of the proposed project would contribute to congestion at intersections and along roadway segments in the project vicinity. Localized air quality impacts would occur when emissions from vehicular traffic increase in local areas as a result of the proposed project. The primary mobile source pollutant of local concern is CO, which is a direct

function of vehicle idling time and, thus, traffic flow conditions. CO transport is extremely limited; it disperses rapidly with distance from the source under normal meteorological conditions. However, under certain extreme meteorological conditions, CO concentrations proximate to a congested roadway or intersection may reach unhealthful levels affecting local sensitive receptors (residents, schoolchildren, etc). High CO concentrations are typically associated with roadways or intersections operating at unacceptable levels of service or with very high traffic volumes. In areas with high ambient background CO concentrations, modeling is recommended to determine a project's effect on local CO levels.

An assessment of project-related impacts on localized ambient air quality requires that future ambient air quality levels be projected. As identified in Table 4.2.E, ambient CO levels monitored at the Riverside – Rubidoux Station, the closest station with complete monitored CO data, showed a highest recorded 1-hour concentration of 2.7 ppm (State standard is 20 ppm) and a highest 8-hour concentration of 1.9 ppm (State standard is 9 ppm) during the past 3 years.

The highest CO concentrations would normally occur during peak traffic hours; hence, CO impacts calculated under peak traffic conditions represent a worst-case analysis. Based on the Traffic Study,[1] CO hotspot analyses were conducted for future cumulative conditions. The impact on local CO levels was assessed with the CARB-approved CALINE4 air quality model, which allows microscale CO concentrations to be estimated along roadway corridors or near intersections. This model is designed to identify localized concentrations of CO, often termed "hot spots."

The proposed project would have a significant CO impact if project emissions increase 1-hour CO concentrations by 1.0 ppm or more. Similarly, the proposed project would also have a significant CO impact if project emissions increase 8-hour CO concentrations by 0.45 ppm or more. Existing (2008) and opening year (2013) scenarios were evaluated for traffic impacts from the proposed project. It is anticipated that emissions in the future years, including CO, would decrease with advances in technology. The highest one-hour CO concentrations for intersections within the project vicinity are identified in Table 4.2.E.

Table 4.2.E: One-Hour Carbon Monoxide Concentrations (ppm)

Scenario	Highest One-Hour CO Concentration		Exceeds State Standards[1]
	Without Project	With Project	1-Hr
Existing Year (2011)	4.0	NA [2]	No
Opening Year (2013)	5.1	5.1	No

1 The one-hour CO State standard is 20 ppm.
2 NA = not applicable.
Source: *Air Quality Analysis,* LSA Associates, Inc. December 2011.

As identified in Table 4.2.E, the highest one-hour CO concentration experienced at any of the intersections in the project vicinity would not exceed the one hour CO State standard of 20 ppm. Based on the *Air Quality Analysis* prepared for the proposed project, the proposed project would contribute, at most, a 0.2 ppm increase to the one-hour CO concentrations for all scenarios. This is below the 1.0 ppm increase threshold. The highest eight-hour CO concentrations for intersections within the project vicinity are identified in Table 4.2.F.

Table 4.2.F: Eight-Hour Carbon Monoxide Concentrations (ppm)

Scenario	Highest Eight-Hour CO Concentration		Exceeds State Standards[1]
	Without Project	With Project	8-Hr
Existing Year (2011)	2.8	NA [2]	No

1 *Traffic Study VIP Moreno Valley,* LSA Associates, Inc., November 2011.

Table 4.2.F: Eight-Hour Carbon Monoxide Concentrations (ppm)

Scenario	Highest Eight-Hour CO Concentration		Exceeds State Standards[1]
	Without Project	With Project	8-Hr
Opening Year (2013)	3.5	3.5	No

[1] The eight-hour CO State standard is 35 ppm.
[2] NA = not applicable.
Source: *Air Quality Analysis,* LSA Associates, Inc. December 2011.

As identified in Table 4.2.F, the highest eight-hour CO concentration experienced at any of the intersections in the project vicinity would not exceed the eight-hour CO state standard of 35 ppm. Based on the Air Quality Analysis prepared for the proposed project, the proposed project would contribute, at most, a 0.2 ppm increase to the eight-hour CO concentrations for all scenarios. This is below the 0.45 ppm increase threshold. Since the proposed project would not exceed the one-hour or eight-hour CO concentration standards, it is reasonable to conclude that no CO hot spots would occur. Therefore, the proposed project would not have a significant impact on local air quality for CO and no mitigation measures would be required.

4.2.5.4 Localized Operational Emissions

Threshold	Would the proposed project violate any AAQS or contribute to an existing or projected air quality violation; or expose sensitive receptors to pollutants? For long-term operation, the applicable localized daily thresholds are: - 12,083 pounds per day of CO; - 585 pounds per day of NO_X; - 32 pounds per day of PM_{10}; and - 14 pounds per day of $PM_{2.5}$.

As previously stated, the SCAQMD has developed an LST methodology that can be used to determine whether or not a project may generate significant adverse localized air quality impacts. These emission levels have been developed based on the ambient concentrations of that pollutant for each source receptor area. Table 4.2.G summarizes the results of the modeled localized emissions during the operational phase of the project.

Table 4.2.G: Modeled Localized Operation Impacts (lbs/day)

Emissions Sources	NO_x	CO	PM_{10}	$PM_{2.5}$
On-site emissions	50	42	8.5	2.1
LST Thresholds	**550**	**11,302**	**126**	**53**
Significant?	**No**	**No**	**No**	**No**

Source: LSA Associates, Inc., December 2011.

The SCAQMD LST threshold for NO_X is designed to ensure that the NO_2 concentrations from project construction emissions added to the ambient NO_2 concentrations are below the State ambient air quality standards (AAQS) of 180 ppb. The emissions rate of NO_X at 97 lbs/day is approximately 18 percent of the LST threshold of 550 lbs/day. Since the federal NO_2 AAQS of 100 ppb is approximately 55 percent of the State NO_2 AAQS of 180 ppb, the construction emissions of NO_X will not result in an exceedance of the federal NO_2 AAQS.

As identified in Table 4.2.G, none of the criteria pollutant emissions would exceed localized thresholds during the operation of the proposed project. Therefore, the proposed project would not

have a significant impact on localized operational pollutant levels and no mitigation measures would be required.

4.2.5.5 Operational-Acute Health Risk Impacts

Threshold	Would the proposed project expose sensitive receptors to substantial pollutant concentrations?

Exposure to diesel exhaust can have immediate health effects, such as irritation of the eyes, nose, throat, and lungs, and it can cause coughs, headaches, light headedness, and nausea. In studies with human volunteers, diesel exhaust particles made people with allergies more susceptible to the materials to which they are allergic, such as dust and pollen. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks. However, according to the rulemaking on *Identifying Particulate Emissions from Diesel-Fueled Engines as a Toxic Air Contaminant* (ARB 1998), the available data from studies of humans exposed to diesel exhaust are not sufficient for deriving an acute non-cancer health risk guidance value. While the lung is a major target organ for diesel exhaust, studies of the gross respiratory effects of diesel exhaust in exposed workers have not provided sufficient exposure information to establish a short-term non-cancer health risk guidance value for respiratory effects. Therefore, the potential for short-term acute exposure from diesel exhaust are considered to be less than significant and no mitigation is required.

4.2.5.6 Operational-Chronic Health Risk Impacts

Threshold	Would the proposed project expose sensitive receptors to substantial pollutant concentrations? For Maximum Individual Cancer Risk, the applicable thresholds are: • An increased cancer risk greater than 10 in 1 million (1.0×10^{-5}) at any receptor location; or For non-cancer chronic hazard indices (HI); the applicable threshold is: • A cumulative increase for any target organ system exceeding 1.0 at any receptor location.

A screening level health risk assessment was performed for the operational emissions associated with the proposed project based on the SCAQMD's *Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis* guidance. The operations expected to occur at this facility will not emit any toxic chemicals in any significant quantity other than vehicle exhaust. While there may be other toxic substances in use on site, compliance with state and federal handling regulations will bring emissions to below a level of significance. Due to the lack of data, precise evaluation of vehicle exhaust impacts is not feasible; however, based on the limited amount of TAC from vehicle exhaust associated with the project operations in relation to background levels, the impact is not expected to be significant.

The nearest existing sensitive receptors are rural residential units located approximately 1,000 feet (ft) to the north along Nandina Avenue. There are also nonconforming residential dwelling units within commercial and industrial uses on property zoned commercial or industrial approximately 0.5 mi southwest of the project site on the south side of Oleander Avenue between Heacock Street and Patterson Avenue. The workers at the nearby commercial and industrial facilities are also considered. Sensitive receptors were placed in a general grid extending in all directions to characterize the risk level surrounding the project site. Meteorological data from the Moreno Valley area were utilized to

represent the conditions at the project site. Table 4.2.H provides the results of the operational related health risk assessment conducted.

Table 4.2.H: Operational-Related Health Risk Assessment Results (risk per million)

Location	Maximum Cancer Risk	Maximum Noncancer Risk
School 1	0.11	0.000069
School 2	0.79	0.00050
School 3	0.26	0.00016
Nearest Residential to the north	6.6	0.0041
Nearest Residential to the east	5.0	0.0031
Nearest Residential to the south	1.2	0.00074
Workers at facility to the west	4.5	0.0029
SCAQMD Threshold	**10**	**1**
Significant?	**No**	**No**

Source: LSA Associates, March 2012.

As identified in Table 4.2.H, the nearest residences would experience a cancer risk of 6.6 in 1 million, which is below the 10 in 1 million threshold. The nearest residences would also experience a chronic hazard index of 0.0041, which is below the 1.0 threshold. The peak off-site worker cancer risk level is 4.5 in a million, which is also below the 10 in 1 million threshold. Chronic hazard index for the peak off-site worker would be 0.0029, which is below the 1.0 threshold. Since the operational phase of the proposed project would not exceed any of the operational related health risk assessment thresholds, a less than significant impact would occur and no mitigation is required.

4.2.6 Significant Impacts

The following impacts were determined to be potentially significant. In each of the following issues, mitigation measures have been recommended to reduce the significance of the identified impacts.

4.2.6.1 Construction Equipment Exhaust Emissions

Impact 4.2.6.1: *Construction of the proposed project has the potential to exceed applicable daily thresholds that may affect sensitive receptors.*

Threshold	Would the proposed project violate any AAQS or contribute to an existing or projected air quality violation; or expose sensitive receptors to pollutants? For construction operations, the applicable daily thresholds are: - 75 pounds per day of ROC; - 100 pounds per day of NO_X; - 550 pounds per day of CO; - 150 pounds per day of PM_{10}; - 150 pounds per day of SO_X; and - 55 pounds per day of $PM_{2.5}$.

Grading and other construction activities produce combustion emissions from various sources such as site grading, utility engines, on-site heavy-duty construction vehicles, equipment hauling materials to and from the site, asphalt paving, and motor vehicles transporting the construction crew. Exhaust emissions during these construction activities will vary daily as construction activity levels change. The use of construction

equipment on site would result in localized exhaust emissions. Activity during peak grading days typically generates a greater amount of air pollutants than other project construction activity.

While the actual details of the future construction schedule are not known, it is expected that project construction would occur in four phases: 1) rough grading which includes mass site grading; 2) infrastructure construction which includes underground construction, curb, gutter, sidewalk, subgrade preparation, drop rock, and paving activities; 3) asphalt paving; and 4) building construction and painting. Appendix D-1 of this EIR includes details of the emission factors and other assumptions.

Projected emissions resulting from grading and construction activities for the proposed project are identified in Table 4.2.I, which identifies the estimated maximum daily construction emissions over the course of project construction.

Table 4.2.I: Short-Term Regional Construction Emissions

	Pollutant Emissions (lbs/day)							
Construction Phase	**ROG**	**NO_X**	**CO**	**SO_2**	**Fugitive PM_{10}**	**Exhaust PM_{10}**	**Fugitive $PM_{2.5}$**	**Exhaust $PM_{2.5}$**
Site Preparation	40	386	212	0.53	329	17	4.4	16
Grading	29	272	149	0.36	325	12	1.6	12
Building Construction	13	82	94	0.18	1.8	0.33	0.02	0.32
Architectural Coating	72	3.7	11	0.01	0.2	2.9	0	2.9
Paving	5.95.9	3434	22	0.03	329	17	4.4	16
Peak Day (Phase Overlap)	90	390	210	0.53	329	17	4.4	16
SCAQMD Threshold	**75**	**100**	**550**	**150**	**150**		**55**	
Exceeds Threshold?	**Yes**	**Yes**	**No**	**No**	**Yes**		**No**	

CO = carbon monoxide
CO_2 = carbon dioxide
lbs/day = pounds per day
NO_x = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
ROG = reactive organic compounds
SO_x = sulfur oxides
SCAQMD = South Coast Air Quality Management District

Source: LSA Associates, Inc., December 2011.

The construction emissions estimates summarized in Table 4.2.I are based on the assumed construction scenario described in the *Air Quality Analysis* prepared for the proposed project. Using emission factors from the SCAQMD *CEQA Air Quality Handbook* and the ARB EMFAC2007 model, Table 4.2.I indicates that construction emissions of criteria pollutants would exceed the SCAQMD daily emission thresholds for ROG from architectural coating, NO_X from diesel exhaust and fugitive PM_{10} during the site preparation and grading phases. It should be noted that site preparation and grading emissions are projected to be higher due to an estimated 220,000 cy of soil import by haul trucks. Although construction of the structure uses different types of equipment on site than during grading periods, similarities do exist in terms of equipment exhaust emissions and fugitive dust emissions. While it is anticipated that total emissions during construction would be below the peak grading day emissions presented in Table 4.2.I, construction emissions of ROG, NOx and PM_{10} would still exceed the SCAQMD daily threshold. This is a significant impact requiring mitigation.

Fugitive dust emissions are generally associated with land clearing and exposure of soils to the air and wind, and cut-and-fill grading operations. Dust generated during construction varies substantially on a project-by-project basis, depending on the level of activity, the specific operations, and weather conditions at the time of construction. Fugitive dust emissions can vary greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, weather conditions, and other factors. The proposed project will be required to comply with SCAQMD Rules

402 and 403 to control fugitive dust. There are a number of feasible control measures that can be reasonably implemented to significantly reduce PM_{10} emissions from construction.

As identified in Table 4.2.I, fugitive dust emissions (i.e., PM_{10}) during the anticipated peak construction day for the proposed project would exceed SCAQMD daily construction thresholds.

The proposed project is required to comply with regional rules that assist in reducing short-term air pollutant emissions. SCAQMD Rule 402 requires implementation of dust-suppression techniques to prevent fugitive dust from creating a nuisance off site. SCAQMD Rule 403 requires that fugitive dust be controlled with best available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. In addition, SCAQMD Rule 403 requires implementation of dust suppression techniques to prevent fugitive dust from creating a nuisance off site. Applicable dust suppression techniques from Rule 403 are summarized below. Implementation of these dust suppression techniques can reduce the fugitive dust generation (and thus the PM_{10} component). Compliance with these rules would reduce impacts on nearby sensitive receptors. The applicable Rule 403 measures are as follows:

- All clearing, grading, earth-moving, or excavation activities shall cease when winds exceed 25 miles per hour per SCAQMD guidelines in order to limit fugitive dust emissions.
- The contractor shall ensure that all disturbed unpaved roads and disturbed areas within the project are watered at least three times daily during dry weather. Watering, with complete coverage of disturbed areas, shall occur at least three times a day, preferably in the mid-morning, afternoon, and after work is done for the day.
- The contractor shall ensure that traffic speeds on unpaved roads and project site areas are reduced to 15 miles per hour or less to reduce fugitive dust haul road emissions.

As previously discussed, SCAQMD Rule 1113 regulates the sale and application of architectural coatings. Rule 1113 is applicable to any person who applies or solicits the application of any architectural coating within the Basin. Rule 1113 sets limits on the amount of ROG or VOC emissions allowed for all types of architectural coatings. Compliance with Rule 1113 means that architectural coatings used during construction would have ROG or VOC emissions that comply with these limits.

Mitigation Measures. To facilitate monitoring and compliance, applicable SCAQMD regulatory requirements are restated in the following mitigation. These measures shall be incorporated in all project plans, specifications, and contract documents. Typical mitigation measures identified to reduce the level of emissions of ROG, NO_X, and PM_{10} include the following:

4.2.6.1A Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall place construction equipment staging areas at least 200 feet away from sensitive receptors. Contract specifications shall be included in the proposed project construction documents, which shall be reviewed by the City.

4.2.6.1B Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall utilize power sources (e.g., power poles) or clean-fuel generators. Contract specifications shall be included in the proposed project construction documents, which shall be reviewed by the City.

4.2.6.1C Prior to the issuance of a grading permit, the project developer shall require by contract specifications that contractors shall utilize California Air Resources Board (CARB) Tier II Certified equipment or better during the rough/mass grading phase for the following pieces of equipment: rubber-tired dozers and scrapers. Contract

specifications shall be included in the proposed project construction documents, which shall be reviewed by the City.

4.2.6.1D All clearing, grading, earthmoving, or excavation activities shall cease when winds exceed 25 mph per SCAQMD guidelines in order to limit fugitive dust emissions.

4.2.6.1E The contractor shall ensure that all disturbed unpaved roads and disturbed areas within the project are watered at least three times daily during dry weather. Watering, with complete coverage of disturbed areas, shall occur at least three times a day, preferably in the mid-morning, afternoon, and after work is done for the day.

4.2.6.1F The contractor shall ensure that traffic speeds on unpaved roads and project site areas are reduced to 15 miles per hour or less to reduce PM_{10} and $PM_{2.5}$ fugitive dust haul road emissions. Speed limit signs (15 mph maximum) shall be posted at entry points to the project site, and along any unpaved roads providing access to or within the project site and/or any unpaved designated on-site travel routes.

4.2.6.1G Groundcover shall be replaced, and/or non-toxic soil stabilizers shall be applied (according to manufacturers' specifications) to any inactive construction areas (previously graded areas inactive for ten days or more).

4.2.6.1H The contractor shall minimize pollutant emissions by maintaining equipment engines in good condition and in proper tune according to manufacturer's specifications and during smog season (May through October) by not allowing construction equipment to be left idling for more than five minutes (per California law).

4.2.6.1I The contractor shall ensure use of low-sulfur diesel fuel in construction equipment as required by the California Air Resources Board (CARB) (diesel fuel with sulfur content of 15 ppm by weight or less).

4.2.6.1J If available, the project applicant shall use "Low-Volatile Organic Compounds" paints, coatings, and solvents with a VOC content lower than required under Rule 1113 (not to exceed 150 grams/liter; 1.25 pounds/gallon). High Pressure Low Volume (HPLV) applications of paints, coatings, and solvents shall be consistent with South Coast Air Quality Management District Rule 1113. Alternatively, the project applicant shall use materials that do not require painting or are pre-painted.

4.2.6.1K Grading plans, construction specifications and bid documents shall also include the following notations:

- Off-road construction equipment shall utilize alternative fuels where feasible e.g., biodiesel fuel (a minimum of B20), natural gas (CNG), liquefied natural gas (LNG), propane, except for equipment where use of such fuels would void the equipment warranty;
- Gravel pads shall be provided at all access points to prevent tracking of mud onto public roads;
- Install and maintain trackout control devices at all access points where paved and unpaved access or travel routes intersect;
- The contractor or builder shall designate a person or person(s) to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust off site;
- The contractor or builder shall post a publicly visible sign with the telephone number and person to contact regarding dust complaints. The contact person shall take corrective action within 24 hours;
- High-pressure injectors shall be provided on diesel construction equipment where feasible;

- Engine size of construction equipment shall be limited to the minimum practical size;
- Substitute gasoline-powered for diesel powered construction equipment where feasible;
- Use electric construction equipment where feasible;
- Install catalytic converters on gasoline-powered equipment where feasible;
- Ride-sharing program for the construction crew shall be encouraged and shall be supported by contractor(s) via incentives or other inducement;
- Documentation shall be provided to the City of Moreno Valley indicating that construction workers have been encouraged to carpool or otherwise reduce VMT to the greatest extent practical, including providing information on available park and ride programs;
- Lunch vendor services shall be provided on site during construction to minimize the need for off-site vehicle trips; and
- All forklifts used during construction and in subsequent operation of the project shall be electric or natural gas powered.

4.2.6.1L Throughout project construction, a construction relations officer/community liaison, appointed by the Applicant, shall be retained on-site. In coordination and cooperation with the City, the construction relations officer/community liaison shall respond to any concerns related to PM_{10} (fugitive dust) generation or other construction-related air quality issues.

4.2.6.1M All project entrances shall be posted with signs which state:

- Truck drivers shall turn off engines when not in use;
- Diesel delivery trucks servicing the project shall not idle for more than three (3) minutes; and
- Telephone numbers of the building facilities manager and CARB, to report violations.

These measures shall be enforced by the on-site facilities manager (or equivalent).

Level of Significance After Mitigation. The implementation of CARB Tier 2 Certified or better equipment would reduce PM_{10} and $PM_{2.5}$ emissions that would otherwise result from off-road equipment in use (e.g., dozers, motor graders, loaders, and excavators); however, emissions of PM_{10} would still exceed established SCAQMD thresholds during construction. It is not possible to quantify the reduction in the amount of NO_x emissions that may occur. During project construction, it is not known specifically what type of on-site equipment will be used (e.g., gasoline- or diesel-powered) therefore, no additional reduction in NO_x emissions were taken. No other feasible mitigation measures have been identified to reduce the construction emissions of NO_x or PM_{10} to a less than significant level. Project-related construction emissions of NO_x and PM_{10} would continue to exceed thresholds. Although implementation of standard Rule 1113 measures will reduce ROG/VOC emissions during application of architectural coatings to 72 pounds per day, which is less than the 75 pounds per day threshold of significance, ROG/VOC emissions are estimated to reach 90 pounds per day due to construction phase overlap. In the absence of feasible mitigation to reduce the proposed project's emission of ROG, NO_x, and PM_{10} to below SCAQMD thresholds, potential air quality impacts resulting from exhaust from construction equipment will remain significant and unavoidable.

4.2.6.2 Localized Construction Emissions

Impact 4.2.6.2: *Construction of the proposed project has the potential to exceed localized daily thresholds that may affect sensitive receptors.*

Threshold	Would the proposed project violate any AAQS or contribute to an existing or projected air quality violation; or expose sensitive receptors to pollutants? For short-term construction, the applicable localized daily thresholds are: - 11,302 pounds per day of CO; - 550 pounds per day of NO_X; - 126 pounds per day of PM_{10}; and - 53 pounds per day of $PM_{2.5}$.

The SCAQMD has developed an LST methodology that can be used to determine whether or not a project may generate significant adverse localized air quality impacts. LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable Federal or State ambient air quality standard. These emission levels have been developed based on the ambient concentrations of that pollutant for each source receptor area. The emissions of concern from construction activities are NO_X and CO combustion emissions from construction equipment and fugitive PM_{10} and $PM_{2.5}$ dust from construction site preparation activities.

Table 4.2.J summarizes the results of the modeled localized emissions during peak construction activity. LSTs for the project area as calculated using AERMOD air dispersion modeling and following the SCAQMD LST methodology. The concentration increases shown in Table 4.2.J occur at the sensitive receptors are approximately 300 meters (m) (1,000 ft) from the project site. The LST dispersion analysis details and calculations are included in the Appendix to the Air Quality Study (Appendix D-1).

Table 4.2.J: Modeled Localized Construction Impacts

Pollutant	AAQS	Ambient Concentration	Threshold	Maximum Concentration Increase	Over/(Under)	Adverse Concentration
CO (1-hour)	20 ppm	2.7 ppm	17.3 ppm	3 ppm	(14.3 ppm)	No
CO (8-hour)	9.0 ppm	1.9 ppm	7.1 ppm	1.8 ppm	(5.3 ppm)	No
NO_2 (1-hour)	0.18 ppm	0.092 ppm	0.088 ppm	0.55 ppm	0.46	**Yes**
NO_2 (annual)	0.03 ppm	0.019 ppm	0.011 ppm	0.014 ppm	0.003	No
PM_{10} (24-hour)[a]			10.4 µg/m3	85 µg/m3	74.6 µg/m3	**Yes**
PM_{10} (annual)[a]			1.0 µg/m3	0 µg/m3	(1 µg/m3)	No
$PM_{2.5}$ (24-hour)[a]			10.4 µg/m3	80 µg/m3	69.6 µg/m3	**Yes**

Source: LSA Associates, Inc., March 2012.
a. Since both PM_{10} and $PM_{2.5}$ are in nonattainment, the thresholds are not based on AAQS exceedance, but rather a violation of SCAQMD Rule 403.
AAQS = ambient air quality standards
CO = carbon monoxide
µg/m3 = microgram of pollutant per cubic meter of air
NO2 = nitrogen dioxide
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
ppm = parts per million
SCAQMD = South Coast Air Quality Management District

The SCAQMD LST threshold for NO_X is designed to insure that the NO_2 concentrations from project construction emissions added to the ambient NO2 concentrations are below the State AAQS of 180ppb. The emissions rate of NO_X at 97 lbs/day is approximately 18 percent of the LST threshold of 550 lbs/day. Since the federal NO_2 AAQS of 100 ppb is approximately 55 percent of the State NO_2 AAQS of 180 ppb, the construction emissions of NO_X will not result in an exceedance of the federal NO_2 AAQS.

Mitigation Measures. Typical mitigation measures identified to reduce the level of emissions of NOx and PM_{10} have been identified above as **Mitigation Measures 4.2.6.1A** through **4.6.1.M.** The project will also be required to comply with SCAQMD Rule 402 and 403.

Level of Significance After Mitigation. The implementation of CARB Tier 2 Certified or better equipment would reduce PM_{10} and $PM_{2.5}$ emissions that would otherwise result from off-road equipment in use (e.g., dozers, motor graders, loaders, and excavators); however, emissions of PM_{10} would still exceed established SCAQMD thresholds during construction. It is not possible to quantify the reduction in the amount of NO_x emissions that may occur. During project construction, it is not known specifically what type of on-site equipment will be used (e.g., gasoline- or diesel-powered) therefore, no additional reduction in NO_x emissions were taken. No other feasible mitigation measures have been identified to reduce the construction emissions of NO_x or PM_{10} to a less than significant level. Project-related construction emissions of NO_x and PM_{10} would continue to exceed thresholds. In the absence of feasible mitigation to reduce the proposed project's emission of NO_x and PM_{10} to below SCAQMD thresholds, potential air quality impacts resulting from exhaust from construction equipment will remain significant and unavoidable.

4.2.6.3 Long-Term Operational Emissions

Impact 4.2.6.3: *Implementation of the proposed project may occur have the potential to exceed applicable daily thresholds for operational activities.*

Threshold	Would the proposed project violate any AAQS or contribute to an existing or projected air quality violation; or expose sensitive receptors to pollutants? For long-term operations, the applicable daily thresholds are: - 55 pounds of ROC; - 55 pounds of NO_X; - 550 pounds of CO; - 150 pounds of PM_{10}; - 55 pounds of $PM_{2.5}$; and - 150 pounds of SO_X.

Long-term air pollutant emission impacts that would result from the proposed project are those associated with stationary sources and mobile sources involving any project-related change (e.g., emissions from landscape maintenance activities and other facility maintenance operations and the use of motor vehicles by project-generated traffic). The analysis assesses the mobile source emissions generated by vehicles driving to and from the proposed land uses, as well as area source emissions generated by project maintenance operations. Projected emissions resulting from operational activities of the proposed project are identified in Table 4.2.K.

Table 4.2.K: Summary of Operational Emissions

Source	Pollutant Emissions, lbs/day					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Area Source Emissions[1]	33	0	0	0	0	0
Energy Source Emissions[2]	0.1	0.93	0.78	0.01	0.07	0.07
Mobile Emissions[3]	110	990	830	1.5	170	42
Maximum Daily Emissions	**143**	**990**	**830**	**1.5**	**170**	**42**
SCAQMD Thresholds	**55**	**55**	**550**	**150**	**150**	**55**
Significant?	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**No**

Notes:
1 = Includes emissions of landscape maintenance equipment, consumer products, and architectural coatings emissions.
2 = Includes emissions of natural gas consumption.
3 = Includes emissions of vehicle emissions and fugitive dust related to vehicular traffic.

CO = carbon monoxide
lbs/day = pounds per day
NO_X = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
VOC = volatile organic compounds
SO_X = sulfur oxides

Source: LSA Associates, Inc., December 2011.

As identified in Table 4.2.K, operational emissions for the proposed project would exceed SCAQMD daily operational thresholds for ROG, NO_X, CO, and PM_{10}. Therefore, project-related long-term air quality impacts for ROG, NO_X, CO, and PM_{10} would be significant and mitigation measures are required.

Mitigation Measures. The following measures have been identified to reduce operational emissions of ROG, NO_X, CO, and PM_{10}:

4.2.6.3A Prior to issuance of the first building permit, building and site plan designs shall ensure that the project's energy efficiencies surpass applicable 2008 California Title 24, Part 6 Energy Efficiency Standards by a minimum of 20 percent. Verification of increased energy efficiencies shall be documented in Title 24 Compliance Reports provided by the Applicant, and review and approved by the City. Any combination of design features, including but not limited to the following list, may be used to fulfill this requirement provided that the total increase in energy efficiency meets or exceeds 20 percent:

- Buildings shall exceed California Title 24 Energy Efficiency performance standards for water heating and space heating and cooling, as deemed acceptable by the City.
- Increase in insulation such that heat transfer and thermal bridging is minimized.
- Limit air leakage through the structure or within the heating and cooling distribution system to minimize energy consumption.
- Incorporate dual-paned or other energy efficient windows.
- Incorporate energy efficient space heating and cooling equipment.
- Interior and exterior energy efficient lighting which exceeds the California Title 24 Energy Efficiency performance standards shall be installed, as deemed acceptable by the City. Automatic devices to turn off lights when they are not needed shall be implemented.
- To the extent that they are compatible with landscaping guidelines established by the City, shade-producing trees, particularly those that shade paved surfaces such as streets and parking lots and buildings shall be planted at the project site.

- Paint and surface color palette for the project shall emphasize light and off-white colors which reflect heat away from the buildings.
- All buildings shall be designed to accommodate renewable energy sources, such as photovoltaic solar electricity systems, appropriate to their architectural design.
- To reduce energy demand associated with potable water conveyance, the project shall implement the following:
  - Landscaping palette emphasizing drought-tolerant plants;
  - Use of water-efficient irrigation techniques; and,
  - U.S. EPA Certified WaterSense labeled for equivalent faucets, high-efficiency toilets (HETs), and water-conserving shower heads.
- The project shall provide secure, weather-protected, on-site bicycle storage/parking.
- The project shall provide on-site showers (one for males and one for females). Lockers for employees shall be provided.
- The project will establish a Transportation Management Association (TMA). The TMA will coordinate with other TMAs within the City to encourage and coordinate carpooling among building occupants. The TMA will advertise its services to building occupants, and offer transit and/or other incentives to reduce GHG emissions. A plan will be submitted by the TMA to the City within two months of project completion that outlines the measures implemented by the TMA, as well as contact information.
- The project shall provide preferential parking for carpools and vanpool. Locations and configurations of proposed preferential parking for carpools and vanpools are subject to review and approval by the City. Prior to final site plan approval, preferential parking for carpools and vanpools shall be delineated on the project site plan.
- The project shall provide at least two electric vehicle charging stations. Locations and configurations of proposed charging stations are subject to review and approval by the City. Prior to issuance of the first building permit, stub outs for charging stations shall be indicated on the project building plans.
- Lease/purchase documents shall identify that tenants are encouraged to promote the following:
  - Implementation of compressed workweek schedules.
  - SmartWay partnership;
  - Achievement of at least 20 percent per year (as a percentage of previous percentage, not total trips) increase in percentage of consolidated trips carried by SmartWay carriers until it reaches a minimum of 90 percent of all long haul trips carried by SmartWay 1.0 or greater carriers.
  - Achievement of at least 15 percent per year (as a percentage of previous percentage, not total trips) increase in percentage of long haul trips carried by SmartWay carriers until it reaches a minimum of 85 percent of all consolidator trips carried by SmartWay 1.0 or greater carriers.
  - Use of fleet vehicles conforming to 2010 air quality standards or better.
  - Installation of catalytic converters on gasoline-powered equipment.

- Inclusion of electric powered and/or compressed natural gas fueled trucks and/or vehicles in fleets.
- Establishment and use of carpool/vanpool programs, complemented by parking fees for single-occupancy vehicles.
- Provision of preferential parking for EV and CNG vehicles.
- Use of electrical equipment (instead of gasoline-powered equipment) for landscape maintenance.
- Use of electric (instead of diesel or gasoline-powered) yard trucks.
- Use of SmartWay 1.25 rated trucks.

4.2.6.3B The project shall be designed to facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills by providing easily accessible areas that are dedicated to the collection and storage of recyclable materials including: paper, cardboard, glass, plastics, and metals. Locations of proposed recyclable materials collection areas are subject to review and approval by the City. Prior to Final Site Plan approval, locations of proposed recyclable materials collection areas shall be delineated on the project site plan.

It is important to note that in addition to the operational activity mitigation measures identified above, the proposed project would incorporate physical attributes and operational programs that will act to generally reduce operational-source pollutant emissions including GHG emissions. These project characteristics are identified in Section 4.3 (Climate Change and Greenhouse Gas Emissions) of this EIR.

Level of Significance after Mitigation. Even with implementation of the identified mitigation measure, it is not possible to quantify the reduction in the amount of ROG, NO_X, CO, and PM_{10} emissions that may occur with the operation of the proposed project. Despite implementation of mitigation measures, emissions of ROG, NO_X, CO, and PM_{10} would still exceed SCAQMD significance thresholds resulting in a significant and unavoidable operational air quality impact.

4.2.7 Cumulative Impacts

4.2.7.1 Short-Term Air Quality Impacts

The cumulative area for air quality impacts is the Basin. The implementation of the project would contribute criteria pollutants to the area during project construction. A number of individual projects in the area may be under construction simultaneously with the proposed project. Depending on construction schedules and actual implementation of projects in the area, generation of fugitive dust and pollutant emissions during construction would result in substantial short-term increases in air pollutants. However, each project would be required to comply with the SCAQMD's standard construction measures. Therefore, cumulative impacts associated with short-term air quality impacts would be less than significant.

4.2.7.2 CO Hot Spot Impacts

As identified in Section 4.2.5.3, no significant CO hot spot impacts would occur. It is anticipated that CO emissions in the future will decrease with advances in technology. As previously identified, background concentrations in future years are anticipated to continue to decrease as the concerted effort to improve regional air quality progresses. Therefore, CO concentrations in the future years would generally be lower than existing conditions. Based on the analysis, because no CO hot spot

impacts would occur, it is reasonable to assume that a less than significant cumulative CO impact would occur.

4.2.7.3 Long-Term Regional Air Quality Impacts

Previously identified Table 4.2.K indicates that the long-term operation of the project would contribute to long-term regional air pollutants despite implementation of mitigation measures. The Basin is in nonattainment for NO_X, PM_{10}, $PM_{2.5}$, and ozone at the present time; therefore, the operation of the proposed project would exacerbate nonattainment of air quality standards within the Basin and contribute to adverse cumulative air quality impacts. Implementation of the proposed project would unavoidably contribute to significant long-term cumulative air quality impacts.

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4.3 CLIMATE CHANGE AND GREENHOUSE GAS EMISSIONS

This section analyzes the proposed project's potential climate impacts based on the comprehensive *Greenhouse Gas Emissions and Global Climate Change Study* (LSA Associates, Inc. December 2011) contained in Appendix E to this EIR. This section provides a discussion of global climate change, existing regulations pertaining to global climate change, and an analysis of greenhouse gas (GHG) emissions associated with the proposed project. This analysis examines the short-term construction and long-term operational impacts and evaluates the effectiveness of measures incorporated as part of the project design.

4.3.1 Existing Setting

4.3.1.1 Global Climate Change

Global climate change is the change in average meteorological conditions on the earth with respect to temperature, precipitation, and storms. The Earth's average near-surface atmospheric temperature rose 0.6 ± 0.2 degrees Celsius (°C) (1.1 ± 0.4°F) in the 20th century. Climate change refers to any significant change in measures of climate such as temperature, precipitation, or wind, lasting for decades or longer (Environmental Protection Agency [EPA], 2007). Climate change may result from:

- Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;
- Natural processes within the climate system (e.g., changes in ocean circulation); and/or
- Human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., deforestation, reforestation, urbanization, and desertification).

Human activities, such as fossil fuel combustion and land use changes release carbon dioxide (CO_2) and other compounds, cumulatively termed greenhouse gases (GHGs). GHGs are effective in trapping infrared radiation that otherwise would have escaped the atmosphere, thereby warming the atmosphere, the oceans, and earth's surface (EPA, 2007). The prevailing scientific opinion on climate change is that "most of the warming observed over the last 50 years is attributable to human activities."[1] The increased amounts of CO_2 and other GHGs are the primary causes of the human-induced component of warming.

GHGs are present in the atmosphere naturally, released by natural sources, or formed from secondary reactions taking place in the atmosphere. They include CO_2, methane (CH_4), nitrous oxide (N_2O), and ozone (O_3). In the last 200 years, substantial quantities of GHGs have been released into the atmosphere. These extra emissions are increasing GHG concentrations in the atmosphere, enhancing the natural greenhouse effect, which is believed to be causing global warming. While human-made GHGs include CO_2, CH_4, and N_2O, some (like chlorofluorocarbons [CFCs]) are completely new to the atmosphere.

Natural sources of CO_2 include the respiration (breathing) of humans and animals and evaporation from the oceans. Together, these natural sources release approximately 150 billion tonnes[2] of CO_2 each year, far outweighing the 7 billion tonnes of human-made emissions from fossil fuel burning, waste incineration, deforestation, and cement manufacture. Nevertheless, natural removal processes such as photosynthesis by land- and ocean-dwelling plant species cannot keep pace with this extra input of human-made CO_2, and consequently the gas is building up in the atmosphere.[3]

[1] Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2007: The Physical Science Basis*, http://www.ipcc.ch.

[2] A tonne means a ton in the metric unit system; it is also called a metric ton. A tonne is 1,000 kilograms, or approximately 2,204 pounds.

[3] Enviropedia, http://www.enviropedia.org.uk/Global_Warming/Emissions.php.

Methane is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources include wetlands, termites, and oceans. Human-made sources include the mining and burning of fossil fuels; digestive processes in ruminant animals such as cattle; rice paddies; and the burying of waste in landfills. Total annual emissions of CH_4 are approximately 500 million tonnes, with human-made emissions accounting for the majority. As for CO_2, the major removal process of atmospheric CH_4—chemical breakdown in the atmosphere—cannot keep pace with source emissions, and CH_4 concentrations in the atmosphere are increasing.

Worldwide emissions of GHGs in 2008 were 30.1 billion metric tons of carbon dioxide equivalent (CO_2E).[1] It is important to note that the global emissions inventory data are not all from the same year and may vary depending on the source of the emissions inventory data.[2] Emissions from the top five countries and the European Union accounted for approximately 55 percent of the total global GHG emissions, according to the most recently available data. The United States was the number two producer of GHG emissions. The primary GHG emitted by human activities in the United States was CO_2, representing approximately 84 percent of total GHG emissions. CO_2 from fossil fuel combustion, the largest source of GHG emissions, accounted for approximately 80 percent of the GHG emissions.[3]

In 2009, the United States emitted approximately 6.6 billion metric tons of CO_2e or approximately 25 tons per year (tpy) per person. Of the six major sectors nationwide (electric power industry, transportation, industry, agriculture, commercial, residential) the electric power industry and transportation sectors combined account for approximately 62 percent of the GHG emissions; the majority of the electrical power industry and all of the transportation emissions are generated from direct fossil fuel combustion. Between 1990 and 2006, total United States GHG emissions rose approximately 14.7 percent.[4]

The California ARB is responsible for developing the California Greenhouse Gas Emission Inventory. This inventory estimates the amount of GHGs emitted to and removed from the atmosphere by human activities within the State of California and supports the Assembly Bill (AB) 32 Climate Change Program. The California ARB's current GHG emission inventory covers the years 1990-2008 and is based on fuel use, equipment activity, industrial processes, and other relevant data (e.g., housing, landfill activity, agricultural lands).

According to California ARB emission inventory estimates, California emitted approximately 478 million metric tons of CO_2e emissions in 2008.[5] The year 2008 saw a small decrease in statewide GHG emissions, driven by a noticeable drop in on-road transportation emissions. 2008 also reflects the beginning of the economic recession and fuel price spikes. As the economy recovers, GHG emissions are likely to rise again without other mitigation actions. California's gross emissions of GHG increased 4.3 percent from 458 million metric tons of CO_2e in 2000 to 477.7 million in 2008, with a maximum of 483.9 million in 2004.

During the same period, California's population grew by 11.8 percent from 34.1 to 38.1 million people, and GHG emissions per person decreased from 13.4 to 12.5 metric tons of CO_2e per person. The California ARB estimates that transportation was the source of approximately 36 percent of the State's GHG emissions in 2008, followed by electricity generation at 21 percent. Other sources of GHG emissions were industrial sources at 10 percent, residential and commercial activities at 9 percent, agriculture at 5 percent, and recycling and waste at 2 percent.

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1 United Nations, *The Millennium Development Goals Report 2011,* http://unstats.un.org/unsd/default.htm, accessed July 26, 2011.

2 US Environmental Protection Agency, "Inventory of US Greenhouse Gas Emissions and Sinks 1990–2006," http://www.epa.gov/climatechange/emissions/usinventoryreport.html, 2008.

3 Ibid.

4 U.S. Environmental Protection Agency (EPA). 2011. *Inventory of U.S. Greenhouse Gas Emissions And Sinks: 1990–2009*. http://www.epa.gov/climatechange/emissions/usinventoryreport.html. Accessed July 2011.

5 California ARB, Greenhouse Gas Inventory Data - 2000 to 2008. http://www.arb.ca.gov/cc/inventory/data/data.htm. Accessed July 2011.

The California ARB staff has projected statewide unregulated GHG emissions for the year 2020, which represent the emissions that would be expected to occur in the absence of any GHG reduction actions, will be 596 million metric tons (MMT) of CO_2e. GHG emissions from the transportation and electricity sectors as a whole are expected to increase, but remain at approximately 38 percent and 23 percent of total CO_2e emissions, respectively. The industrial sector consists of large stationary sources of GHG emissions and the percentage of the total 2020 emissions is projected to be 17 percent of total CO_2e emissions. The remaining sources of GHG emissions in 2020 are high global warming potential gases at 8 percent, residential and commercial activities at 8 percent, agriculture at 5 percent, and recycling and waste at 1 percent.

4.3.1.2 Effects of Global Climate Change

Effects from global climate change may arise from temperature increases, climate-sensitive diseases, extreme weather events, and air quality. There may be direct temperature effects through increases in average temperature leading to more extreme heat waves and less extreme cold spells. Those living in warmer climates are likely to experience more stress and heat-related problems. Heat-related problems include heat rash and heat stroke. In addition, climate-sensitive diseases may increase, such as those spread by mosquitoes and other disease-carrying insects. Such diseases include malaria, dengue fever, yellow fever, and encephalitis. Extreme events such as flooding and hurricanes can displace people and agriculture. Global warming may also contribute to air quality problems from increased frequency of smog and particulate air pollution. Table 4.3.A lists greenhouse gases, the effects of each greenhouse gas, and sources for each of the greenhouse gases.

Additionally, according to the 2006 California Climate Action Team (CAT) Report,[1] the following climate change effects, which are based on trends established by the United Nations Intergovernmental Panel on Climate Change (IPCC), can be expected in California over the course of the next century:

- A diminishing Sierra snowpack declining by 70 percent to 90 percent, threatening the State's water supply;
- Increasing temperatures from 8 to 10.4 degrees Fahrenheit under the higher emission scenarios, leading to a 25 percent to 35 percent increase in the number of days ozone pollution levels are exceeded in most urban areas;
- Increased vulnerability of forests due to forest fires, pest infestation, and increased temperatures;
- Increased electricity demand, particularly in the hot summer months; and
- Increased ground-level ozone formation due to higher reaction rates of ozone precursors.

4.3.1.3 Existing Greenhouse Gas Emissions

The project site is currently vacant, and therefore does not generate emissions.

[1] California Environmental Protection Agency, *Climate Action Team Report to Governor Schwarzenegger and the Legislature*, March 2006.

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Table 4.3.A: Greenhouse Gas Properties, Effects, and Sources

Constituent	Description and Physical Properties	Health Effects	Sources
Water Vapor	Water vapor (H_2O) is the most abundant, important, and variable greenhouse gas in the atmosphere. Water vapor is not considered a pollutant; in the atmosphere it maintains a climate necessary for life. Changes in its concentration are primarily considered to be a result of climate feedbacks related to the warming of the atmosphere rather than a direct result of industrialization.	There are no health effects from water vapor. When some pollutants come in contact with water vapor, they can dissolve and then the water vapor can be a transport mechanism to enter the human body.	The main source of water vapor is evaporation from the oceans (approximately 85%). Other sources include evaporation from other water bodies, sublimation (change from solid to gas) from sea ice and snow, and transpiration from plant leaves.
Carbon Dioxide	Carbon dioxide (CO_2) is an odorless, colorless natural greenhouse gas.	Outdoor levels of carbon dioxide are not high enough to result in negative health effects.	Carbon dioxide is emitted from natural and anthropocentric (human) sources. Natural sources include the following: decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic out gassing. Anthropogenic sources are from burning coal, oil, natural gas, and wood.
Methane	Methane (CH_4) is an extremely effective absorber of radiation, though its atmospheric concentration is less than carbon dioxide and its lifetime in the atmosphere is brief (10–12 years) compared to other greenhouse gases.	There are no health effects from methane.	Methane has both natural and anthropogenic sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production (at the roots of the plants). Over the last 50 years, human activities such as growing rice, raising cattle, using natural gas, and mining coal have added to the atmospheric concentration of methane. Other anthropocentric sources include fossil-fuel combustion and biomass burning.
Nitrous Oxide	Nitrous oxide (N_2O), also known as laughing gas, is a colorless greenhouse gas.	Nitrous oxide can cause dizziness, euphoria, and sometimes slight hallucinations. In small doses it is harmless. In some cases, heavy and extended use can cause Olney's Lesions (brain damage).	Concentrations of nitrous oxide also began to rise at the beginning of the industrial revolution. In 1998, the global concentration was 314 ppb. Nitrous oxide is produced by microbial processes in soil and water, including those reactions which occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. It is used as an aerosol spray propellant, e.g., in whipped cream bottles. It is also used in potato chip bags to keep chips fresh. It is used in rocket engines and in race cars.
Chloro-fluorocarbons	Chlorofluorocarbons (CFCs) are gases formed synthetically by replacing all hydrogen atoms in methane or ethane (C_2H_6) with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the earth's surface).	In confirmed indoor locations, working with CFC-113 or other CFCs is thought to have resulted in death by cardiac arrhythmia (heart frequency too high or too low) or asphyxiation.	CFCs have no natural source, but were first synthesized in 1928. They were used for refrigerants, aerosol propellants, and cleaning solvents. Due to the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken and was extremely successful, so much so that levels of the major CFCs are now remaining level or declining. However, their long atmospheric lifetimes mean that some of the CECs will remain in the atmosphere for over 100 years.
Hydro-fluorocarbons	Hydrofluorocarbons (HFCs) are synthetic man-made chemicals that are used as a substitute for CFCs. Out of all the greenhouse gases, they are one of three groups with the highest global warming potential. Prior to 1990, the only significant emissions were HFC-23. HFC-134a use is increasing due to its use as a refrigerant.	None.	HFCs are man made for applications such as automobile air conditioners and refrigerants.
Per-fluorocarbons	Perfluorocarbons (PFCs) have stable molecular structures and do not break down through the chemical processes in the lower atmosphere. Because of this, PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane (CF_4) and hexafluoroethane (C_2F_6).	None.	The two main sources of PFCs are primary aluminum production and semiconductor manufacture.
Sulfur Hexafluoride	Sulfur hexafluoride (SF_6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It also has the highest GWP of any gas evaluated, 23,900. Concentrations in the 1990's were about 4 ppt.	In high concentrations in confined areas, the gas presents the hazard of suffocation because it displaces the oxygen needed for breathing.	Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.
Aerosols	Aerosols are particles emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light. Cloud formation can also be affected by aerosols.	Similar health effects associated with particulate matter.	Sulfate aerosols are emitted when fuel containing sulfur is burned. Another source of aerosols (in the form of black carbon or soot) is the result of incomplete combustion or the incomplete burning of fossil fuels. Although particulate matter regulation has been lowering aerosol concentrations in the United States, global concentrations are likely increasing as a result of other sources around the world.

Source: LSA Associates, August 2011

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4.3.2 Regulatory Setting

4.3.2.1 Federal Regulations/Standards

Energy Policy and Conservation Act. The Energy Policy and Conservation Act of 1975 sought to ensure that all vehicles sold in the U.S. would meet certain fuel economy goals. Through this Act, Congress established the first fuel economy standards for on-road motor vehicles in the U.S. Pursuant to the Act, the National Highway Traffic and Safety Administration (NHTSA), which is part of the U.S. Department of Transportation (USDOT), is responsible for establishing additional vehicle standards and for revising existing standards. Since 1990, the fuel economy standard for new passenger cars has been 27.5 miles per gallon (mpg). Since 1996, the fuel economy standard for new light trucks (gross vehicle weight of 8,500 pounds or less) has been 20.7 mpg. The Corporate Average Fuel Economy (CAFE) program, administered by the Environmental Protection Agency (EPA), was created to determine vehicle manufacturers' compliance with the fuel economy standards. The EPA calculates a CAFE value for each manufacturer based on city and highway fuel economy test results and vehicle sales. Based on the information generated under the CAFE program, the USDOT is authorized to assess penalties for noncompliance.

Energy Policy Act of 1992. The Energy Policy Act (EPAct) of 1992 was passed to reduce the country's dependence on foreign petroleum and improve air quality. EPAct includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. EPAct requires certain Federal, State, and local governments and private fleets to purchase a percentage of light-duty AFVs capable of running on alternative fuels each year. In addition, financial incentives are also included in EPAct. Federal tax deductions will be allowed for businesses and individuals to cover the incremental cost of AFVs. States are also required by the act to consider a variety of incentive programs to help promote AFVs.

Energy Policy Act of 2005. The Energy Policy Act of 2005 includes provisions for renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for clean renewable energy and rural community electrification; and establishes a Federal purchase requirement for renewable energy.

Federal Regulation of Climate Change. Climate change and GHG reduction are also concerns at the Federal level; however, at this time, no Federal legislation or regulations have been enacted specifically addressing GHG emissions reductions and climate change. California, in conjunction with several environmental organizations and several other states, sued to force the EPA to regulate GHG as a pollutant under the Clean Air Act (*Massachusetts vs. Environmental Protection Agency et al.*, 549 U.S. 497 (2007). The court ruled that GHG does fit within the Clean Air Act's definition of a pollutant, and that the EPA does have the authority to regulate GHG. Despite the Supreme Court ruling, there are no promulgated Federal regulations to date limiting GHG emissions.

On December 7, 2009, the EPA Administrator signed two distinct findings regarding greenhouse gases under Section 202(a) of the Clean Air Act:

- *Endangerment Finding:* The Administrator finds that the current and projected concentrations of the six key well-mixed greenhouse gases—carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)—in the atmosphere threaten the public health and welfare of current and future generations.
- *Cause or Contribute Finding:* The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare.

These findings do not themselves impose any requirements on industry or other entities. However, this action is a prerequisite to finalizing the EPA's proposed greenhouse gas emission standards for light-duty vehicles, which were jointly proposed by EPA and the Department of Transportation's National Highway Safety Administration on September 15, 2009.[1]

4.3.2.2 State Regulations/Standards

California Code of Regulations Title 24, Part 6. Enacted in 1978, this part of the California Code established energy efficiency standards for residential and nonresidential buildings in response to a legislative mandate to reduce California's energy consumption. These standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. The most recent standards were adopted and went into effect January 1, 2010.[2] Such standards include the provision of cool roofs, demand control ventilation, skylights for day-lighting in buildings, thermal breaks for metal building roofs, and lighting power limits. These standards are expected to reduce the growth in electricity use of residential and non-residential buildings. Continual updates to Title 24 along with the State's implementation of AB 1493 and SB 1368 will have a major impact on the State's attainment of the AB 32 goals.

California Code of Regulations Title 24, Part 11. This part of the California Code is known as the California Green Building Standards Code (CALGreen Code) and was enacted to improve public health, safety, and general welfare by enhancing the design and construction of buildings through the use of building concepts with positive environmental impacts and through encouragement of sustainable construction practices. The CALGreen Code is not intended to substitute or be identified as meeting the certification requirements of any green building program that is not established and adopted by the California Building Standards Commission (CBSC). This update to Part 11 of Title 24 of the California Code of Regulations was effective January 1, 2011.

California Code of Regulations Titles 14 and 27. These parts of the California Code require energy efficient practices as part of solid and hazardous waste handling and disposal.

Assembly Bill 4420 (AB 4420). The State of California has been studying the impacts of climate change since 1988, when AB 4420 was approved. This legislation directed the California Energy Commission (CEC), in consultation with the CARB and other agencies, to study the implications of global warming on California's environment, economy, and water supply. The CEC was also directed to prepare and maintain the State's inventory of GHG emissions.

Assembly Bill 1493 (AB 1493). In 2002, Governor Grey Davis signed AB 1493 which required the CARB to develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty truck and other vehicles determined by the CARB to be vehicles whose primary use is noncommercial personal transportation in the State."

Executive Order S-3-05. Executive Order S-3-05 was signed by Governor Schwarzenegger in 2005 proclaiming California is vulnerable to the impacts of climate change. It states that increased temperatures could reduce the Sierra Nevada's snowpack, worsen California's air quality problems, and potentially cause a rise in sea levels. The Executive Order establishes total GHG emission

[1] http://www.epa.gov/climatechange/endangerment.html.

[2] *Nonresidential Compliance Manual for California's 2008 Energy Efficiency Standards*, California Energy Commission, effective January 1, 2010, http://www.energy.ca.gov/title24/2008standards/index.html, website accessed on March 4, 2010.

targets including emissions reductions to the 2000 level by 2010, and the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

Assembly Bill 32 (AB 32). In September 2006, Governor Schwarzenegger signed Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006. AB 32 directs the CARB to implement regulations for a cap on sources or categories of sources of GHG emissions. The bill requires that the CARB develop regulations to reduce emissions with an enforcement mechanism to ensure that the reductions are achieved, and to disclose how it arrives at the cap. It also includes conditions to ensure businesses and consumers are not unfairly affected by reductions.

AB 32 requires the CARB to:

- Adopt a list of discrete early action measures by July 1, 2007, that can be implemented before January 1, 2010;
- Establish a statewide GHG emissions cap for 2020 based on 1990 emissions and adopt mandatory reporting rules for significant sources of GHG by January 1, 2008;
- Indicate how emission reductions will be achieved from significant GHG sources via regulations, market mechanisms and other actions by January 1, 2009; and
- Adopt regulations by January 1, 2011, to achieve the maximum technologically feasible and cost-effective reductions in GHG, including provisions for using both market mechanisms and alternative compliance mechanisms.

AB 32 codifies Executive Order S-3-05's[1] year 2020 goal by requiring that statewide GHG emissions be reduced to 1990 levels by the year 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will be implemented no later than January 1, 2012. To effectively implement the cap, AB 32 directs the CARB to develop appropriate regulations and establish a mandatory reporting system to track and monitor global warming emissions levels.

Senate Bill 1368 (SB 1368). In September 2006, Governor Arnold Schwarzenegger signed Senate Bill 1368, which calls for the adoption of a GHG performance standard for in-State and imported electricity generators to mitigate climate change. On January 25, 2007, the California Public Utilities Commission adopted an interim GHG emissions performance standard. This standard is a facility-based emissions standard requiring all new long-term commitments for baseload generation to serve California consumers with power plants that have emissions no greater than a combined cycle gas turbine plant. The established level is 1,100 pounds of CO_2 per megawatt-hour.

Executive Order S-01-07. Executive Order S-01-07 was signed by Governor Schwarzenegger on January 18, 2007 mandating a statewide goal to reduce the carbon intensity of California's transportation fuel by at least ten percent by 2020. The order also requires that a California specific Low Carbon Fuel Standard be established for transportation fuels.

Senate Bill 97 (SB 97). Senate Bill 97 was approved on August 25, 2007, to address GHG analysis under CEQA. This legislation mandates that the Office of Planning and Research (OPR) prepare and submit guidelines to the California Resource Agency (CRA) for the mitigation of GHG emissions and their effects by July 1, 2009, and their adoption by January 1, 2010. This legislation does not provide for any guidance for non-exempted projects in the interim period between the passage of SB 97 and the adoption of guidelines by the OPR.

[1] Executive Order S-3-05 establishes greenhouse gas emission reduction targets for California.

As directed by SB 97, the Natural Resources Agency adopted Amendments to the CEQA Guidelines for greenhouse gas emissions on December 30, 2009. On February 16, 2010, the Office of Administrative Law approved the Amendments, and filed them with the Secretary of State for inclusion in the California Code of Regulations. The Amendments became effective on March 18, 2010. Proposed changes to the guidelines included new questions in Appendix G regarding Greenhouse Gas Emissions and major changes to the Transportation/Traffic checklist questions (Appendix A-3, CEQA Guidelines changes).

Senate Bill 375. SB 375 was signed into law on October 1, 2008. SB 375 provides emissions-reduction goals around which regions can plan, integrating disjointed planning activities, and provides incentives for local governments and developers to follow new conscientiously planned growth patterns.

Senate Bill 1078 (SB 1078), Senate Bill 107 (SB 107), Executive Order S-14-08, and Senate Bill X1-2 (SB X1-2). Established in 2002 SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. Established in 2006, SB 107 (Chapter 464, Statutes of 2006) accelerated this requirement to the year 2010. In November 2008 Governor Schwarzenegger signed Executive Order S-14-08, which expanded the State's renewable energy standard from 20 percent to 33 percent by the year 2020. In an effort to codify the 33 percent by 2020 goal, SB X1-2 was signed by Governor Edmund G. Brown Jr. in April 2011 preempting the California Air Resources Boards' 33 percent Renewable Electricity Standard which applies to all electricity retailers in the State including publicly owned utilities (POUs), investor-owned utilities, electricity service providers, and community choice aggregators. All of these entities must adopt the new goals of 20 percent of retails sales from renewables by the end of 2013, 25 percent by the end of 2016, and the 33 percent requirement being met by the end of 2020.

4.3.2.3 Regional Regulations

As stated above, SB 375 took effect in 2009 and required regional municipal planning organizations to develop regional land use plans that demonstrate how the regions will achieve compliance with the GHG reduction goals of AB 32. Cities located within these regions are then required, in turn, to update their General Plans in accordance with the regional plans. Non-compliance with SB 375 will result in transportation funds being withheld from the regional and/or local agency. To date, the regional municipal planning organization for Riverside County (the Western Riverside Council of Governments, or WRCOG) has not adopted a regional plan that is in compliance with SB 375.

4.3.2.4 City of Moreno Valley General Plan Policies

Although the City of Moreno Valley General Plan does not include any specific GHG or climate change policies or goals, a number of the goals, objectives, policies, and programs identified in the air quality (Chapter 6 – Safety) and energy (Chapter 7 – Conservation) elements will result in an indirect reduction in GHG emissions through reductions in vehicle trips, vehicle miles traveled, and energy use. The specific policies of the General Plan that are relevant to the proposed project are as follows:

Air Quality Chapter:

Objective 6.6: Promote land use patterns that reduce daily automotive trips and reduce trip distance for work, shopping, school, and recreation.

> **Policy 6.6.1:** Provide sites for new neighborhood commercial facilities within close proximity to the residential areas they serve.

Policy 6.6.2: Provide multi-family residential development sites in close proximity to neighborhood commercial centers in order to encourage pedestrian instead of vehicular travel.

Policy 6.6.3: Locate neighborhood parks in close proximity to the appropriate concentration of residents in order to encourage pedestrian and bicycle travel to local recreation areas.

Objective 6.7: Reduce mobile and stationary source air pollution emissions.

Policy 6.7.1: Cooperate with regional efforts to establish and implement regional air quality strategies and tactics.

Policy 6.7.2: Encourage the financing and construction of park-and-ride facilities.

Policy 6.7.3: Encourage express transit service from Moreno Valley to the greater metropolitan areas of Riverside, San Bernardino, Orange, and Los Angeles Counties.

Policy 6.7.4: Locate heavy industrial and extraction facilities away from residential areas and sensitive receptors.

Policy 6.7.5: Require grading activities to comply with the South Coast Air Quality Management District's (SCAQMD) Rule 403 regarding the control of fugitive dust.

Policy 6.7.6: Require building construction to comply with the energy conservation requirements of Title 24 of the California Administrative Code.

Conservation Chapter

Energy Objective 7.5: Encourage efficient use of energy resources.

Policy 7.5.1: Encourage building, site design, and landscaping techniques that provide passive heating and cooling to reduce energy demand.

Policy 7.5.2: Encourage energy efficient modes of transportation and fixed facilities, including transit, bicycle, equestrian, and pedestrian transportation. Emphasize fuel efficiency in the acquisition and use of City-owned vehicles.

Policy 7.5.3: Locate areas planned for commercial, industrial and multiple family density residential development within areas of high transit potential and access.

Policy 7.5.4: Encourage efficient energy usage in all city public buildings.

Policy 7.5.5: Encourage the use of solar power and other renewable energy systems.

4.3.3 Methodology

Bearing in mind that CEQA does not require "perfection" but instead "adequacy, completeness, and a good faith effort at full disclosure," the analysis is based on methodologies and information available at the time this EIR was prepared. Estimation of GHG emissions in the future does not account for changes in technology that may reduce such emissions; therefore, the estimates are based on past performance and represent a scenario that is worse than that which is likely to be encountered. Additionally, as explained in greater detail below, many uncertainties exist regarding the precise relationship between specific levels of GHG emissions and the ultimate impact on global climate. Significant uncertainties also exist regarding the reduction potential of mitigation strategies. Thus,

while information is presented below to assist the public and the City's decision-makers in understanding the project's potential contribution to global climate change impacts, the information available to the City is not sufficiently detailed to allow a direct comparison between particular project characteristics and particular climate change impacts, nor between any particular proposed mitigation measure and any reduction in climate change impacts.

The recommended approach for GHG analysis included in the State of California Office of Planning and Research's (OPR's) June 2008 release is to: (1) identify and quantify GHG emissions, (2) assess the significance of the impact on climate change, and (3) if significant, identify alternatives and/or mitigation measures to reduce the impact below a level of significance.[1] Neither the CEQA statute nor Guidelines prescribe quantitative thresholds of significance or a particular methodology for performing an impact analysis; as with most environmental topics, significance criteria are left to the judgment and discretion of the lead agency.

The June 2008 OPR guidance provides some additional direction regarding planning documents as follows: "CEQA can be a more effective tool for GHG emissions analysis and mitigation if it is supported and supplemented by sound development policies and practices that will reduce GHG emissions on a broad planning scale and that can provide the basis for a programmatic approach to project-specific CEQA analysis and mitigation. For local government lead agencies, adoption of general plan policies and certification of general plan EIRs that analyze broad jurisdiction-wide impacts of GHG emissions can be part of an effective strategy for addressing cumulative impacts and for streamlining later project-specific CEQA reviews."

Pursuant to SB 97, the OPR is in the process of developing guidelines for analysis of the effects of GHG emissions. As part of this process, the OPR has asked CARB technical staff to recommend Statewide interim thresholds of significance for GHGs. The CARB released a preliminary draft staff proposal in October 2008 that included initial suggestions for significance criteria related to industrial, commercial, and residential projects.

In March 2010, *CEQA Guidelines* amendments were adopted and include the following direction regarding determination of significant impacts from GHG emissions (Section 15064.4):

(a) The determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency consistent with the provisions in Section 15064. A lead agency should make a good-faith effort, based on available information, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project. A lead agency shall have discretion to determine, in the context of a particular project, whether to:

  (1) Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use. The lead agency has discretion to select the model it considers most appropriate provided it supports its decision with substantial evidence. The lead agency should explain the limitations of the particular model or methodology selected for use; or

  (2) Rely on a qualitative analysis or performance based standards.

(b) A lead agency may consider the following when assessing the significance of impacts from greenhouse gas emissions on the environment:

  (1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting.

  (2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.

[1] State of California, 2008. Governor's Office of Planning and Research. *CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act Review*. June 19.

(3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such regulations or requirements must be adopted by the relevant public agency through a public review process and must include specific requirements that reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

CEQA Guidelines Section 15064(b) provides that the "determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data," and further, states that an "ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting."

On February 3, 2011 the SCAQMD released the California Emissions Estimator Model (CalEEMod) Emissions Inventory Model. The purpose of this new model is to more accurately calculate air quality and GHG emissions from direct and indirect sources and quantify applicable air quality and GHG reductions achieved from mitigation measures. The latest version of CalEEMod was utilized to calculate GHG emissions from the following source categories: construction, area, energy, mobile, waste, and water.

In addition, on September 28, 2010, the SCAQMD proposed the following draft-tiered interim GHG significance threshold for development projects:

Tier 1 consists of evaluating whether or not the project qualifies for any applicable exemption under CEQA. If the project qualifies for an exemption, no further action is required. If the project does not qualify for an exemption, then it would move to the next tier.

Tier 2 consists of determining whether or not the project is consistent with a GHG reduction plan that may be part of a local general plan, for example. The concept embodied in this tier is equivalent to the existing consistency determination requirements in CEQA Guidelines Sections 15064(h)(3), 15125(d), or 15152(a). The GHG reduction plan must, at a minimum, comply with AB 32 GHG reduction goals; include an emissions inventory agreed upon by either ARB or the SCAQMD, have been analyzed under CEQA and have a certified Final CEQA document, and have monitoring and enforcement components. If the proposed project is consistent with the qualifying local GHG reduction plan, it is not significant for GHG emissions. If the project is not consistent with a local GHG reduction plan, there is no approved plan, or the GHG reduction plan does not include all of the components described above, the project would move to Tier 3.

Tier 3 establishes a screening significance threshold level to determine significance using a 90 percent GHG emission capture rate. The 90 percent capture rate GHG significance screening level in Tier 3 for stationary sources was derived using the following methodology. Using the SCAQMD's Annual Emission Reporting (AER) Program, the reported annual natural gas consumption for 1,297 permitted facilities for 2006 through 2007 was compiled and the facilities were rank-ordered to estimate the 90^{th} percentile of the cumulative natural gas usage for all permitted facilities. Approximately 10 percent of facilities evaluated comprise more than 90 percent of the total natural gas consumption, which corresponds to 10,000 metric tons of CO_2 equivalent emissions per year ($MTCO_2e/yr$) (the majority of combustion emissions comprise CO_2). SCAQMD suggested the following GHG screening thresholds: Industrial (when SCAQMD is the Lead Agency): 10,000 tpy CO_2e; Residential: 3,500 tpy CO_2e; Commercial: 1,400 tpy CO_2e; Mixed-use: 3,000 tpy CO_2e. If a project's GHG emissions exceed the GHG screening threshold, the project would move to Tier 4.

Tier 4 establishes a decision tree approach that includes compliance options for projects that have incorporated design features into the project and/or implement GHG mitigation measures. For 2020, the Efficiency Target (2020 Targets) are as follows:

- 4.8 mt CO_2e per SP for project level threshold (land use emissions only) and total residual emissions not to exceed 25,000 million tons per year (mty) CO_2e
- 6.6 mt CO_2e per SP for plan level threshold (all sectors)

For 2035, the Efficiency Target (2035 Targets) are as follows:

- 3.0 mt CO_2e per SP for project level threshold
- 4.1 mt CO_2e per SP for plan level threshold

If a project fails to meet any of these emissions efficiency targets, the project would move to Tier 5.

Tier 5 would require projects that implement off-site GHG mitigation that includes purchasing offsets to reduce GHG emission impacts to purchase sufficient offsets for the life of the project (30 years) to reduce GHG emissions to less than the applicable GHG screening threshold level.

This analysis analyzes whether the project's GHG emissions should be considered cumulatively significant based on the following:

- Hinder attainment of the State's goals of reducing GHG emissions to 1990 levels by 2020, as stated in the Global Warming Solutions Act of 2006. A project may be considered to help attainment of the State's goals by being consistent with an adopted Statewide 2020 GHG emissions limit or the plans, programs, and regulations adopted to implement the Global Warming Solutions Act of 2006.
- Fail to achieve increased energy efficiency or reduce overall GHG emissions from an existing facility.
- Significantly increase the consumption of fuels or other energy resources, especially fossil fuels that contribute to GHG emissions when consumed.

The analysis uses compliance with AB 32, considered a "previously approved mitigation program," as set forth in the CEQA Guidelines §15064(h)(3), to determine if the project's incremental contribution of GHGs is a cumulatively considerable contribution to global climate change. The OPR's proposed draft amendment to Section 15064.7 of the CEQA Guidelines reinforces the use of this approach. CEQA Guideline Section 15064(h)(3) states three main conditions that a plan must meet to be sufficient for use as a basis for determining significance of GHG emissions. The plan must:

1. Be "a previously approved plan or mitigation program";
2. Provide "specific requirements that will avoid or substantially lessen the cumulative problem"; and
3. Be specified in law or adopted by the public agency with jurisdiction over the affected resources through a public review process to implement, interpret, or make specific the law enforced or administered by the public agency.

AB 32 meets conditions one and three provided above. Accordingly, in addition to determining whether the project's GHG emissions exceed the SCAQMD's interim industrial section stationary source threshold, to determine the significance of the project GHG emission impact on climate change, consistency or inconsistency with the reduction targets in AB 32 is also evaluated. To do so, project features that implement specific reduction measures identified in the rules and regulations that implement AB 32 were evaluated.

4.3.4 Thresholds of Significance

Based on Appendix G of the *CEQA Guidelines*, climate change/greenhouse gas emissions impacts would occur if the proposed project would:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; and/or
- Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.

Global climate change may result in significant adverse effects to the environment that will be experienced worldwide, with some specific effects observed in California. AB 32 requires statewide GHG emissions reductions to 1990 levels by 2020. Although these statewide reductions are now mandated by law, no generally applicable GHG emission threshold has yet been established.

State CEQA Guidelines Section 15064(b) provides that "…the determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data," and further, that an "ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting." The *State CEQA Guidelines* further indicate that even when thresholds are established, they may include "identifiable quantitative, qualitative or performance level of a particular environmental effect" (*State CEQA Guidelines*, Section 15064.7).

Some policymakers and regulators suggest that a zero emissions threshold would be appropriate when evaluating GHGs and their potential effect on climate change. Such a rule appears inconsistent with the State's approach to mitigation of climate change impacts. AB 32 does not prohibit all new GHG emissions; rather, it requires a reduction in Statewide emissions to a given level. Thus, AB 32 recognizes that GHG emissions will continue to occur; increases will result from certain activities, but reductions must occur elsewhere.

Individual projects incrementally contribute toward the potential for global climate change on a cumulative basis in concert with all other past, present, and probable future projects. While individual projects are unlikely to measurably affect global climate change, each of these projects incrementally contributes toward the potential for global climate change on a cumulative basis, in concert with all other past, present, and probable future projects. This analysis analyzes whether the project's emissions should be considered cumulatively significant.

In order to evaluate the significance of a proposed project's environmental impacts related to GHG emissions, it is necessary to identify quantitative or qualitative thresholds which, if exceeded, would constitute a finding of significance. As previously described, while project-related GHG emissions can be estimated the direct impact of such emissions on climate change and global warming cannot be determined on the basis of available science. There is no evidence at this time that the proposed project would directly affect global climate change. SCAQMD has adopted a quantitative GHG emission significance threshold to assess direct impacts from industrial projects where SCAQMD is the lead agency. SCAQMD and other air quality agencies agree that GHG and climate change should be assessed as a potentially significant cumulative impact rather than a project-specific impact. SCAQMD is considering the adoption of a numeric plan-level efficiency target of 6.6 $MTCO_2E$ per service population.

Currently, there is no adopted threshold of significance for determining the cumulative significance of a project's GHG emissions on global climate change. In the most recent IPCC Assessment Report (IPCC 2007b, Synthesis Report), the IPCC acknowledges that man-made warming and sea level rise would continue for centuries due to the time scales associated with climate processes and feedback even if GHG concentration were to be stabilized. The IPCC further found that both past and future man-made CO_2 emissions will continue to contribute to warming and sea level rise for more than a

millennium, due to the time scales required for the removal of CO_2 from the atmosphere. Furthermore, the IPCC assessment noted that the definition of what is a danger man-made interference with the climate system and, consequently, the limits to be set for policy purposes are complex tasks that can only be partially based on science, as such definitions inherently involve normative judgments (IPCC 2007b – Working Group III).

Based on the information presented above, for the purpose of this analysis implementation of the proposed project may have a significant adverse impact on GHG emissions if it would result in any of the following:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment based on any applicable threshold of significance.
- Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.

4.3.5 Less than Significant Impacts

The following impacts were determined to be less than significant. For each of the following issues either no impact would occur (therefore, no mitigation would be required) or adherence to established regulations, standards and policies would reduce potential impacts to a less than significant level.

4.3.5.1 Greenhouse Gas Plan, Policy, Regulation Consistency

Threshold	Would the proposed project conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?

The CAT and the CARB have developed several reports to achieve the Governor's GHG targets that rely on voluntary actions of California businesses, local government and community groups, and State incentive and regulatory programs. These include the CAT's 2006 "Report to Governor Schwarzenegger and the Legislature," the CARB's 2007 "Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California," and the CARB's "Climate Change Proposed Scoping Plan: a Framework for Change."

The reports identify strategies to reduce California's emissions to the levels proposed in Executive Order S-3-05 and AB 32 (i.e., 29 percent below existing "business as usual" emissions) that are applicable to proposed project. Table 4.3.B presents the applicable Recommended Actions (qualitative measures) identified to date by CARB in its Climate Change Proposed Scoping Plan and whether or not the proposed project is consistent with the applicable Recommended Actions.

Table 4.3.B: Proposed Scoping Plan Recommended Actions for Climate Change

ID No.	Sector	Strategy Name	Applicable to Project?	Will Project Conflict With Implementation?
T-1	Transportation	Pavley I and II – Light-Duty Vehicle GHG Standards	Yes	No
T-2	Transportation	Low Carbon Fuel Standard (Discrete Early Action)	Yes	No
T-3	Transportation	Regional Transportation-Related GHG Targets	Yes	No
T-4	Transportation	Vehicle Efficiency Measures	Yes	No
T-5	Transportation	Ship Electrification at Ports (Discrete Early Action)	No	No

Table 4.3.B: Proposed Scoping Plan Recommended Actions for Climate Change

ID No.	Sector	Strategy Name	Applicable to Project?	Will Project Conflict With Implementation?
T-6	Transportation	Goods-movement Efficiency Measures	No	No
T-7	Transportation	Heavy Duty Vehicle Greenhouse Gas Emission Reduction Measure – Aerodynamic Efficiency (Discrete Early Action)	No	No
T-8	Transportation	Medium and Heavy-Duty Vehicle Hybridization	No	No
T-9	Transportation	High Speed Rail	No	No
E-1	Electricity and Natural Gas	Increased Utility Energy Efficiency Programs. More Stringent Building and Appliance Standards	Yes	No
E-2	Electricity and Natural Gas	Increased Combined Heat and Power Use by 30,000 GWh	No	No
E-3	Electricity and Natural Gas	Renewable Portfolio Standard	No	No
E-4	Electricity and Natural Gas	Million Solar Roofs	No	No
CR-1	Electricity and Natural Gas	Energy Efficiency	No	No
CR-2	Electricity and Natural Gas	Solar Water Heating	No	No
GB-1	Green Buildings	Green Buildings	Yes	No
W-1	Water	Water Use Efficiency	Yes	No
W-2	Water	Water Recycling	No	No
W-3	Water	Water System Energy Efficiency	No	No
W-4	Water	Reuse Urban Runoff	No	No
W-5	Water	Increase Renewable Energy Production	No	No
W-6	Water	Public Goods Charge (Water)	No	No
I-1	Industry	Energy Efficiency and Co=Benefits Audits for Large Industrial Sources	No	No
I-2	Industry	Oil and Gas Extraction GHG Emission Reduction	No	No
I-3	Industry	GHG Leak Reduction from Oil and Gas Transmission	No	No
I-4	Industry	Refinery Flare Recovery Process Improvements	No	No
I-5	Industry	Removal of Methane Exemption from Existing Refinery Regulations	No	No
RW-1	Recycling and Waste Management	Landfill Methane Control (Discrete Early Action)	No	No
RW-2	Recycling and Waste Management	Additional Reduction in Landfill Methane – Capture Improvements	No	No

Table 4.3.B: Proposed Scoping Plan Recommended Actions for Climate Change

ID No.	Sector	Strategy Name	Applicable to Project?	Will Project Conflict With Implementation?
RW-3	Recycling and Waste Management	High Recycling/Zero Waste	No	No
F-1	Forestry	Sustainable Forest Target	No	No
H-1	High Global Warming Potential Gases	Motor Vehicle Air Conditioning Systems (Discrete Early Action)	No	No
H-2	High Global Warming Potential Gases	SF_6 Limits in Non-Utility and Non-Semiconductor Manufacturing (Discrete Early Action)	No	No
H-3	High Global Warming Potential Gases	Reduction in Perfluorocarbons in Semiconductor Manufacturing (Discrete Early Action)	No	No
H-4	High Global Warming Potential Gases	Limit High GWP Use in Consumer Products (Discrete Early Action, Adopted June 2008)	No	No
H-5	High Global Warming Potential Gases	High GWP Reduction from Mobile Sources	No	No
H-6	High Global Warming Potential Gases	High GWP Reductions from Stationary Sources	No	No
H-7	High Global Warming Potential Gases	Mitigation Fee on High GWP Gases	No	No
A-1	Agriculture	Methane Capture at Large Dairies	No	No

Source: LSA Associates, Inc., December 2011.

As identified in Table 4.3.B, of the 39 Recommended Actions, the applicable Recommended Actions are those that are within the Transportation, Electricity and Natural Gas, Green Buildings, and Water sectors.

Applicable Recommended Actions in the Transportation sector include Actions T-1 through T-4. Action T-1 involves improvements to light-duty vehicle technology for the purposes of reducing GHG emissions through focusing on legislating improved controls for vehicle manufacturers. This Action would not generally be considered applicable to the proposed project; however, vehicles utilized by the proposed project would be subject to these standards, as applicable, and would be consistent with this Action. Action T-2 involves implementation of a low carbon fuel standard. In order to reduce the carbon intensity of transportation fuels, CARB is developing a Low Carbon Fuel Standard (LCFS), which would reduce the carbon intensity of California's transportation fuels by at least ten percent by 2020 as called for by Governor Schwarzenegger in Executive Order S-01-07. While implementation of this standard is not within the purview of a development project, a land use such as that proposed under the proposed project would be a substantial consumer of fuels for its vehicle fleet. Vehicles utilized by the proposed project would be subject to these standards, as applicable, and would be consistent with this Action.

Action T-3 addresses regional transportation targets for reducing GHG emissions. The intent of the proposed project is to reduce vehicle miles travelled within the region by reducing trip lengths and providing a sustainable community. The actions associated with implementation of the proposed project would allow for warehousing uses to be clustered around other industrial and commercial

uses and would encourage a reduction of vehicle miles traveled within the City. Action T-4 concerns vehicle efficiency measures such as the promotion of sustainable tire practices. CARB is pursuing a regulation to ensure that tires are properly inflated when vehicles are serviced. In addition, the California Energy Commission in consultation with the California Integrated Waste Management Board is developing an efficient tire program focusing first on data gathering and outreach, then on potential adoption of minimum fuel-efficient tire standards, and on the development of consumer information requirements for replacing tires. While implementation of this standard is not within the purview of a development project, a land use such as that proposed under the proposed project would be a contributor of vehicle miles travelled. Vehicles utilized by the proposed project would be subject to these standards, as applicable, and would be consistent with this Action.

Applicable Recommended Actions in the Energy and Natural Gas sector includes Action E-1. Action E-1, together with Action GB-1 (Green Building), aims to reduce electricity demand by increased efficiency of Utility Energy Programs and adoption of more stringent building and appliance standards. Elements of this action include encouraging construction of zero net energy (ZNE) buildings and implementation of passive solar design. In addition to employing on-site electricity generation, a ZNE building must either replace natural gas with renewable energy for space and water heating, or compensate for natural gas use by generating surplus electricity for sale on the State's electricity grid. The proposed project is required to comply with the 2008 Title 24 Energy Efficiency Standards and applicable Green Building Standards; therefore, the proposed project would not conflict with these Actions.

Applicable Recommended Actions in the Water sector includes Action W-1. Action W-1, Water Use Efficiency, involves the reduction in the energy consumption used to convey, treat, distribute and use water and wastewater. Increasing the efficiency of water transport and reducing water use would reduce GHG emissions. The proposed project would install water-efficient fixtures and appliances and would not conflict with this Action.

GHG emissions reduction strategies were also set forth in the 2006 Climate Action Team (CAT) Report, and the strategies included in the CAT Report that apply to the project are contained in Table 4.3.C, which also summarizes the extent to which the project would comply with the strategies to help California reach the emission reduction targets. The strategies listed in Table 4.3.C are addressed as either part of the project, required mitigation measures, or requirements under local or State ordinances.

Table 4.3.C: Project Compliance with Greenhouse Gas Emission Reduction Strategies

Strategy	Project Compliance
Mandatory Code	
California Green Building Code. The Cal Green Code prescribes a wide array of measures that would directly and indirectly result in reduction of GHG emissions from the Business as Usual Scenario (California Building Code). The mandatory measures that are applicable to nonresidential projects include site selection, energy efficiency, water efficiency, materials conservation and resource efficiency, and environmental quality measures.	**Compliant.** The project would be required to adhere to the nonresidential mandatory measures as required by the Cal Green Code.
Energy Efficiency Measures	
Energy Efficiency. Maximize energy efficiency building and appliance standards, and pursue additional efficiency efforts including new technologies, and new policy and implementation mechanisms. Pursue comparable investment in energy efficiency from all retail providers of electricity in California (including both investor-owned and publicly owned	**Compliant with Mitigation Incorporated.** The proposed project will comply with the updated Title 24 standards, including the new 2010 California Building Code (CBC), for building construction if any building interior improvements are required. In addition, the project would be required to comply with the requirements of Minimization Measure GCC-1,

Table 4.3.C: Project Compliance with Greenhouse Gas Emission Reduction Strategies

Strategy	Project Compliance
utilities).	identified later, including measures to incorporate energy efficient building design features.
Renewables Portfolio Standard. Achieve a 33 percent renewable energy mix statewide.	
Green Building Strategy. Expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings.	
Water Conservation and Efficiency Measures	
Water Use Efficiency. Continue efficiency programs and use cleaner energy sources to move and treat water. Approximately 19 percent of all electricity, 30 percent of all natural gas, and 88 million gallons of diesel are used to convey, treat, distribute and use water and wastewater. Increasing the efficiency of water transport and reducing water use would reduce GHG emissions.	**Compliant with Mitigation Incorporated.** The project would be required to comply with the requirements of Minimization Measure GCC-1, identified later, including measures to increase water use efficiency.
Solid Waste Reduction Measures	
Increase Waste Diversion, Composting, and Commercial Recycling, and Move Toward Zero-Waste. Increase waste diversion from landfills beyond the 50 percent mandate to provide for additional recovery of recyclable materials. Composting and commercial recycling could have substantial GHG reduction benefits. In the long term, zero waste policies that would require manufacturers to design products to be fully recyclable may be necessary.	**Compliant with Mitigation Incorporated.** Data available from the California Integrated Waste Management Board (CIWMB) indicates that the City of Moreno Valley has not achieved the 50 percent diversion rate. The proposed project would be required to comply with Mitigation Measure **4.3.6.1B**, identified later, including measures to increase solid waste diversion and recycling.
Transportation and Motor Vehicle Measures	
Vehicle Climate Change Standards. AB 1493 (Pavley) required the State to develop and adopt regulations that achieve the maximum feasible and cost effective reduction of GHG emissions from passenger vehicles and light-duty trucks. Regulations were adopted by the ARB in September 2004.	**Compliant.** The project does not involve the manufacture of vehicles. However, vehicles that are purchased and used within the project site would comply with any vehicle and fuel standards that the ARB adopts.
Light-Duty Vehicle Efficiency Measures. Implement additional measures that could reduce light-duty GHG emissions. For example, measures to ensure that tires are properly inflated can both reduce GHG emissions and improve fuel efficiency.	
Adopt Heavy- and Medium-Duty Fuel and Engine Efficiency Measures. Regulations to require retrofits to improve the fuel efficiency of heavy-duty trucks that could include devices that reduce aerodynamic drag and rolling resistance. This measure could also include hybridization of and increased engine efficiency of vehicles.	
Low Carbon Fuel Standard. ARB identified this measure as a Discrete Early Action Measure. This measure would reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020.	
Regional Transportation-Related Greenhouse Gas Targets. Develop regional GHG emissions reduction targets for passenger vehicles. Local governments will play a significant role in the regional planning process to reach passenger vehicle GHG emissions reduction	**Compliant.** Specific regional emission targets for transportation emissions do not directly apply to this project; regional GHG reduction target development is outside the scope of this project. The project will comply with any plans developed by the City.

Table 4.3.C: Project Compliance with Greenhouse Gas Emission Reduction Strategies

Strategy	Project Compliance
targets. Local governments have the ability to directly influence both the siting and design of new residential and commercial developments in a way that reduces GHGs associated with vehicle travel.	
Measures to Reduce High Global Warming Potential (GWP) Gases. ARB has identified Discrete Early Action measures to reduce GHG emissions from the refrigerants used in car air conditioners, semiconductor manufacturing, and consumer products. ARB has also identified potential reduction opportunities for future commercial and industrial refrigeration, changing the refrigerants used in auto air conditioning systems, and ensuring that existing car air conditioning systems do not leak.	**Compliant.** New products used or serviced on the project site (after implementation of the reduction of GHG gases) would comply with future ARB rules and regulations.

Source: LSA Associates, Inc., December 2011.
AB = Assembly Bill
ARB = California Air Resources Board
GHG = greenhouse gas

As previously identified, implementation of the proposed project could result in the development an approximately 1,616,133 square foot distribution warehouse. The proposed project includes a variety of physical attributes and operational programs that would generally contribute to a reduction in operational-source pollutant emissions including GHG emissions. As identified in Table 4.3.C, future development that would occur under the proposed project would be consistent with greenhouse gas emission reduction strategies and policies. The project would implement appropriate GHG reduction strategies and would ensure that it does not conflict with or impede implementation of reduction goals identified in AB 32, Governor's Executive Order S-3-05, and other strategies to help reduce GHGs to the level proposed by the Governor. In addition, the project would also be subject to all applicable regulatory requirements, which would also reduce the GHG emissions of the project. Therefore, the proposed project would not conflict with any applicable plan, program, policy, or regulation related to the reduction of GHG emissions. Impacts are considered less than significant.

4.3.6 Significant Impacts

The following impact was determined to be potentially significant and mitigation measures have been recommended to reduce the significance of the identified impact.

4.3.6.1 Greenhouse Gas Emissions

Impact 4.3.6.1: *Implementation of the proposed project may have the potential to emit GHG emissions in excess of interim thresholds.*

Threshold	Would the proposed project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Future development that could occur within the proposed project site could generate GHG emissions during construction and operation activities. It is anticipated that the majority of energy consumption (and associated generation of GHG emissions) would occur during the project's operation (as opposed to its construction). Typically, more than 80 percent of the total energy consumption takes place during the use of buildings and less than 20 percent is consumed during construction.[1] As of

[1] United Nations Environment Programme (UNEP), 2007. *Buildings and Climate Change: Status, Challenges and Opportunities*, Paris, France.

yet, there is no study that quantitatively assesses all of the GHG emissions associated with each phase of the construction and use of an individual development.

The following activities are associated with the proposed project and could directly or indirectly contribute to the generation of GHG emissions:

- **Removal of Vegetation:** The net removal of vegetation for construction results in a loss of the carbon sequestration in plants. However, planting of additional vegetation would result in additional carbon sequestration and would lower the carbon footprint of the project.
- **Construction Activities:** During construction of the project, GHGs would be emitted through the operation of construction equipment and from worker and builder supply vendor vehicles, each of which typically uses fossil-based fuels to operate. The combustion of fossil-based fuels creates GHGs such as CO_2, CH_4, and N_2O. Furthermore, CH_4 is emitted during the fueling of heavy equipment.
- **Gas, Electric, and Water Use:** Natural gas use results in the emissions of two GHGs: CH_4 (the major component of natural gas) and CO_2 from the combustion of natural gas. Electricity use can result in GHG production if the electricity is generated by combusting fossil fuel. California's water conveyance system is energy-intensive. Preliminary estimates indicate that the total energy used to pump and treat this water exceeds 6.5 percent of the total electricity used in the State per year.[1]
- **Solid Waste Disposal:** Solid waste generated by the project could contribute to GHG emissions in a variety of ways. Landfilling and other methods of disposal use energy for transporting and managing the waste, and they produce additional GHGs to varying degrees. Landfilling, the most common waste management practice, results in the release of CH_4 from the anaerobic decomposition of organic materials. CH_4 is 25 times more potent than CO_2. However, landfill CH_4 can also be a source of energy. In addition, many materials in landfills do not decompose fully, and the carbon that remains is sequestered in the landfill and not released into the atmosphere.
- **Motor Vehicle Use:** Transportation associated with the proposed project would result in GHG emissions from the combustion of fossil fuels in daily automobile and truck trips.

The proposed project was analyzed for the potential construction of the project's proposed land uses, water, sewer, and drainage infrastructure, and roadways. Implementation of the proposed project would result in the development of a 1,616,133 square foot distribution warehouse building. Table 4.3.D provides the GHG emissions that could be generated during construction activities on the project site.

Table 4.3.D: Short-Term Regional GHG Construction Emissions

Construction Phase	Total Regional Pollutant Emissions, lbs/day					
	Bio-CO_2	NBio-CO_2	Total -CO_2	CH_4	N_2O	CO_2e
Site Preparation	0	56,000	56,000	2.4	0	56,000
Grading	0	38,000	38,000	1.9	0	38,000
Building Construction	0	19,000	19,000	1.1	0	19,000
Architectural Coating	0	3,100	3,100	0.51	0	3,100
Paving	0	1,700	1,700	0.12	0	1,700

Bio-CO_2 = biologically generated CO_2
NBio-CO_2 = non-biologically generated CO_2
CH_4 = methane
CO_2e = carbon dioxide equivalent
CO_2 = carbon dioxide
N_2O = nitrous oxide
Source: LSA Associates, Inc., December 2011.

[1] California Energy Commission (CEC), 2004. *Water Energy Use in California* (online information sheet) Sacramento, CA, August 24. Website: energy.ca.gov/pier/iaw/industry/water.html. Accessed July 24, 2007.

GHG emissions that could be generated on the proposed project site would occur over the short term from construction activities, consisting primarily of emissions from equipment exhaust. There would also be long-term regional emissions associated with project-related vehicular trips and stationary source emissions, such as natural gas used for heating. Preliminary guidance from OPR and recent letters from the Attorney General critical of CEQA documents that have taken different approaches indicate that lead agencies should calculate, or estimate, emissions from vehicular traffic, energy consumption, water conveyance and treatment, waste generation, and construction activities. The calculation presented below in Table 4.3.E, includes operational emissions in terms of CO_2 and annual carbon dioxide equivalent (CO_2e) GHG emissions from increased energy consumption, water usage, solid waste disposal, and estimated GHG emissions from vehicular traffic that could result from the development of the project site. Calculations and model run sheets for greenhouse gas emissions are provided in Appendix D of this EIR.

Table 4.3.E: Long-Term Regional GHG Operational Emissions

Construction Phase	Total Regional Pollutant Emissions, lbs/day					
	Bio-CO_2	NBio-CO_2	Total -CO_2	CH_4	N_2O	CO_2e
Construction emissions amortized over 30 years	0	95	95	0.0063	0	95
Area	0	0	0	0	0	0
Energy	0	1,500	1,500	0.06	0.03	1,500
Mobile	0	34,000	34,000	1.1	0	34,000
Waste	3,500	0	3,500	210	0	7,900
Water	0	63	63	0.25	0.01	71
Total Project Emissions	**3,500**	**35,658**	**39,158**	**211.47**	**0.04**	**43,566**

Bio-CO_2 = biologically generated CO_2
NBio-CO_2 = non-biologically generated CO_2
CH_4 = methane
CO_2e = carbon dioxide equivalent
CO_2 = carbon dioxide
N_2O = nitrous oxide
Source: LSA Associates, Inc., July 2011.

As identified in Table 4.3.E, the proposed project would produce approximately 44,000 metric tpy of CO_2e, which is 0.044 $MMTCO_2e/yr$. This includes the short-term construction emissions amortized over 30 years, as directed by the SCAQMD. As a comparison, the existing emissions from the entire Southern California Association of Governments (SCAG) region are estimated to be approximately 176.79 $MMTCO_2e/yr$ and approximately 478 $MMTCO_2e/yr$ for the entire State.

Area sources of GHG emissions include carpet systems, resilient flooring, composite wood, consumer products, and landscaping. The project would not result in measurably increased GHG emissions from area sources due to the anticipated light use of consumer products and landscaping.

Buildings represent 39 percent of the United States' primary energy usage and 70 percent of electricity consumption. The proposed project would increase the demand for electricity and natural gas due to the increased building area. The project would indirectly result in increased GHG emissions from off-site electricity generation at power plants and on-site natural gas consumption (1,500 metric tons of CO_2e/year).

Mobile sources (vehicle trips and associated miles traveled) are the largest source of GHG emissions in California and represent approximately 38 percent of annual CO_2 emissions generated in the State. Like most land use development projects, vehicle miles traveled (VMT) is the most direct indicator of CO_2 emissions from the proposed project, and associated CO_2 emissions function as the best indicator of total GHG emissions. The emissions from vehicle exhaust would comprise approximately 77 percent of the project's total CO_2e emissions. The emissions from vehicle exhaust are controlled by the State and federal governments and are outside the control of the City.

The proposed project would also generate solid waste during the operation phase of the project. The project would indirectly result in increased GHG emissions from solid waste treatment at treatment plants (7,900 metric tons of CO_2e/year).

Water-related energy use consumes 19 percent of California's electricity every year. Energy use and related GHG emissions are based on electricity used for water supply and conveyance, water treatment, water distribution, and wastewater treatment (1.3 metric tons of CO_2e/year). The project would comply with provisions of the California Green Building Code and would install water efficient fixtures such that it would experience reduction of indoor potable water use by 20 percent from what is required in the California Buildings Standards Code. In addition, the outdoor water use would be monitored by irrigation controls as prescribed in the Cal Green Building Code. The project would indirectly result in increased GHG emissions from water transport and treatment (71 metric tons of CO_2e/year).

The project will comply with existing State and federal regulations regarding the energy efficiency of buildings, appliances, and lighting, which will reduce the project's electricity demand compared to older buildings. The warehouse building will be built in compliance with the new 2010 California Building Code (CBC) to improve public health, safety, and general welfare by enhancing the design and construction of buildings through the use of building concepts having a positive environmental impact and encouraging sustainable construction practices.

Comparing the proposed project to the SCAQMD tiered interim GHG significance criteria; it is not exempt as described in Tier 1. Considering the Tier 2 criteria, the levels of GHG emissions shown in Table 4.3.E, at approximately 0.009 percent of the State GHG emissions, are unlikely to result in GHG emission levels that would substantially conflict with implementation of the GHG reduction goals under AB 32 or other State regulations. The CAT and the ARB have developed several reports to achieve the Governor's GHG targets that rely on voluntary actions of California businesses, local government and community groups, and State incentive and regulatory programs. These include the CAT's 2006 "*Report to Governor Schwarzenegger and the Legislature*," ARB's 2007 "*Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California,*" and ARB's "*Climate Change Proposed Scoping Plan: a Framework for Change."*

The reports identify strategies to reduce California's emissions to the levels proposed in EO S-3-05 and AB 32 that are applicable to the proposed project. The Proposed Scoping Plan is the most recent document, and the strategies included in the Scoping Plan that apply to the project are contained in Table 4.3.C, which also summarizes the extent to which the project would comply with the strategies to help California reach the emission reduction targets. Thus, this project complies with Tier 2 of the SCAQMD tiered interim GHG significance thresholds.

With implementation of these strategies/measures, the project's contribution to cumulative GHG emissions would be reduced. In order to ensure that the proposed project complies with and would not conflict with or impede the implementation of reduction goals identified in AB 32, the Governor's EO S-3-05, and other strategies to help reduce GHGs to the level proposed by the Governor, **Mitigation Measures 4.3.6.1A** through **4.3.6.1C** will be implemented. Many of the individual elements of this measure are already included as part of the proposed project or are required as part of project specific mitigation measures.

Mitigation Measures. Previously referenced **Mitigation Measures 4.2.6.3A** and **4.2.6.3B** were introduced to reduce project air pollution emissions. These measures will also reduce the project's greenhouse gas emissions. To ensure that the proposed project's emissions of GHG are reduced to a less than significant level, the following additional mitigation measures shall be implemented.

4.3.6.1A Prior to the issuance of building permits, the project applicant shall provide evidence to the City of Moreno Valley that building features have been incorporated in building plans

as required by Title 24 of the California Code of Regulations. These features include but are not limited to the following:

- Exterior windows shall utilize window treatments for efficient energy conservation.
- Per CALGreen Code requirements, water-efficient fixtures and appliances, including but not limited to low-flow faucets, dual-flush toilets minimizing water consumption by 20 percent from the Building Standards Code baseline water consumption shall be used.
- Per CALGreen Code requirements, a Commissioning Plan shall be prepared and all building systems (e.g., heating, ventilation, and air-conditioning [HVAC], irrigation systems, lighting, water heating) shall be commissioned by the Commissioning Authority.
- Per CALGreen Code, restrict watering methods (e.g., prohibit systems that apply water to non-vegetated surfaces) and control runoff.

4.3.6.1B Prior to the issuance of building permits, the project applicant shall provide evidence to the City of Moreno Valley that the following measures have been be incorporated into the design and construction of the project:

- Use locally produced and/or manufactured building materials for at least 10 percent of the construction materials used for the project.
- Use "Green Building Materials," such as those materials that are resource efficient, and recycled and manufactured in an environmentally friendly way, for at least 10 percent of the project.
- Limit unnecessary idling of construction equipment. A reduction in equipment idling would reduce fuel consumption, and therefore, GHG emissions.
- Maximize the use of electricity from the power grid by replacing diesel- or gasoline-powered equipment. This would reduce GHG emissions because electricity can be produced more efficiently at centralized power plants.
- Design the project building to exceed the California Building Code's (CBC) Title 24 energy standard, including, but not limited to, any combination of the following:
    - Increase insulation such that heat transfer and thermal bridging is minimized.
    - Limit air leakage through the structure or within the heating and cooling distribution system to minimize energy consumption.
    - Incorporate ENERGY STAR or better rated windows, space heating and cooling equipment, light fixtures, appliances, or other applicable electrical equipment.
- Provide a landscape and development plan for the project that takes advantage of shade, prevailing winds, and landscaping.
- Install efficient lighting and lighting control systems. Use daylight as an integral part of the lighting systems in buildings.
- Install light-colored "cool" roof and cool pavements.
- Install energy-efficient heating and cooling systems, appliances and equipment, and control systems.
- Install solar or light-emitting diodes (LEDs) for outdoor lighting.

4.3.6.1C Prior to the issuance of occupancy permits, the project applicant shall provide evidence to the City of Moreno Valley that the following measures have been be incorporated into the operation of the project:

- The project applicant shall use less than 3,900 Global Warming Potential (GWP) hydrofluorocarbon (HCF) refrigerants or natural refrigerants (ammonia, propane, carbon dioxide [CO_2]) for refrigeration and fire suppression equipment.
- Provide vegetative or man-made exterior wall shading devices for east-, south-, and west facing walls with windows.
- Devise a comprehensive water conservation strategy appropriate for the project and its location. The strategy may include the following, plus other innovative measures that may be appropriate:
    - Install drought tolerant plants for landscaping.
    - Use reclaimed water for landscape irrigation within the project. Install the infrastructure to deliver and use reclaimed water.
    - Install water-efficient irrigations systems, such as weather-based and soil-moisture-based irrigation controllers and sensors for landscaping according to the California Department of Water Resources Model Efficient Landscape Ordinance.
- Provide employee education about reducing waste and available recycling services.

Level of Significance After Mitigation. The mitigation measures identified above would contribute to a reduction in GHG emissions from energy, mobile, and water usage sources. With implementation of the identified mitigation measures, the proposed project's GHG emissions are reduced. As described above, project-related GHG emissions are not confined to a particular air basin but are dispersed worldwide. Consequently, it is speculative to determine how project-related GHG emissions would contribute to global climate change and how global climate change may impact the State. Therefore, project-related GHG emissions are not project-specific impacts to global warming but are instead the project's contribution to this cumulative impact. As stated previously, project-related GHG emissions and their contribution to global climate change impacts in the State are less than significant and less than cumulatively considerable because: (1) the project's impacts alone would not cause or significantly contribute to global climate change, and (2) the project has no substantial effect on consumption of fuels or other energy resources, especially fossil fuels that contribute to GHG emissions when consumed.

4.3.7 Cumulative Impacts

Given the findings of AB 32, of SB 97, and the requirements of CEQA, the Lead Agency must determine whether a project will or will not have a cumulatively considerable contribution. Due to the lack of guidance for determining the significance of cumulative impacts to climate change from projects, and out of an overabundance of caution, the project has been evaluated to determine whether emissions of greenhouse gases have been minimized to the extent feasible with current technology and measures.

While it is not possible to determine whether the project individually will have a significant impact on global warming or climate change, it will contribute to cumulative GHG emissions in California. Cumulatively, the build out of the proposed project would contribute approximately 0.044 metric tons of CO_2e per year, which is 0.009 percent of California's existing total emissions for carbon dioxide, methane, and nitrous oxide (478 metric tons of CO_2e per year). The mitigation measures discussed above will likely reduce the project's emissions of greenhouse gases; however, without the necessary science and analytical tools, it is not possible to determine with certainty whether the project's emissions of greenhouse gases will be cumulatively considerable, within the meaning of *CEQA Guidelines* Sections 15065(a)(3) and 15130. The CARB is currently in the process of designing

regulations to monitor, limit, and ultimately reduce California GHG emissions but there are as yet no adopted standards for assessing the significance of cumulative impacts from projects.

Cumulatively, the emissions from electricity production would comprise approximately 3.4 percent of the project's total CO_2e emissions. Water usage and solid waste disposal emissions comprise approximately 18 percent of the project's total CO_2e emissions while the emissions from vehicle exhaust would comprise approximately 77 percent of the project's total CO_2e emissions. The emissions from vehicle exhaust are controlled by the State and Federal governments and are outside the control of the City. The remaining CO_2e emissions are primarily associated with building systems. The proposed project is required to comply with existing State and Federal regulations regarding the energy efficiency of buildings, appliances, and lighting, which would reduce the project's electricity demand. The new buildings constructed in accordance with current energy efficiency standards would be more energy efficient than older buildings.

With implementation of the strategies and programs described previously, the project is consistent with the strategies to reduce California's emissions to the levels proposed in Executive Order S-3-05. However, given the uncertainty of data and appropriate methodology to accurately analyze, and the inability to quantify the reduction achieved through implementation of strategies and programs previously identified, the proposed project's GHG emission contribution would result in a cumulative impact regarding global climate change and the cumulative impacts of the proposed project on global climate change are considered to be significant and unavoidable.

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4.4 NOISE

This analysis is intended to satisfy the City's requirements for a project-specific noise impact analysis by examining the short-term and long-term noise impacts of the proposed project on sensitive uses adjacent to the proposed project site and by evaluating the effectiveness of mitigation measures incorporated as part of the project design. This includes the potential for the proposed project to result in impacts associated with a substantial temporary and/or permanent increase in ambient noise levels in the vicinity of the project area; exposure of people to excessive noise levels, groundborne vibration, or groundborne noise levels. The analysis contained in this section is based on a comprehensive *Noise Impact Analysis* contained in Appendix E (LSA Associates, Inc., December 2011), which examines existing ambient noise conditions and project-related impacts.

4.4.1 Existing Setting

4.4.1.1 Background

Characteristics of Sound. Noise is usually defined as unwanted sound; it consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep. To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is generally an annoyance, while loudness can affect our ability to hear. The analysis of a project's noise impact defines the noise environment of the project area in terms of sound intensity and its effect on adjacent sensitive land uses.

Measurement of Sound. There are many ways to rate sound for various time periods. An appropriate rating of ambient noise[1] affecting humans accounts for the annoying effects of sound by penalizing noises that occur during quiet periods of time, such as late night/early morning, through weighted averaging metric. Single-event or peak noises are measured by a simple peak noise measurement. Equivalent continuous sound level (L_{eq}) is the total sound energy of time varying noise over a sample period. However, the predominant rating scales for human communities in the State of California are the L_{eq} and community noise equivalent level (CNEL) or the day-night average level (L_{dn}) based on A-weighted decibels (dBA). CNEL is the time varying noise over a 24-hour period, with a five dBA weighting factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and a 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale, but without the adjustment for events occurring during the evening hours. CNEL and L_{dn} are within one dBA of each other and are normally exchangeable.

Other noise rating scales of importance when assessing the annoyance factor include the maximum noise level (L_{max}), which is the highest exponential time averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis for short-term noise impacts are specified in terms of maximum levels denoted by L_{max}, which reflects peak operating conditions and addresses the annoying aspects of intermittent noise. It is often used together with another noise scale, or noise standards in terms of percentile noise levels, in noise ordinances for enforcement purposes. For example, the L_{10} noise level represents the noise level exceeded 10 percent of the time during a stated period. The L_{50} noise level represents the median noise level. Half the time the noise level exceeds this level, and half the time it is less than this level. The L_{90} noise level represents the noise level exceeded 90 percent of the time and is considered the background noise level during a monitoring period. For a relatively constant noise source, the L_{eq} and L_{50} are approximately the same. Table 4.4.A defines noise measurements that are typically used in noise analyses.

[1] Ambient noise is the totality of noise in a given place and time; usually a composite of sounds from varying sources at varying distances. Ambient sounds generally range from 30 dBA (very quiet) to 100 dBA (very loud).

Table 4.4.A: Noise Measurement Definitions

Unit of Measurement		Description
dB	Decibel	Units for measuring the volume of sound, decibels are measured on a logarithmic scale, representing points on a sharply rising curve. For example, 10 decibels are 10 times more intense than one decibel and 20 decibels are 100 times more intense. A 10-decibel increase in sound level is perceived by the human ear as a doubling of the loudness of the sound.
dBA	A-Weighted Decibel	A sound pressure level that has been weighted to quantitatively reduce the effect of the high and low frequency noise. It was designed to approximate the response of the human ear to sound.
CNEL	Community Noise Equivalent Level	The CNEL value represents noise as measured by an A-weighted sound level. The metric includes a 4.8-decibel penalty during relaxation hours (7 p.m. to 10 p.m.) and a 10-decibel penalty for sleeping hours (10 p.m. to 7 a.m.). CNEL is similar to L_{dn} (which does not include the evening penalty).
L_{dn}	Day-Night Average Noise	The 24-hour average sound level, expressed in a single decibel rating, for the period from midnight to midnight obtained after the addition of a 10.0-decibel penalty to sound levels for the periods between 10 p.m. and 7 a.m.
L_{eq}	Equivalent Noise Level	Total sound energy of time-varying noise over a sample period.
L_{01}, L_{10}, L_{25}, L_{50}, L_{90}	Percentile Noise Exceedance Levels	The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 1 percent, 10 percent, 25 percent, 50 percent, and 90 percent of a stated time period.
L_{max}	Maximum Noise Level	L_{max} is the highest exponential time-averaged sound level that occurs during a stated time period. It reflects peak operating conditions and addresses the annoying aspects of intermittent noise.

Sound levels are generated from a source and their decibel level decreases as the distance from that source increases. Table 4.4.B describes attenuation levels of various types of noise sources.

Table 4.4.B: Attenuation Levels and Type of Noise Sources

Decrease in Sound for Each Doubling of Distance	Type of Noise Source	Description/Example
6.0 decibels	Single-point source	Stationary equipment
4.5 decibels	Line source	Highway traffic or railroad operations in a relatively flat environment with absorptive vegetation
3.0 decibels	Line source	Highway traffic or railroad operations in a hard site environment

Source: LSA Associates, Inc., *Noise Analysis, Moreno Valley Eucalyptus*, June 2008.

Definition of Noise. Noise impacts can be described in three categories:

- Audible (3.0 dB or greater);
- Potentially audible (between 1.0 and 3.0 dB); and
- Inaudible (less than 1.0 dB).

Audible noises are increases in noise levels noticeable to humans and generally refer to a change of 3.0 dB or greater, because this level has been found to be barely perceptible in exterior environments. Potentially audible refers to a change in the noise level between 1.0 and 3.0 dB, which is noticeable only in laboratory environments. Changes in noise levels of less than 1.0 dB are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are

considered potentially significant. Therefore, a 3 dBA increase in long-term noise levels above existing ambient noise levels is used as a threshold of significant change in this noise analysis.

Fundamentals of Groundborne Vibration. Vibration refers to groundborne noise and perceptible motion. Groundborne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors, where the motion may be discernable. However, without the effects associated with the shaking of a building, there is less adverse reaction. Building vibration may be perceived by the occupants as motion of building surfaces, rattling of items on shelves or hanging on walls, or as a low-frequency rumbling noise. Building damage is not a factor for normal projects, with the occasional exception of blasting and pile driving during construction or mining. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by up to 10 decibels. This is an order of magnitude below the damage threshold for normal buildings.

Typical sources of groundborne vibration are construction activities (e.g., blasting, pile driving, and operating heavy-duty earthmoving equipment), steel-wheeled trains, and occasional traffic on rough roads. Problems with groundborne vibration and noise from these sources are usually localized to within about 100 feet of the vibration source, although there are examples of groundborne vibration causing interference out to distances greater than 200 feet, as described in the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment (FTA, May 2006). When roadways are smooth, vibration from traffic, even heavy trucks, is rarely perceptible.

Factors that influence groundborne vibration and noise include the following:

- Vibration Source: vehicle suspension, wheel types and condition, track/roadway surface, track support system, speed, transit structure, and depth of vibration source.
- Vibration Path: soil type, rock layers, soil layering, depth to water table, and frost depth.
- Vibration Receiver: foundation type, building construction, and acoustical absorption.

Among the factors listed above, there are significant differences in the vibration characteristics when the source is underground versus at ground surface. In addition, soil conditions are known to have a strong influence on the levels of groundborne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth to bedrock. Vibration propagation is more efficient in stiff clay soils than in loose sandy soils, and shallow rock seems to concentrate the vibration energy close to the surface and can result in groundborne vibration problems at a great distance from the track. Factors such as layering of the soil and depth to water table can have significant effects on the propagation of groundborne vibration. Soft, loose, sandy soils tend to attenuate more vibration energy than hard, rocky materials. Vibration propagation through groundwater is more efficient than through sandy soils.

4.4.1.2 Sensitive Land Uses in the Project Vicinity

Certain land uses are considered more sensitive to noise than others. Examples include residential areas, educational facilities, hospitals, childcare facilities, and senior housing. The nearest existing sensitive receptors in the vicinity of the project site are rural residential uses located along Nandina Avenue approximately 1,000 feet north of the project boundary. There are also residential uses approximately 0.77 mile (mi) southwest of the project site on the south side of Harley Knox/Oleander Avenue between Heacock Street and Patterson Avenue.

Existing Noise Environment. The project site is currently vacant land. The primary existing noise sources in the project area are transportation facilities. Primary transportation noise sources include vehicular traffic along Indian Street and Perris Boulevard. Aircraft operations from March Air Reserve

Base to the northwest of the project site contribute to high intermittent single-event noise levels. Based on the *Citizen's Brochure for the 452nd Air Mobility Wing Air Installation Compatible Use Zone Study* (AICUZ) for the March Air Reserve Base (August 2005), the project site is located outside of the 60 dBA CNEL noise contour from March Air Reserve Base.

Existing Traffic Noise Modeling. To document the existing environment, the Federal Highway Administration (FHWA) highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate highway traffic-related noise conditions in the project vicinity. This model requires various parameters, including traffic volumes, vehicle mix, vehicle speed, and roadway geometry[1] to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The noise impact analysis was conducted using the existing traffic volumes provided in the *Traffic Study* prepared for the proposed project (LSA Associates, Inc., December 2011). In addition, unlike the urban area where the ground is filled with pavement, the project site is located in a rural/suburban area where there is vacant land around the project vicinity. Empirical data show that such environment is best analyzed with the soft site propagation for noise. The traffic noise modeling in this noise study uses 4.5 dBA per doubling of the distance for the soft site sound propagation from a line source. The modeled 24-hour CNEL levels are identified in Table 4.4.C. The resultant noise levels are weighted and summed over 24-hour periods to determine the CNEL values. The primary existing noise sources in the project area are transportation facilities. Dominant noise sources at the project site are vehicle traffic from Indian Street and Perris Boulevard. Traffic noise in the project vicinity ranges from low (Nandina Avenue) to moderate (Indian Street and Oleander Avenue) to high (Perris Boulevard). As shown in Table 4.4.C, existing traffic noise along these roadway segments range from low to moderate to high.

Table 4.4.C: Existing Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (feet)	Centerline to 65 CNEL (feet)	Centerline to 60 CNEL (feet)	CNEL (dBA) 50 Feet from Centerline of Outermost Lane
Perris Blvd. between Gentian Ave. and Iris Ave.	13,800	54	111	237	68.4
Perris Blvd. between Iris Ave. and Krameria Ave.	15,400	58	119	255	68.8
Perris Blvd. between Krameria Ave. and Nandina Ave.	15,200	57	118	253	68.8
Perris Blvd. between Nandina Ave. and Grove View Rd.	15,000	57	117	251	68.7
Perris Blvd. between Grove View Rd. and Oleander Ave.	15,500	58	120	256	68.9
Indian Ave. between Nandina Ave. and Grove View Rd.	5,600	< 50	51	109	64.4
Indian Ave. between Grove View Rd. and Oleander Ave.	5,600	< 50	51	109	64.4
Oleander Ave. west of I-15 Ramps	6,000	< 50	63	136	65.8
Oleander Ave. between I-15 Ramps and Indian Ave.	9,200	< 50	84	181	67.7
Oleander Ave. between Indian Ave. and Perris Blvd.	4,400	< 50	52	111	64.5

[1] Roadway geometry is defined as the lane configuration (number of through lanes and turn lanes) of two intersecting roads.

Table 4.4.C: Existing Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (feet)	Centerline to 65 CNEL (feet)	Centerline to 60 CNEL (feet)	CNEL (dBA) 50 Feet from Centerline of Outermost Lane
Nandina Ave. between Indian Ave. and Perris Blvd.	590	< 50	< 50	< 50	54.6

ADT = Average Daily Trips CNEL = Community Noise Equivalent Level dBA = A-weighted decibel.
*Traffic noise within 50 feet of the roadway centerline should be evaluated with site-specific information.

Source: *Noise Impact Analysis,* City of Moreno Valley. LSA Associates, Inc. December 2011.

4.4.2 Existing Policies and Regulations

The applicable noise standards governing the project site are the criteria in the City of Moreno Valley General Plan Noise Element and Municipal Code (Noise Ordinance). The City's Noise Element of the General Plan is based on the County of Riverside Land Use Compatibility Chart for Community Noise and is adopted by reference. In addition, standards identified in the *California Noise Insulation Standards*[1] and the *State of California Vehicular Code*[2] are included below. The following sections list the General Plan policies and State standards relevant to noise for the proposed project.

4.4.2.1 City of Moreno Valley General Plan Policies

Chapter 9 of the *City of Moreno Valley General Plan*[3] defines goals, objectives, policies, and action items related to noise conditions in the City. The specific policies related to noise that are relevant to the proposed project are as follows:

Objective 2.5 Promote a mix of industrial uses which provide a sound and diversified economic base and ample employment opportunities for the citizens of Moreno Valley with the establishment of industrial activities that have good access to the regional transportation system, accommodate the personal needs of workers and business visitors; and which meets the service needs of local businesses.

Policy 2.5.3 Screen manufacturing and industrial uses where necessary to reduce glare, noise, dust, vibrations and unsightly views.

Objective 6.3 Provide noise compatible land use relationships by establishing noise standards utilized for design and siting purposes.

Policy 6.3.6 Building shall be limited in areas of sensitive receptors.

Objective 6.4 Review noise issues during the planning process and require noise attenuation measures to minimize acoustic impacts to existing and future surrounding land uses.

Policy 6.4.1 Site, landscape and architectural design features shall be encouraged to mitigate noise impacts for new developments, with a preference for noise barriers that avoid freeway sound barrier walls.

Objective 6.5 Minimize noise impacts from significant noise generators such as, but not limited to, motor vehicles, trains, aircraft, commercial, industrial, construction, and other activities.

1 California Code of Regulations, Title 24, Part 2, §3501, *California Noise Insulation Standards.*
2 Governor's Office of Planning and Research, *State of California General Plan Guidelines*, October 2003, pages 249 and 250.
3 *City of Moreno Valley General Plan*, City of Moreno Valley, adopted by City Council Resolution No. 2006-83, July 11, 2006.

Policy 6.5.1 New commercial and industrial activities (including the placement of mechanical equipment) shall be evaluated and designed to mitigate noise impacts on adjacent uses.

Policy 6.5.2 Construction activities shall be operated in a manner that limits noise impacts on surrounding uses.

The City's General Plan, Section 6.4, states that acceptable residential exterior noise standards are within 60–65 dBA CNEL, and acceptable residential interior noise standard is 45 dBA CNEL.

Moreno Valley Municipal Code. The *Moreno Valley Municipal Code*[1] describes the noise standards within the City. It states that noise will be measured with a sound level meter that meets the standards of the American National Standards Institute (ANSI) Section I.4-1983. All measurements of sound will be made by qualified officials of the City who are designated by the City Manager or designee to operate the apparatus used to make the measurements.

In addition, the following standards are listed in the *Moreno Valley Municipal Code* in Chapter 11.80.030 Prohibited Acts (Title 11). Sound level limits are established for both continuous and impulsive (momentary) sounds. The City prohibits grading activities between the hours of 8:00 p.m. and 7:00 a.m. and prohibits construction activities from 8:00 p.m. to 6:00 a.m. during the week and between 8:00 p.m. and 7:00 a.m. on weekends and holidays.

The City's Municipal Code, Section 8.14.040.E, specifies the hours of any construction within the City to occur only as follows: Monday through Friday (except for holidays that occur on weekdays), 6:00 a.m. to 8:00 p.m.; weekends and holidays (as observed by the City and described in Chapter 2.55 of the Municipal Code), 7:00 a.m. to 8:00 p.m., unless written approval is obtained from the City building official or City engineer. According to the City's Municipal Code ordinance 8.21.050, grading permit requirements, the hours are limited to between 7 am and 6 pm weekdays and 8 am to 4 pm on weekends and holidays.

The City's Municipal Code, Section 9.10.140, specifies that all commercial and industrial uses shall be operated so that noise created by any loudspeaker, bells, gongs, buzzers, or other noise attenuation or attracting devices shall not exceed 55 dBA at any one time beyond the boundaries of the property.

Chapter 11.80.030 of the City's Municipal Code also states:

> *Based on statistics from the Center for Disease Control and Prevention and the National Institute for Occupational Safety and Health, Table 1 and Table 1-A specify sound level limits which, if exceeded, will have a high probability of producing permanent hearing loss in anyone in the area where the sound levels are being exceeded. No sound shall be permitted within the City which exceeds the parameters set forth in Table 11.80.030-1* [Table 4.4.D] *and 11.80.030-1-A* [Table 4.4.E] *of this chapter.*
>
> *No person shall maintain, create, operate or cause to be operated on private property any source of sound in such a manner as to create any nonimpulsive sound which exceeds the limits set forth for the source land use category (as defined in Section 11.80.020) in Table 11.80.030-2* [Table 4.4.F] *when measured at a distance of two hundred (200) feet or more from the real property line of the source of the sound, if the sound occurs on privately owned property, or from the source of the sound, if the sound occurs on public right-of-way, public space or other publicly owned property. Any source of sound in violation of this subsection shall be deemed prima facie to be a noise disturbance.*

[1] *Moreno Valley Municipal Code,* City of Moreno Valley, current through Ordinance 761 and the February 2008 code supplement.

The following uses and activities shall be exempt from the sound level regulations except the maximum sound levels provided in Tables 11.80.030-1 [Table 4.4.D] *and 11.80.030-1A* [Table 4.4.E]*:*

1. *Sounds resulting from any authorized emergency vehicle when responding to an emergency call or acting in time of an emergency.*
2. *Sounds resulting from emergency work as defined in Section 11.80.020.*
3. *Any aircraft operated in conformity with, or pursuant to, federal law, federal air regulations and air traffic control instruction used pursuant to and within the duly adopted federal air regulations; and any aircraft operating under technical difficulties in any kind of distress, under emergency orders or air traffic control, or being operated pursuant to and subsequent to the declaration of an emergency under federal air regulations.*
4. *All sounds coming from the normal operations of interstate motor and rail carriers, to the extent that local regulation of sound levels of such vehicles has been preempted by the Noise Control Act of 1972 (42 U.S.C. § 4901 et seq.) or other applicable federal laws or regulations.*
5. *Sounds from the operation of motor vehicles, to the extent they are regulated by the California Vehicle Code.*
6. *Any constitutionally protected noncommercial speech or expression conducted within or upon any public right-of-way, public space or other publicly owned property constituting an open or a designated public forum in compliance with any applicable reasonable time, place and manner restriction on such speech or expression or otherwise pursuant to legal authority.*
7. *Sounds produced at otherwise lawful and permitted city-sponsored events, organized sporting events, school assemblies, school playground activities, by permitted fireworks, and by permitted parades on public right-of-way, public space, or other publicly owned property.*
8. *An event for which a temporary use permit or special event permit has been issued under other provisions of this code, where the provision of Section 11.80.010 are met, the permit granted expressly grants an exemption from specific standards contained in this chapter, and the permittee and all persons under the permitttee's reasonable control actually comply with all conditions of such permit. Violation of any condition of such permit related to sound or sound equipment shall be in violation of this chapter and punishable as such.*

Table 4.4.D: Maximum Continuous Sound Levels*

Duration Per Day Continuous Hours	Sound Level (dBA)
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25	115

* When the daily sound exposure is composed of two or more periods of sound exposure at different levels, the combined effect of all such periods shall constitute a violation of this section if the sum of the percentage of allowed period of sound exposure at each level exceeds 100 percent.

Source: Chapter 11.80.030 Table 11.80.030-1, City of Moreno Valley Municipal Code, City of Moreno Valley.

Table 4.4.E: Maximum Impulsive Sound Levels

Number of Repetitions Per 24-Hour Period	Sound Level (dBA)
1	145
10	135
100	125

Source: Chapter 11.80.030 Table 11.80.030-1A, City of Moreno Valley Municipal Code, City of Moreno Valley.

Table 4.4.F: Maximum Sound Levels (in dBA) for Source Land Uses

Residential		Commercial	
Daytime	Nighttime	Daytime	Nighttime
60	55	65	60

Source: Chapter 11.80.030 Table 11.80.030-2, City of Moreno Valley Municipal Code, City of Moreno Valley.

4.4.2.2 State of California Vehicular Code

Recent studies have shown that the most objectionable feature of traffic noise is the sound produced by vehicles equipped with illegal or faulty exhaust systems. In addition, such vehicles are often operated in a manner that causes tire squeal and excessively loud exhaust noise. A number of California State vehicle noise regulations can be enforced by local authorities as well as the California Highway Patrol. These include § 23130, § 23130.5, § 27150, and § 38275 of the California Vehicle Code, as well as excessive speed laws, which may be applied to curtail traffic noise:

- § 23130 and § 23130.5 establish maximum noise emission limits for the operation of all motor vehicles at any time under any conditions of grade, load, acceleration, or deceleration.
- § 27150 requires motor vehicles to be equipped with an adequate muffler to prevent excessive noise.
- § 38275 requires off-highway motor vehicles to be equipped with an adequate muffler to prevent excessive noise.

The California Highway Patrol and the Department of Health Services (through local health departments) are available to aid local authorities in code enforcement and training pursuant to proper vehicle sound level measurements.

4.4.3 Methodology

Evaluation of noise impacts associated with the proposed project includes the following:

- Determination of the short-term construction noise impacts on off-site noise-sensitive uses;
- Determination of the long-term noise impacts, including vehicular traffic and stationary noise sources, on on-site and off-site noise-sensitive uses; and
- Determination of the required mitigation measures to reduce long-term noise impacts from all sources.

The proposed project includes the construction and operation of an approximately 1.6 million square-foot distribution warehouse. The noise analysis considers the noise effects of the warehouse distribution development on the existing residential development (sensitive receptors) in the vicinity of the proposed project site. The applicable noise standards governing the project site are the criteria in the City of Moreno Valley's *Noise Element of the General Plan* and *Municipal Code*.

4.4.4 Thresholds of Significance

A project would have a significant effect on the environment related to noise if it would substantially increase the ambient noise levels for adjoining areas or if it would conflict with adopted environmental plans and goals of the community in which it is located.

The applicable noise standards governing the project site are the criteria that are contained within the Noise Element of the *City of Moreno Valley General Plan* and the *Moreno Valley Municipal Code*. For this project, a noise impact is considered significant if the project would result in:

- Exposure of persons to or generation of noise levels in excess of standards established in the *City of Moreno Valley General Plan*, *Moreno Valley Municipal Code*, or applicable standards of other agencies;
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;
- A substantial temporary, periodic, and/or permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels; and/or
- For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

The standards within the *City of Moreno Valley General Plan* and *Moreno Valley Municipal Code* determine the acceptable noise environment for proposed project and its vicinity. The standards are as follows:

- Ensure through the design review process that exterior noise levels at commercial and industrial areas do not exceed 75 dBA CNEL.
- Consider the following uses noise-sensitive and discourage them in areas where exterior noise levels exceed 65 dBA CNEL unless measures are implemented that reduce the noise exposure below this level: single- and multiple-family residential uses, group homes, hospitals, schools and other learning institutions, and parks and open space areas where quiet is a basis for use.

4.4.5 No Impact/Less than Significant Impacts

The following impacts have been identified as having a less than significant impact or no impact on the environment with implementation of the proposed project.

4.4.5.1 Airport Noise Impacts

Threshold	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, results in exposure of people residing or working in the project area to excessive noise levels. For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

The nearest airport is the March Air Reserve Base, which is located approximately 0.75 mile northwest of the project site. The proposed project is not identified as being within the noise or safety

contours delineated for the March Air Reserve Base Airport.[1] While the proposed project is located within two miles of a public airport, the proposed project would not have the potential to expose people working on the project site to excessive noise levels from airport operations as the project site is located outside of the noise and safety contours of March Air Reserve Base. A less than significant impact would occur with implementation of the proposed project. Additionally, the proposed project site is not located within the vicinity of a private airstrip; therefore, no impact associated with this issue would occur and no mitigation is required.

4.4.5.2 Groundborne Vibration Impacts

Threshold:	Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Vibration refers to groundborne noise and perceptible motion. Typical sources of groundborne vibration are construction activities (e.g., blasting, pile driving, and operating heavy-duty earthmoving equipment), steel-wheeled trains, and occasional traffic on rough roads. Groundborne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors, where the motion may be discernable but without the accompanying effects (e.g., shaking of a building). Groundborne vibration is measured in terms of the velocity of the vibration oscillations. When groundborne vibration exceeds 0.1 inch per second (in/sec), it is generally perceived as annoying to building occupants. The degree of annoyance is dependent upon type of land use, individual sensitivity to vibration, and the frequency of the vibration events. Typically, vibration levels must exceed 0.2 in/sec before building damage occurs. Problems with groundborne vibration and noise are usually localized to areas within about 100 feet from the vibration source, although there are examples of groundborne vibration causing interference out to distances greater than 200 feet.

The project site is not located near steel-wheeled trains. Additionally, roadways in the project area are either paved or would be paved and would not result in traffic driving over rough roads. Construction activities for the project site do not include blasting or pile driving. The primary vibratory source during the construction of the proposed project would be large bulldozers. Based on published data, typical bulldozer activities generate an approximate vibration level of 0.089 in/sec at a distance of 25 feet. At the distance of the nearest residence to the project boundary (approximately 1,000 feet) the estimated vibration level would not be discernable. While heavy-duty earthmoving equipment would be used during the construction phase of the project, the level of vibration would not be excessive or permanent, nor would it exceed the level at which building damage typically occurs. Therefore, impacts from construction-related groundborne vibration construction would be less than significant and no mitigation is required.

4.4.5.3 Long-Term Traffic Noise Impacts

Threshold	Would the project result in a substantial temporary, periodic, and/or permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Only audible changes in existing ambient or background noise levels are considered potentially significant. It takes doubling of the traffic volume to have a 3 dB increase in traffic noise. Therefore, a 3 dBA increase in long-term noise levels above existing ambient noise levels is used as a threshold of significant change in this noise analysis.

The FHWA highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate highway traffic-related noise conditions. The noise impact analysis was conducted using the future traffic

[1] *Figure 5.4-1 March Reserve Air Base Noise Impact Area*, City of Moreno Valley General Plan EIR, July 2006.

volumes provided in the *Traffic Study* (LSA Associates, Inc., December 2011). In addition, unlike the urban area where the ground is filled with pavement, the project site is located in a rural/suburban area where there is vacant land around the project vicinity. Empirical data show that such environment is best analyzed with the soft site propagation for noise. The traffic noise modeling in this noise study uses 4.5 dBA per doubling of the distance for the soft site sound propagation from a line source. The future Year (2013) with and without project scenarios average daily traffic (ADT) volumes on roadway segments in the project vicinity were used to conduct the traffic noise modeling. The existing ADT volumes in the area were taken from the *Traffic Study* prepared for the proposed project. The modeled 24-hour CNEL levels are presented in Tables 4.4.G and 4.4.H for the Opening (2013) Year scenarios. Standard vehicle mix for Southern California streets was used in this analysis. Background traffic volumes at study area intersections for Year 2013 Without Project Traffic scenario represent the existing (2008) conditions plus the ambient growth that is expected to occur by the time the proposed project is built. Ambient growth considers increasing the existing (2008) volumes by 10.4 percent (or 2% per year compounded over five years). Traffic volumes for the Opening Year (2013) With Project Traffic scenario considers the addition of traffic generated by the proposed project to the Year 2013 Without Project conditions. Traffic volumes for the Opening Year (2013) Cumulative Without Project Traffic scenario were developed from information concerning approved and pending projects in the project vicinity obtained from the City of Moreno Valley and added to the Year 2013 Without Project Traffic volumes. Traffic volumes for the Opening Year (2013) Cumulative With Project Traffic scenario considers the addition of traffic generated by the proposed project to the Year 2013 Cumulative Without Project Traffic volumes. Noise levels presented in Tables 4.4.G and 4.4.H represent the worst-case scenario, which assumes that no shielding is provided between the traffic and the location where the noise contours are drawn.

Table 4.4.G: Year 2013 Without Project Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (feet)	Centerline to 65 CNEL (feet)	Centerline to 60 CNEL (feet)	CNEL (dBA) 50 Feet from Centerline of Outermost Lane
Perris Blvd. between Gentian Ave. and Iris Ave.	30,200	88	186	399	71.8
Perris Blvd. between Iris Ave. and Krameria Ave.	34,600	96	203	437	72.4
Perris Blvd. between Krameria Ave. and Nandina Ave.	35,400	97	206	443	72.5
Perris Blvd. between Nandina Ave. and Grove View Rd.	35,500	97	207	444	72.5
Perris Blvd. between Grove View Rd. and Oleander Ave.	36,000	98	209	448	72.5
Indian Ave. between Nandina Ave. and Grove View Rd.	11,800	< 50	83	179	67.6
Indian Ave. between Grove View Rd. and Oleander Ave.	11,800	< 50	83	179	67.6
Oleander Ave. west of I-15 Ramps	8,400	< 50	79	170	67.3
Oleander Ave. between I-15 Ramps and Indian Ave.	25,900	78	167	360	72.2

Table 4.4.G: Year 2013 Without Project Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (feet)	Centerline to 65 CNEL (feet)	Centerline to 60 CNEL (feet)	CNEL (dBA) 50 Feet from Centerline of Outermost Lane
Oleander Ave. between Indian Ave. and Perris Blvd.	18,200	62	132	285	70.6
Nandina Ave. between Indian Ave. and Perris Blvd.	2,900	< 50	< 50	70	61.5

ADT = Average Daily Trips CNEL = Community Noise Equivalent Level dBA= A-weighted decibel.
*Traffic noise within 50 feet of the roadway centerline should be evaluated with site-specific information.

Source: *Noise Impact Analysis,* City of Moreno Valley. LSA Associates, Inc. December 2011.

Table 4.4.H: Year 2013 With Project Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (feet)	Centerline to 65 CNEL (feet)	Centerline to 60 CNEL (feet)	CNEL (dBA) 50 Feet from Centerline of Outermost Lane	Increase CNEL (dBA) 50 Feet from Centerline of Outermost Lane
Perris Blvd. between Gentian Ave. and Iris Ave.	30,800	89	188	404	71.8	0.0
Perris Blvd. between Iris Ave. and Krameria Ave.	35,300	97	206	443	72.4	0.0
Perris Blvd. between Krameria Ave. and Nandina Ave.	36,100	98	209	449	72.5	0.0
Perris Blvd. between Nandina Ave. and Grove View Rd.	36,100	98	209	449	72.5	0.0
Perris Blvd. between Grove View Rd. and Oleander Ave.	36,600	99	211	453	72.6	0.1
Indian Ave. between Nandina Ave. and Grove View Rd.	13,000	< 50	89	191	68.0	0.4
Indian Ave. between Grove View Rd. and Oleander Ave.	13,900	< 50	93	200	68.3	0.7
Oleander Ave. west of I-15 Ramps	8,500	< 50	80	172	67.3	0.0
Oleander Ave. between I-15 Ramps and Indian Ave.	27,500	81	174	375	72.4	0.2
Oleander Ave. between Indian Ave. and Perris Blvd.	18,200	62	132	285	70.6	0.0
Nandina Ave. between Indian Ave. and Perris Blvd.	3,500	< 50	< 50	80	62.3	0.8

Table 4.4.H: Year 2013 With Project Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (feet)	Centerline to 65 CNEL (feet)	Centerline to 60 CNEL (feet)	CNEL (dBA) 50 Feet from Centerline of Outermost Lane	Increase CNEL (dBA) 50 Feet from Centerline of Outermost Lane
Perris Blvd. between Gentian Ave. and Iris Ave.	30,800	89	188	404	71.8	0.0
Perris Blvd. between Iris Ave. and Krameria Ave.	35,300	97	206	443	72.4	0.0
Perris Blvd. between Krameria Ave. and Nandina Ave.	36,100	98	209	449	72.5	0.0
Perris Blvd. between Nandina Ave. and Grove View Rd.	36,100	98	209	449	72.5	0.0

ADT = Average Daily Trips CNEL = Community Noise Equivalent Level dBA= A-weighted decibel.
*Traffic noise within 50 feet of the roadway centerline should be evaluated with site-specific information.

Source: *Noise Impact Analysis,* City of Moreno Valley. LSA Associates, Inc. December 2011.

As presented in Table 4.4.G (2013 with Project), project-related traffic noise level increases would be 0.8 dBA or less along all roadway segments analyzed. Noise level increases within this range are small and are not perceptible by the human ear. Therefore, no significant traffic noise impacts would occur to off-site land uses with implementation of the proposed project. Table 4.4.G also shows that the proposed warehouse distribution center uses are not impacted by the 75 dBA CNEL noise contour from Indian Street (within 50 feet of the roadway centerline), Oleander Avenue (within 50 feet of the roadway centerline), or Perris Boulevard (98 feet from the roadway centerline). Therefore, noise levels at the on-site uses are below the City's 75 dBA CNEL noise standard for industrial uses. No significant noise impacts to on-site industrial uses would occur and no mitigation measures are required.

4.4.5.4 Long-Term Operational Noise Impacts

Threshold:	Would the project cause exposure of persons to or generation of noise levels in excess of standards established in the *City of Moreno Valley General Plan, Moreno Valley Municipal Code*, or applicable standards of other agencies?

Potential long-term stationary noise impacts would primarily be associated with operations at the proposed warehouse distribution center. The proposed on-site warehouse distribution center would generate noise from truck delivery, loading/unloading activities at the loading areas, and other noise-producing activities within the parking lot. These activities are potential point sources of noise that could affect noise-sensitive receptors adjacent to the loading areas and parking lots, such as the existing residential uses to the north of the project site.

The project site is adjacent to Perris Boulevard to the east, Indian Street to the west, Grove View Road to the north and the Perris Valley Storm Drain Lateral B forms the southern boundary of the project site. Other warehouse distribution uses are located on adjacent properties to the west, north, and east. The remaining parcels adjacent to the project site are vacant. The nearest existing sensitive receptors in the vicinity of the project site are rural residential uses located along Nandina Avenue approximately 1,000 feet north of the project boundary. There are also nonconforming residential

dwelling units within commercial and industrial uses on property zoned for commercial or industrial uses approximately 0.5 mile southwest of the project site on the south side of Oleander Avenue between Heacock Street and Patterson Avenue.

As indicated in the project's site plan (Figure 1.2), the proposed warehouse distribution use has loading docks on the north and south sides of the building, approximately 1,000 feet from the existing residences to the north. Noise associated with loading/unloading activities would potentially affect these existing residential uses. Other on-site, noise-producing activities may include traffic and activity within the parking lot (load talking, horn blowing, vehicle door slamming, truck idling, etc.).

As noise spreads from a source, it loses energy; therefore, the farther away the noise receiver is from the noise source, the lower the perceived noise level would be. Geometric spreading causes the sound level to attenuate or be reduced, resulting in a 6 dBA reduction in the noise level for each doubling of distance from a single-point source of noise, such as an idling truck, to the noise-sensitive receptor of concern. Although individual activity may generate relatively high and intermittent noise, when added to the typically lower ambient noise and averaged over a longer period of time, the cumulative noise level would be much lower and would be considered a less than significant impact.

Based on the preliminary site plan, the shortest distance (approximately 1,000 feet) from the existing residences to the nearest loading/unloading areas on the project site would result in a 26 dBA[1] noise attenuation (compared to the levels at 50 feet).

Truck Delivery and Loading and Unloading Noise. Delivery trucks for the proposed on-site warehouse distribution uses would result in a maximum noise similar to noise readings from loading and unloading activities for other warehouse distribution projects, which generates a noise level of approximately 75 dBA L_{max} at 50 feet and is used in this analysis. Based on the foregoing discussion, distance divergence of 1,000 feet provides 26 dBA noise attenuation; thus, loading/unloading noise at the proposed uses would be reduced to below 49 dBA L_{max}[2] at ground level of the nearest existing residences north of the project site. Based on the City's Municipal Code, Chapter 11.80.030, when measured at 200 feet or more from the real property line of the source of the sound (if the sound occurs on privately owned property as is the case here), the exterior noise standard is 60 dBA L_{max} during the day (8:00 a.m. to 10:00 p.m.) and 55 dBA L_{max} during the night (10:01 p.m. to 7:59 a.m.) for residential uses. This level of maximum noise levels is below the City's residential exterior noise standards of 60 dBA L_{max} during the day (8:00 a.m. to 10:00 p.m.) and the 55 dBA L_{max} standard during the night (10:01 p.m. to 7:59 a.m.). Although the typical truck unloading process takes an average of 15 to 20 minutes, this maximum intermittent noise level occurs in a much shorter period of time and would amount to less than a few minutes. This level of noise would be below the most stringent noise standard (55 dBA maximum noise standard at any time). Therefore, noise associated with loading and unloading activities at the loading areas associated with the proposed warehouse distribution uses would not result in noise levels exceeding the noise standards at the nearest residences to the north. Loading/unloading activities would not result in a significant noise impact at the nearest existing off-site residential uses and no mitigation is required.

Parking Lot Activity. Representative parking lot activities, such as conversing, doors slamming, engine startup, and slow-moving vehicles would generate approximately 60 to 70 dBA L_{max} at 50 feet. This level of noise is lower than that of the truck delivery and loading/unloading activities. With the noise attenuation effect from distance divergence (26 dBA noise attenuation) to the proposed on-site

[1] Based on the sound pressure level equation of L = 20 Log (Distance / Reference Distance); where L is the sound level (in dBA), the value of 20 is 20 µPa (Pascal) root mean squared or 20 units of pressure (usually considered the threshold of hearing), multiplied by the logarithm of the distance divided by the reference distance, thus (log [1,000 ft ÷ 50 ft] = 1.301; 1.301 × 20 = 26.02).

[2] 75 dBA L_{max} – 26 dBA L_{max} = 49 dBA L_{max}.

warehouse buildings, noise levels in the parking lots of the proposed warehouse distribution uses would be below 44 dBA L_{max} and would not be significant; therefore, no mitigation is required.

Heating, Ventilating, and Air Conditioning Equipment Noise. The proposed project would have rooftop heating, ventilating, and air conditioning (HVAC) equipment, as well as ground floor garbage compactors. Although no final design is available at this time for the type and location of the rooftop mechanical units, based on noise measurements conducted at a similar use, rooftop HVAC units generate noise levels of approximately 62 dBA at 50 feet. The closest noise-sensitive land uses are existing residences which are located approximately 1,000 feet to the north from the nearest potential on-site rooftop HVAC equipment location. With the effect of distance divergence, noise generated by HVAC equipment would be reduced by 26 dBA[1] at the closest residences when compared with the noise level measured at 50 feet. Additionally, the roof edge (parapet) creates a noise barrier that reduces noise levels from rooftop HVAC units by an additional 3 to 5 dBA or more for ground floor receptors. Because of the attenuation achieved, nearest residences located to the north of the project site would be exposed to an exterior noise level of 33 dBA L_{max}[2] or lower. This range of noise levels is substantially lower than traffic noise on roadways in the project vicinity and the truck movement and loading/unloading noise. Therefore, because the City's exterior noise standard of 60 dBA L_{dn}/CNEL for HVAC equipment in residential district (Planning and Zoning Code, Chapter 9.03.040) would not be exceeded at the nearest sensitive noise receptors, no significant noise impact resulting from the operation of rooftop HVAC equipment would occur and no mitigation is required.

Garbage Compactor Noise. Garbage compactors generate approximately 70 dBA L_{max} at 6 feet. It is assumed that two garbage compactors would be located at the loading docks on the north side of the proposed buildings nearest to the existing residences. These compactors would be located approximately 1,000 feet from the nearest residences located to the north of the project site. This distance provides approximately 44 dBA[3] in noise attenuation when compared to noise levels measured at 6 feet. With the effect of distance divergence, noise generated by garbage compactors would be reduced to 26 dBA L_{max}[4] or lower at the closest residences. Because the City's exterior noise standard of 60 dBA L_{max} during the day and 55 dBA L_{max} during the night would not be exceeded, no significant noise impacts from the on-site garbage compactors would occur. In the absence of any significant impact, no mitigation is required.

Other Potential On-Site Operational Noise Sources. It is anticipated that the proposed uses would have some sort of speaker system at the truck loading docks. As stated previously, the closest loading docks to the residential areas to the north are approximately 1,000 feet from these existing residences to the north. Typical loud speakers generate a sound level of 75 dBA L_{max} at 50 feet. With the distance attenuation of 26 dBA the speaker noise at the nearest residences will be at or below 49 dBA L_{max}[5]. This range of maximum noise levels is lower than the City's nighttime exterior noise standards of 55 dBA L_{max}[6] standard. Therefore, noise associated with loading dock speakers at the proposed warehouse buildings would not result in noise levels exceeding the typical daytime or nighttime noise standards at the nearest residences to the southeast and no mitigation measures are required.

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1 log [1,000 ft ÷ 50 ft] = 1.301; 1.301 × 20 = 26.02)

2 HVAC equipment generates a noise level of approximately 62 dBA L_{max} at 50 feet. Accounting for distance divergence (log [1,000 ft ÷ 50 ft] = 1.301; 1.301 × 20 = 26.02) and shielding (minimum of 3 dBA), 62 dBA L_{max} – 26 dBA L_{max} – 3 dBA L_{max} = 33 dBA L_{max}.

3 log [1,000 ft ÷ 6 ft] = 2.222; 2.222 × 20 = 44.44.

4 Garbage compactors generate a noise level of approximately 70 dBA L_{max} at 6 feet. Accounting for distance divergence (log [1,000 ft ÷ 6 ft] = 2.222; 2.222 × 20 = 44.44), 70 dBA L_{max} – 44 dBA L_{max} = 26 dBA L_{max}.

5 75 dBA L_{max} – 26 dBA L_{max}= 49 dBA L_{max}.

6 *Chapter 11.80.030 City of Moreno Valley Municipal Code,* City of Moreno Valley.

Interior Noise. The typical maximum allowable interior noise levels for residential uses are 45 dBA between 10:01 p.m. and 7:59 a.m. and 50 dBA between 8:00 a.m. and 10:00 p.m.[1] Typical southern California homes with windows open would achieve up to 12 dBA in exterior to interior noise reduction. When windows are closed, the noise attenuation increases to 24 dBA. Additionally, distance divergence of 1,000 feet provides 26 dBA of noise attenuation. Interior noise levels at the nearest residential homes to the north, attributable to loading/unloading activities from the nearest on-site loading areas, would be reduced to 37 dBA L_{max} with windows open[2] and to 25 dBA L_{max} with windows closed.[3] This range of noise level is compatible with or lower than typical household activity noise. Therefore, no significant interior noise impacts for the nearest sensitive receptors would occur and no mitigation is required.

4.4.6 Significant Impacts

4.4.6.1 Short-Term Construction Noise Impacts

Impact 4.4.6.1. *Noise levels from grading and other construction activities for the proposed project may range up to 65 dBA at the closest residences north of the project site for very limited times when construction occurs near the project's boundary. Construction-related noise impacts from the proposed project would be potentially significant.*

Threshold:	Would the project result in a substantial temporary, periodic, and/or permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Two types of short-term noise impacts could occur during the construction of the proposed project. First, construction crew commutes and the transport of construction equipment and materials to the site for the proposed project would incrementally increase noise levels on access roads leading to the site. There would be a relatively high single-event noise exposure potential at a maximum level of 87 dBA L_{max} with trucks passing at 50 feet. However, the projected construction traffic would be small when compared with the existing traffic volumes on Indian Avenue, Perris Boulevard, and other affected streets. Furthermore, the proposed project's truck traffic will not travel on roadways adjacent to the existing residences as Nandina Avenue does not provide access to the project site. Therefore, short-term construction-related worker commutes and equipment transport noise impacts would be less than significant and no mitigation is required.

The second type of short-term noise impact is related to noise generated during excavation, grading, and building erection on the project site. Construction is completed in discrete steps, each of which has its own mix of equipment, and consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on the site, and therefore, the noise levels surrounding the site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table 4.4.I lists typical construction equipment noise levels recommended for noise-impact assessments, based on a distance of 50 feet between the equipment and a noise receptor. Typical noise levels range up to 91 dBA L_{max} at 50 feet during the noisiest construction phases. The site preparation phase, which includes excavation and grading of the site, tends to generate the highest noise levels, because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery such as backfillers, bulldozers, draglines, and front loaders. Earthmoving and compacting equipment includes compactors, scrapers, and graders. Typical operating cycles for these types of construction

1 *Model Community Noise Control Ordinance*, State of California, Department of Health, Office of Noise Control, 1977.

2 The loudest noise-generating use would come from loading/unloading activities. As previously identified, loading/unloading activities generate a noise level of approximately 75 dBA L_{max} at 50 feet. Accounting for distance divergence (log [1,000 ft ÷ 50 ft] = 1.301; 1.301 × 20 = 26.02); 75 dBA L_{max} – 26 dBA L_{max} – 12 dBA L_{max} = 37 dBA L_{max}.

3 75 dBA L_{max} – 26 dBA L_{max} – 24 dBA L_{max} = 25 dBA L_{max}.

equipment may involve one or two minutes of full-power operation followed by three to four minutes at lower power settings.

Table 4.4.I: Typical Construction Equipment Maximum Noise Levels

Type of Equipment	Range of Maximum Sound Levels Measured (dBA at 50 feet)	Suggested Maximum Sound Levels for Analysis (dBA at 50 feet)
Pile Drivers, 12,000 to 18,000 ft-lb/blow	81 to 96	93
Rock Drills	83 to 99	96
Jack Hammers	75 to 85	82
Pneumatic Tools	78 to 88	85
Pumps	74 to 84	80
Dozers	77 to 90	85
Tractors	83 to 91	80
Scrapers	83 to 94	87
Haul Trucks	79 to 86	88
Cranes	71 to 87	82
Portable Generators	75 to 82	80
Rollers	77 to 82	80
Front-End Loaders	77 to 90	86
Hydraulic Backhoe	81 to 90	86
Hydraulic Excavators	81 to 90	86
Graders	79 to 89	86
Air Compressors	76 to 89	86
Trucks	81 to 87	86

Source: Noise Control for Buildings and Manufacturing Plants, Bolt, Beranek & Newman, 1987

Construction of the proposed project is expected to require the use of scrapers, bulldozers, and water and pickup trucks. Based on the information in Table 4.4.I, the maximum noise level generated by each scraper on the proposed project site is assumed to be approximately 87 dBA L_{max} at 50 feet from the scraper. Each bulldozer would generate approximately 85 dBA L_{max} at 50 feet. The maximum noise level generated by water and pickup trucks is approximately 86 dBA L_{max} at 50 feet from these vehicles. Each doubling of the sound sources with equal strength increases the noise level by three (3) dBA. Assuming that each piece of construction equipment operates at some distance from the other equipment, the worst-case composite noise level during this phase of construction would be 91 dBA L_{max} at a distance of 50 feet from the active construction area.

The nearest noise-sensitive receptor locations to the project site are existing residences approximately 1,000 feet to the north. These nearest residents may be subject to short-term, intermittent, maximum noise reaching 65 dBA L_{max}, generated by construction activities on the project site. The ambient noise associated with vehicular traffic and industrial uses in the project area would mask the majority of the construction noise from the project site. No significant construction noise impacts would occur if construction of the proposed project would occur within the permitted hours of 6:00 a.m. to 8:00 p.m. of any working day, and within the permitted hours of 7:00 a.m. and 8:00 p.m. on Sundays and federal holidays. Compliance with the construction hours specified in the City's Municipal Code would result in construction noise impacts that are less than significant. While impacts would be considered less than significant as long as construction activities occur within the designated hours identified in the City's Municipal Code, mitigation measures have been identified to

reduce the noise levels that would expose nearby sensitive receptors to noise levels in excess of the City's noise standards.

Mitigation Measures. The following measures would reduce short-term construction-related noise impacts associated with the proposed project:

4.4.6.1A During all project site excavation and grading on site, the project contractor shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.

4.4.6.1B The project contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest to the project site.

4.4.6.1C The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receptors nearest to the project site during all project construction.

4.4.6.1D During all project site construction activities, the construction contractor shall limit all construction-related activities that would result in high noise levels to between the hours of 6:00 a.m. and 8:00 p.m. on weekdays and between the hours of 7:00 a.m. to 8:00 p.m. on weekends and holidays, unless written approval is obtained from the City Building Official or City Engineer. For grading activity, the hours are limited to between 7:00 a.m. and 6:00 p.m. weekdays and 8:00 a.m. to 4:00 p.m. on weekends and holidays.

Level of Significance after Mitigation. With adherence to the City's designated construction hours and with implementation of the proposed mitigation measures, potential short-term construction noise impacts would be reduced below the level of significance.

4.4.7 Cumulative Impacts

The cumulative area for noise impacts is the City of Moreno Valley. Cumulative projects are identified in Chapter 2.0, Table 2.A and Figure 2.1. Implementation of the proposed project would result in the introduction of new noise sources and levels. Construction crew commutes and the transport of construction equipment, materials, and fill to the site for the proposed project would incrementally increase noise levels on access roads leading to the site. Secondary sources of noise would include noise generated during excavation, grading, and building erection on the project site. The net increase in project site noise levels generated by these activities and other sources has been quantitatively estimated and compared to the applicable noise standards and thresholds of significance. Although it is not possible to predict if contiguous properties may be constructed at the same time and create cumulative noise impacts that would be greater than if developed at separate times, it is unlikely that adjacent properties will be developed at the same time as the proposed project. However, in the unlikely event that adjacent properties are developed at the same time as the proposed project, implementation of the stated mitigation measures would render the cumulative impacts of the proposed project to less than significant levels. The noise analysis contained in this section also provides an assessment of on-site operational noise level impacts onto adjacent sensitive uses, both existing and future. Additionally, on-site operational noises are individual noise occurrences and are not additive in nature.

Cumulative traffic volumes were developed from the addition of traffic generated by approved and pending projects to opening year with project traffic volumes. Cumulative noise impacts associated with roadway noise have been addressed based on the cumulative traffic volumes. The increases over existing traffic volumes are attributable to cumulative development projects in the project vicinity and region. As indicated, the cumulative roadway noise (with project) assessment concludes that

noise levels along all roadway segments analyzed would not exceed baseline noise levels by 3 dBA or more. Comparing cumulative noise levels that would occur both with and without the project, the proposed project would not expose sensitive uses located adjacent to area roadways to excessive noise levels. As indicated, the future roadway noise assessment concludes that there will be no significant roadway noise impacts associated with cumulative project conditions. Therefore, there are no projects that would, in combination with the proposed project, produce significant noise impacts to sensitive land uses from on-site operational noise. Thus, no significant cumulative noise impacts would occur after implementation of the proposed mitigation measures.

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4.5 TRANSPORTATION AND TRAFFIC

This section analyzes the potential traffic and circulation impacts of the proposed project based on the *Traffic Study*,[1] which is included in its entirety as Appendix G to this EIR. This section examines the project's traffic impacts on the existing baseline and opening year (2013) cumulative traffic scenarios.

4.5.1 Existing Setting

4.5.1.1 Existing Traffic Controls and Intersection Geometrics

An inventory of the existing study area street system was conducted by LSA Associates, Inc. Existing study area locations are illustrated in Figure 4.5.1 and consist of 6 project driveways, and12 off-site intersections (for a total of 18 study area intersections), and 6 adjacent roadway segments. The northern driveway on Perris Boulevard will be for emergency access only and therefore has not been evaluated in this analysis. In the project vicinity, existing Perris Boulevard is a divided six-lane arterial roadway and Indian Street is a divided major arterial roadway. In addition, for informational purposes and disclosure to California Department of Transportation (Caltrans), the 7 freeway segments along Interstate 215 (I-215) in the project vicinity were analyzed.

Study area intersections include the following:

- I-215 Southbound Ramps/Harley Knox Boulevard;
- I-215 Northbound Ramps/Harley Knox Boulevard;
- Indian Street/Nandina Avenue;
- Indian Street/Grove View Road;
- Indian Street/North Project Driveway;
- Indian Street/South Project Driveway;
- Indian Street/Harley Knox Boulevard;
- Perris Boulevard/Gentian Avenue;
- Perris Boulevard/Iris Avenue;
- Perris Boulevard/Krameria Avenue;
- Perris Boulevard/Nandina Avenue;
- Perris Boulevard/Grove View Road-Globe Street;
- Perris Boulevard/North Project Driveway;
- Perris Boulevard/South Project Driveway;
- Perris Boulevard/Harley Knox Boulevard;
- West Project Driveway/Grove View Road;
- Main Project Driveway/Grove View Road; and
- East Project Driveway/Grove View Road.

[1] *Traffic Study, VIP Moreno Valley, City of Moreno Valley, Riverside County, California,* prepared for Vogel Engineers, Inc., LSA Associates, Inc., April 2012.

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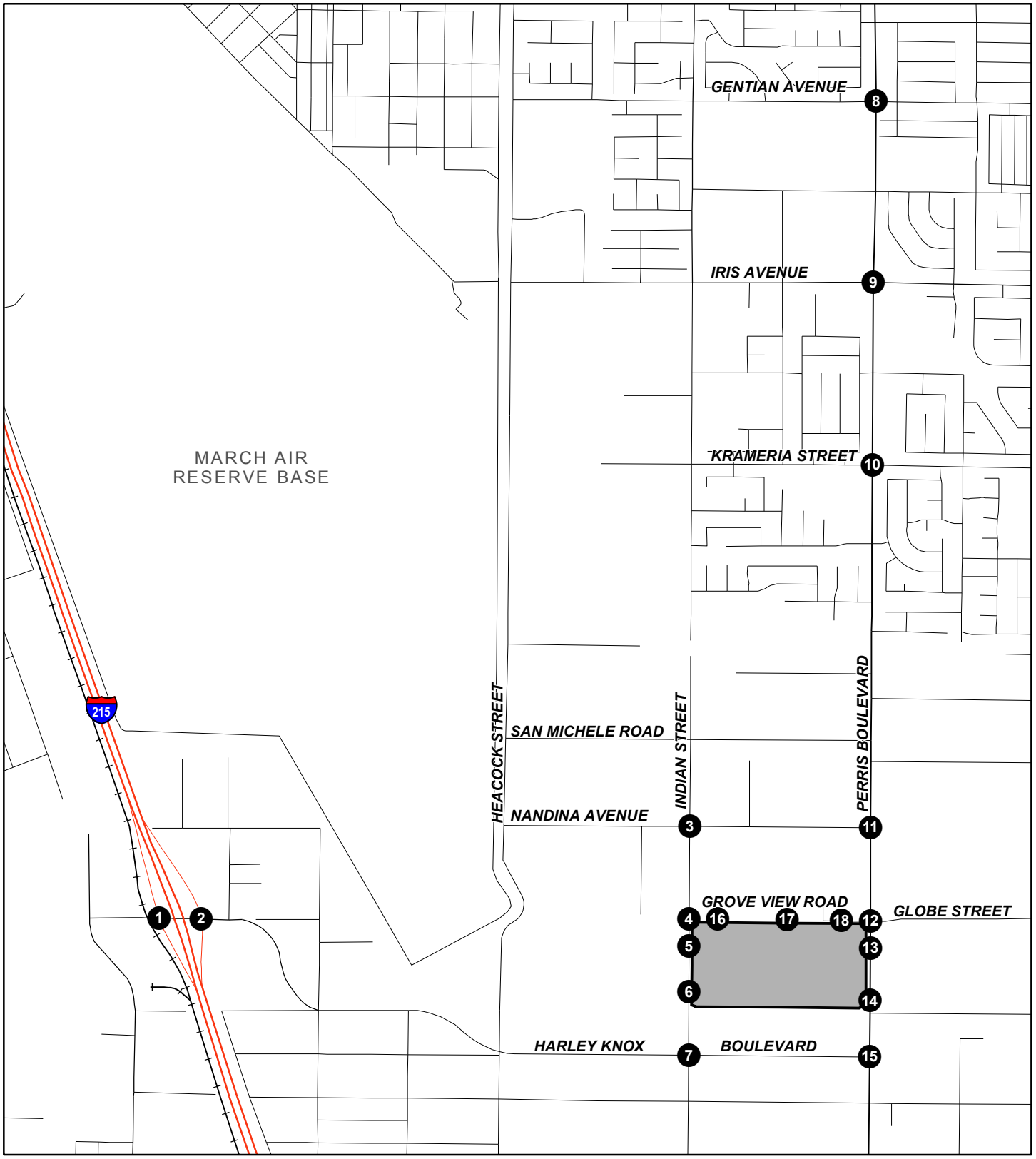

LSA

FIGURE 4.5.1

N

0 1,000 2,000

FEET

Project Location

Study Area Intersections

SOURCE: Thomas Bros., 2009

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VIP Moreno Valley
Environmental Impact Report

Study Area Intersections

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Study area roadway segments include the following:

- Nandina Avenue west of Indian Avenue;
- Harley Knox Boulevard west of Indian Avenue;
- Indian Street north of Grove View Road;
- Indian Street south of the south project driveway;
- Perris Boulevard north of Grove View Road; and
- Perris Boulevard south of the south project driveway.

Study area freeway segments include the following:

- Freeway segment north of Harley Knox Boulevard;
- Harley Knox Boulevard On-Ramp (merge area) at Northbound I-215;
- Freeway segment between Harley Knox Boulevard Ramps;
- Harley Knox Boulevard Off-Ramp (diverge area) at Northbound I-215;
- Freeway segment south of Harley Knox Boulevard;
- Harley Knox Boulevard Off-Ramp (diverge area) at Southbound I-215; and
- Harley Knox Boulevard On-Ramp (merge area) at Southbound I-215.

4.5.1.2 Existing Baseline Traffic Volumes

Existing traffic conditions for the study area intersections are based on a.m. and p.m. peak hour intersection turning movement counts collected by Counts Unlimited, Inc. in December 2007, with the exception of the intersection of Perris Boulevard/South Project Driveway. The intersection of Perris Boulevard/South Project Driveway was counted in May 2009 to document traffic from the Ross distribution center driveway, and was adjusted to reflect year 2007 conditions by matching the south leg approach and departure volumes with the north leg of Perris Boulevard/Harley Knox Boulevard. Count sheets are contained in the Traffic Study, included as Appendix G of this EIR. Since it has been four years since the 2007 counts, traffic counts were conducted for 3 locations near the project in 2011. However, since the 2011 counts were found to be lower than the 2007 counts due to reduced vehicular travel arguably caused by the current economic conditions, the 2007 counts were maintained to present a conservative approach for existing baseline traffic conditions. A comparison of the 2007 counts to the 2011 counts is included in Appendix G of this EIR.

Existing daily traffic volumes for the 6 study area roadway segments are based on daily counts collected by Counts Unlimited, Inc. in June 2009. For the 7 freeway segments, existing freeway segment bidirectional volumes are derived from the Annual Average Daily Traffic (AADT) volume data published by Caltrans in 2009.

Vehicle classification counts were conducted at the intersections of I-215 Southbound Ramps/Harley Knox Boulevard, I-215 Northbound Ramps/Harley Knox Boulevard, Indian Street/Nandina Avenue, Indian Street/Harley Knox Boulevard, Perris Boulevard/Gentian Avenue, Perris Boulevard/South Project Driveway, and Perris Boulevard/Harley Knox Boulevard. Based on recommendation from the City of Moreno Valley, Passenger Car Equivalent (PCE) volumes at these locations were computed using a PCE factor of 1.5 for 2-axle trucks, 2.0 for 3-axle trucks, and 3.0 for trucks with 4 or more axles. The percentage of trucks at intersections where classification counts were not conducted was determined based on percentage of trucks and average truck PCE at the nearest intersection with

classification counts. Detailed volume development worksheets are included in the Traffic Study (Appendix G).

The peak hour volumes for freeway segments are derived from a percentage of the bidirectional AADT known as the K factor multiplied by the percentage of peak hour travel in the peak direction known as the D factor. Based on Caltrans data, 7.9 percent (K factor) of AADT occurs in the a.m. peak hour with 63.3 percent (D factor) of the total traffic traveling southbound and 36.7 percent in the northbound direction. In addition, 7.4 percent of AADT occurs in the p.m. peak hour with 56.3 percent of the total traffic traveling southbound and 43.7 percent in the northbound direction.

4.5.1.3 Existing Intersection Levels of Service

Traffic Level of Service Definitions. Level of service (LOS) will be referred to frequently in this section. Roadway operations and the relationship between capacity and traffic volumes are generally expressed in LOS, which are defined using the letter grades A through F (Table 4.5.A) and reflect the reality that conditions rapidly deteriorate as traffic approaches a thoroughfare's absolute capacity.

LOS was used in the traffic study to determine adequate operation of each of the study intersections. These intersections were selected based on the City of Moreno Valley Public Works Department staff recommendations. The distribution of project trips was developed in consultation with City staff by examining the location of the proposed project trips in relation to the surrounding residential areas, as well as the regional roadway network, which follows current practice. The freeway segments on I-215 are under the jurisdiction of Caltrans; all study intersections on Harley Knox Boulevard are under the jurisdiction of the City of Perris; and all other study intersections are under the jurisdiction of the City of Moreno Valley.

Table 4.5.A: Traffic Level of Service (LOS) Definitions

LOS	Description
A	No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. The approach appears quite open, turns are made easily, and nearly all drivers find freedom of operation.
B	This service level represents stable operation, where an occasional approach phase is fully utilized and a substantial number approach full use. Many drivers begin to feel restricted within platoons of vehicles.
C	This level still represents stable operating conditions. Occasionally drivers may have to wait through more than one red signal indication, and backups may develop behind turning vehicles. Most drivers feel somewhat restricted, but not objectionably so.
D	This level encompasses a zone of increasing restriction approaching instability at the intersection. Delays to approaching vehicles may be substantial during short peaks within the peak period; however, enough cycles with lower demand occur to permit periodic clearance of developing queues, thus preventing excessive backups.
E	Capacity occurs at the upper end of this service level. It represents the most vehicles that any particular intersection approach can accommodate. Full utilization of every signal cycle is seldom attained no matter how great the demand.
F	This level describes forced flow operations at low speeds, where volumes exceed capacity. These conditions usually result from queues of vehicles backing up from a restriction downstream. Speeds are reduced substantially and stoppages may occur for short or long periods of time due to the congestion. In the extreme case, both speed and volume can drop to zero.

Source: *Highway Capacity Manual, Special Report 209,* Transportation Research Board, Washington, DC, 1985.

4.5.1.4 Level of Service Standards

Intersections on Harley Knox Boulevard are under the jurisdiction of the City of Perris, and all other study intersections are under the jurisdiction of the City of Moreno Valley. The City of Moreno Valley's

standard for peak hour intersection LOS and roadway segment LOS is either LOS C or LOS D, depending on the LOS defined for that roadway in the General Plan Circulation Element. The standard of LOS D applies to all City intersections and roadways analyzed in the traffic study conducted for the proposed project. The intersection and roadway level of service standard for the City of Perris is D. Caltrans considers acceptable LOS to be between LOS C and LOS D for all intersections under its jurisdiction; therefore, all signalized ramp terminus intersections on I-15 must operate with a weighted average delay of 45 seconds or less (representing the midpoint of the delay range for LOS D). If project traffic contributes to an existing or cumulative unsatisfactory LOS, it is considered a significant cumulative impact. Therefore, recommendation of circulation improvements is required for all intersections operating at LOS E or F. Any intersection operating below the relevant jurisdiction's level of service is considered an impact requiring mitigation. Table 4.5.B summarizes the level of service criteria for unsignalized and signalized intersections.

Table 4.5.B: Level of Service Criteria for Unsignalized and Signalized Intersections

Level of Service	Unsignalized Intersection Average Delay per Vehicle (seconds)	Signalized Intersection Average Delay per Vehicle (seconds)
A	$\leq$ 10	$\leq$ 10
B	> 10 and $\leq$ 15	> 10 and $\leq$ 20
C	> 15 and $\leq$ 25	> 20 and $\leq$ 35
D	> 25 and $\leq$ 35	> 35 and $\leq$ 55
E	> 35 and $\leq$ 50	> 55 and $\leq$ 80
F	> 50	> 80

Source: Transportation Research Board, *2000 Highway Capacity Manual, Intersection Level of Service Criteria,* December 2000.

As previously stated, the freeway segments on I-215 are under the jurisdiction of Caltrans. The level of service standard for freeway segments is LOS E. Any freeway segment operating below the level of service standard E is considered an impact requiring mitigation.

4.5.1.5 Baseline and Cumulative Traffic Scenarios

Existing baseline and cumulative peak hour traffic operations have been evaluated for both the a.m. and p.m. peak hours of traffic at the study area intersections. A level of service analysis was conducted to evaluate existing baseline and cumulative a.m. and p.m. peak hour traffic operations at the study area intersections. LOS is discussed in the following paragraphs for these two traffic analysis scenarios against which project impacts are compared:

- Existing setting baseline without the project; and,
- Opening year (2013) cumulative without the project.

Existing Setting Baseline. Existing traffic volumes at study area intersections are based on peak hour intersection turn movement counts. An intersection level of service analysis was conducted for existing conditions to determine current circulation system performance. As identified in Table 4.5.C, all study area intersections are currently operating at a satisfactory level of service (LOS D) or better.

A roadway segment level of service analysis was conducted for existing without project conditions to determine current roadway performance. Table 4.5.C summarizes the level of service analysis results. As shown in Table 4.5.C, the following roadway segments operate at unsatisfactory levels of service:

- Perris Boulevard north of Grove View Road (southbound); and

- Perris Boulevard south of South Project Driveway (northbound and southbound).

Table 4.5.C also summarizes the existing without project levels of service for freeway segments and ramp merge/diverge areas. As shown in Table 4.5.C, the following freeway segments and ramp merge/diverge areas operate at unsatisfactory levels of service:

- Harley Knox Boulevard Off-Ramp (diverge area) at Southbound I-215 (a.m. peak hour); and
- Harley Knox Boulevard On-Ramp (merge area) at Southbound I-215 (a.m. peak hour).

Opening Year (2013) Cumulative Without the Project. For the opening year (2013) cumulative scenario, information concerning approved and pending projects in the project vicinity was obtained from the City of Moreno Valley, City of Perris, County of Riverside, and March JPA and added to the year 2013 traffic volumes. From this information, 44 projects were identified that would interact with the proposed project and have potential impacts at the study intersections under year 2013 conditions. Trip generation for the approved and pending projects were calculated based on the rates published in the ITE *Trip Generation,* 8th Edition. As identified in Table 4.5.C, the following nine intersections were forecast to operate at unsatisfactory levels of service in opening year 2013 cumulative without the project:

- I-215 Southbound Ramps/Harley Knox Boulevard (a.m. and p.m. peak hours);
- I-215 Northbound Ramps/Harley Knox Boulevard (a.m. and p.m. peak hours);
- Indian Street/Harley Knox Boulevard (a.m. and p.m. peak hours);
- Perris Boulevard/Gentian Avenue (a.m. and p.m. peak hours);
- Perris Boulevard/Krameria Avenue (a.m. and p.m. peak hours);
- Perris Boulevard/Nandina Avenue (a.m. and p.m. peak hours);
- Perris Boulevard/Grove View Road (a.m. and p.m. peak hours);
- Perris Boulevard/South Project Driveway (a.m. and p.m. peak hours); and
- Perris Boulevard/Harley Knox Boulevard (a.m. and p.m. peak hours).

A roadway segment level of service analysis was conducted for the year 2013 cumulative without project conditions to determine projected roadway performance. Table 4.5.C summarizes the level of service analysis results. As shown in Table 4.5.C, the following three roadway segments are projected to operate at unsatisfactory levels of service:

- Harley Knox Boulevard west of Indian Street (eastbound and westbound);
- Perris Boulevard north of Grove View Road (southbound only); and
- Perris Boulevard south of South Project Driveway (northbound and southbound).

Table 4.5.C also summarizes the year 2013 cumulative without project levels of service for freeway segments and ramp merge/diverge areas and shows that the following freeway segments and ramp merge/diverge areas are projected to operate at unsatisfactory levels of service:

- Freeway segment north of Harley Knox Boulevard (a.m. peak hour);
- Harley Knox Boulevard Off-Ramp (diverge area) at Southbound I-215 (a.m. peak hour); and
- Harley Knox Boulevard On-Ramp (merge area) at Southbound I-215 (a.m. peak hour).

Table 4.5.C: Baseline and Cumulative Levels of Service Without Project

Location	Traffic Control/Type	Level of Service (LOS)			
		Existing		Opening Year (2013) Cumulative	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Study Area Intersections					
I-215 Southbound Ramps/Harley Knox Boulevard	Signal	C	C	**F**	**F**
I-215 Northbound Ramps/Harley Knox Boulevard	Signal	C	B	**F**	**F**
Indian Street/Nandina Avenue	Signal	C	C	C	D
Indian Street/Grove View Road	TWSC	B	B	B	B
Indian Street/North Project Driveway	TWSC	*Future Intersection*		*Future Intersection*	
Indian Street/South Project Driveway	TWSC	*Future Intersection*		*Future Intersection*	
Indian Street/Harley Knox Boulevard	Signal	C	C	**F**	**F**
Perris Boulevard/Gentian Avenue	Signal	B	C	**F**	**F**
Perris Boulevard/Iris Avenue	Signal	**D**	**C**	**F**	**F**
Perris Boulevard/Krameria Avenue	Signal	C	**C**	**F**	**F**
Perris Boulevard/Nandina Avenue	Signal	B	B	**F**	**F**
Perris Boulevard/Grove View Road	Signal	B	B	**F**	**F**
Perris Boulevard/North Project Driveway	TWSC	*Future Intersection*		*Future Intersection*	
Perris Boulevard/South Project Driveway	Signal	A	A	**F**	**F**
Perris Boulevard/Harley Knox Boulevard	Signal	**B**	**B**	**F**	**F**
West Project Driveway/Grove View Road	TWSC	*Future Intersection*		*Future Intersection*	
Center Project Driveway/Grove View Road	TWSC	*Future Intersection*		*Future Intersection*	
East Project Driveway/Grove View Road	TWSC	*Future Intersection*		*Future Intersection*	
Study Area Roadway Segments					
Nandina Avenue west of Indian Street	NA	A	A	A	A
Harley Knox Boulevard west of Indian Street	NA	A	B	F	F
Indian Street north of Grove View Road	NA	A	A	D	D
Indian Street south of South Project Driveway	NA	A	A	E	F
Perris Boulevard north of Grove View Road	NA	A	F	C	F
Perris Boulevard south of South Project Driveway	NA	F	F	F	F

Table 4.5.C: Baseline and Cumulative Levels of Service Without Project

Location	Traffic Control/Type	Level of Service (LOS)			
		Existing		Opening Year (2013) Cumulative	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Study Area Freeway Segments and Ramps					
I-215 Northbound					
North of Harley Knox Boulevard	Basic	C	C	C	D
Harley Knox Boulevard On-Ramp (merge area)	1 Lane Off	C	C	D	D
Between Harley Knox Boulevard Ramps	Basic	B	B	C	C
Harley Knox Boulevard Off-Ramp (diverge area)	1 Lane On	C	C	D	D
South of Harley Knox Boulevard	Basic	C	C	C	D
I-215 Southbound					
North of Harley Knox Boulevard	Basic	E	D	F	E
Harley Knox Boulevard Off-Ramp (diverge area)	1 Lane Off	F	D	F	F
Between Harley Knox Boulevard Ramps	Basic	E	D	E	D
Harley Knox Boulevard On-Ramp (merge area)	1 Lane On	F	D	F	D
South of Harley Knox Boulevard	Basic	D	D	F	D

Shaded = Exceeds LOS standard; TWSC = Two Way Stop Control
Source: *Traffic Study, VIP Moreno Valley, City of Moreno Valley, Riverside County, California,* LSA Associates, Inc., April 2012, Appendix G of this EIR.

4.5.2 Existing Policies and Regulations

The City of Moreno Valley's current General Plan was approved in July 2006. Goals and policies extracted from the Circulation Element are included in the current General Plan. The specific policies and recommendations of implementation of the General Plan that are relevant to the proposed project are as follows:

Circulation Element

Objective 5.1 Create a safe, efficient, and neighborhood-friendly street system.

Policy 5.1.1 Plan access and circulation of each development project to accommodate vehicles (including emergency vehicles and trash trucks), pedestrians, and bicycles.

Policy 5.1.2 Plan the circulation system to reduce conflicts between vehicular, pedestrian and bicycle traffic.

Policy 5.1.3 Require adequate off-street parking for all developments.

Policy 5.1.4 Driveway placement shall be designed for safety and to enhance circulation wherever possible.

Policy 5.1.5 Incorporate American Disability Act (ADA) and Title 24 requirements in roadway improvements as appropriate.

Policy 5.1.6 Design new developments to provide opportunity for access and circulation to future adjacent developments.

Objective 5.3 Maintain Level of Service (LOS) C on roadway links, wherever possible, and LOS D in the vicinity of SR 60 and high employment centers.

Policy 5.3.1 Obtain right-of-way and construct roadways in accordance with the designation shown on the General Plan Circulation Element Map and the City street improvement standards.

Policy 5.3.5 Ensure that new development pays a fair-share cost to provide local and regional transportation improvements and to mitigate cumulative traffic impacts. For this purpose, require new developments to participate in Transportation Uniform Mitigation Fee (TUMF), the Development Impact Fee Program (DIF), and any other applicable transportation fee programs and benefit assessment districts.

Policy 5.3.6 Where new developments would increase traffic flows beyond the LOS C (or LOS D, where applicable), require appropriate and feasible mitigation measures as a condition of approval. Such measures may include extra right-of-way and improvements to accommodate left-turn and right-turn lanes at intersections, or other improvements.

Policy 5.3.7 Provide consideration to projects that have overriding regional or local benefits that would be desirable even though the LOS standards cannot be met. These projects would be required to analyze traffic impacts and mitigate such impacts to the extent that it is deemed feasible.

Objective 5.5 Maximize efficiency of the local circulation system by using appropriate policies and standards to design, locate, and size roadways.

Policy 5.5.3 Prohibit points of access from conflicting with other existing or planned access points. Require points of access to roadways to be separated sufficiently to maintain capacity, efficiency, and safety of the traffic flow.

Policy 5.5.4 Wherever possible, minimize the frequency of access points along streets by the consolidation of access points between adjacent properties on all circulation element streets, excluding collectors.

Policy 5.5.5 Design streets and intersections in accordance with the Moreno Valley Municipal Code.

Policy 5.5.8 Whenever possible, require private and public land developments to provide on-site and off-site improvements necessary to mitigate any development-generated circulation impacts. A review of each proposed land development project shall be undertaken to identify project impacts to the circulation system. The City may require developers to provide traffic impact studies prepared by qualified professionals to identify the impacts of a development.

Policy 5.5.9 Design curves and grades to permit safe movement of vehicular traffic per applicable Caltrans and Moreno Valley standards.

Policy 5.5.10 Provide adequate sight distances for safe vehicular movement at all intersections and driveways.

Objective 5.8 Encourage development of an efficient public transportation system for the entire community.

Policy 5.8.4 Ensure that all new developments make adequate provision for bus stops and turnout areas for both public transit and school bus service.

Objective 5.11 Eliminate obstructions that impede safe movement of vehicles, bicyclists, and pedestrians.

Policy 5.11.2 Driveways shall be designed to avoid conflicts with pedestrian and bicycle travel.

Program 5-1 Periodically review current traffic volumes, traffic collision data, and the pattern of urban development to coordinate, program, and as necessary revise the planning and prioritization of road improvements.

Program 5-6 Conduct studies of specified arterial segments to determine if any additional improvements will be needed to maintain an acceptable LOS at General Plan build-out. Generally, these segments will be studied as new developments are proposed in their vicinity. Measures will be identified that are consistent with the Circulation Element designation of these roadway segments, such as additional turn lanes at intersections, signal optimization by coordination and enhanced phasing, and travel demand management measures. The study of specified arterial segments will be required to identify measures to maintain an acceptable LOS at General Plan build-out for at least one of the reasons discussed below:

(a) Segments will need improvement, but their ultimate volumes slightly exceed design capabilities.

(b) Segments will need improvements but require inter-jurisdictional coordination.

(c) Segments would require significant encroachment on existing adjacent development if built out to their Circulation Element designations.

Program 5-13 Implement Transportation Demand Management (TDM) strategies that reduce congestion in the peak travel hours. Examples include carpooling, telecommuting, and flexible work hours.

City of Moreno Valley Development Impact Fee Program

The City of Moreno Valley has a development impact fee (DIF) program that is used to collect fees from new residential, commercial, and industrial development for funding roadways and intersections to accommodate City growth as identified in the City's General Plan Circulation Element. The City of Moreno Valley updated its DIF program in February 2008 in response to the City's General Plan update, which occurred in 2006. Adoption of the updated DIF program has been deferred. The DIF program was updated to include new roadway segments and intersections necessary to accommodate future growth and to ensure that the identified street improvements would operate at or above the City's LOS performance threshold. The DIF program includes facilities that are not part of improvements identified and covered by the TUMF program. Therefore, the pairing of regional and local fee programs provides a more comprehensive funding and implementation plan to ensure an adequate circulation system. Under the City's DIF program, the City may grant to developers a credit against specific components of fees when those developers construct certain improvements identified in the list of improvements funded by the DIF program.

After the City's DIF fees are collected, they are placed in a separate account. The timing to use the DIF fees is established through periodic capital improvement programs, which are overseen by the City's Public Works Department. The City's DIF program establishes a mechanism to fund design and construction of General Plan roadways. The City uses citywide traffic counts, traffic trends, and a review of traffic accidents to determine the timing of the improvements listed in its capital improvement facilities list. The City also uses these data to prioritize the timing of improvements listed on the facilities list.

Transportation Uniform Mitigation Fee Program

The Transportation Uniform Mitigation Fee (TUMF) program, which is administered by the Western Riverside Council of Governments (WRCOG), is based upon a regional Nexus Study completed in early 2003 and updated in 2006. The update addresses major changes in right-of-way acquisition and improvement cost factors. The TUMF identifies a network of roadways needed to accommodate growth through 2030. This program ensures that development pays its fair share and that funding is in place for construction of facilities needed to maintain the requisite levels of service and is critical to mobility in the region. The TUMF is implemented in every jurisdiction in Western Riverside County.

TUMF fees are imposed on new residential, industrial, and commercial development through application of the TUMF fee ordinance and fees are generally collected at the building permit stage. After the TUMF fees are collected, they are placed in a separate interest-bearing account pursuant to the requirements of Government Code sections 66000 et seq. The TUMF funds both local and regional projects. Local projects receive about 48 percent of all funds, are programmed into five localized zones, and fund the construction of localized projects that are proposed by the affected local jurisdictions within each zone.

4.5.3 Methodology

Evaluation of traffic and circulation impacts associated with the proposed project includes the following:

4.5.3.1 Project Trip Generation

The project trip generation is based on the City of Moreno Valley trip rates for High-Cube warehousing as derived from the NAIOP trip generation study (2006). Based on discussion with the City, the vehicle splits for Truck Terminal from the City of Fontana's *Truck Trip Generation Study* were used to convert project trips into PCE trips.

Table 4.5.D shows the calculation of the project trip generation. As shown in Table 4.5.D, the project is expected to generate 327 PCE trips in the a.m. peak hour, 388 PCE trips in the p.m. peak hour, and 5,052 daily PCE trips.

Table 4.5.D: Project Trip Generation

Vehicle Type	A.M. Peak Hour			P.M. Peak Hour			Daily
	In	Out	Total	In	Out	Total	
Passenger Cars	45	37	82	23	74	97	1,256
Truck Trips (total raw trucks)	45	50	95	74	39	113	1,475
2-axle (PCE)	8	9	17	12	8	20	249
3-axle (PCE)	22	26	48	38	20	58	760
4+-axle (PCE)	87	93	180	141	72	213	2,787
Total Trips (PCE)[1]	**162**	**165**	**327**	**214**	**174**	**388**	**5,052**

Notes: PCE = Passenger Car Equivalent.
Total a.m. peak hour, p.m. peak hour and daily rates from modified NAIOP rates for High-Cube Warehousing as approved by the City of Moreno Valley.
All trip generation rates converted to car and truck trips using vehicle mix and enter/exit splits for Truck Terminal from Fontana Truck Trip Generation Study.
Truck trips converted to PCEs based on the SANBAG PCE values.
[1] Total Trips (PCE) = Passenger Cars + PCE Truck Trips.

The concept of PCEs accounts for the larger impact of trucks on traffic operations. It does so by assigning each type of truck a PCE factor that represents the number of passenger vehicles that could travel through an intersection in the same time that a particular type of truck could. PCE volumes for study area locations were computed using a PCE factor of 1.5 for 2-axle trucks, 2.0 for 3-axle trucks, and 3.0 for trucks with 4 or more axles, which are values recommended by the City of Moreno Valley. For example, in this report, trucks with four or more axles have been assigned a PCE factor of 3.0, indicating that three passenger vehicles could travel through an intersection in the same amount of time required for a single truck with four or more axles; therefore, the impacts and mitigations identified in this EIR incorporate the impact of trucks on intersection operations.

4.5.3.2 Trip Distribution and Assignment

Trip distribution patterns were estimated by examining the location of the project in relation to the regional roadway network and adjoining land uses and through consultation with City staff. Trip distribution was developed separately for passenger vehicles and trucks. Trip distribution for roadway segments was developed using a similar methodology.

The project trip generation was applied to the trip distribution patterns for the proposed project to develop trip assignments for new project trips. Trip assignment for roadway segments was developed by applying the project daily trip generation to the roadway segment distribution.

4.5.4 Thresholds of Significance

In the Initial Study[1] for this project, it was concluded that the proposed project could create potentially significant traffic impacts associated with the following CEQA traffic impact thresholds of significance if the project would:

- *Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways, and freeways, pedestrian and bicycle paths, and mass transit.*

  (A significant traffic impact would occur if the project would cause a decrease from a standard LOS to a less than standard LOS at a study intersection based on a peak hour analysis.)

  - City of Moreno Valley LOS C or LOS D, depending on the LOS defined for that roadway in the General Plan Circulation Element, and
  - California Department of Transportation LOS standard is LOS D.
- *Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.*
- *Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.*

The Initial Study also concluded that the project would not impact or would create a less than significant impact associated with the following CEQA traffic impact thresholds:

- *Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).*
- *Result in inadequate emergency access.*
- *Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease performance or safety of such facilities.*

4.5.5 No Impact/Less than Significant Impacts

The following potential impacts were determined to be less than significant. In each of the following issues, either no impact would occur (therefore, no mitigation would be required) or adherence to established regulations, standards, and policies would reduce potential impacts to a less than significant level.

4.5.5.1 Design Features or Incompatible Uses

Threshold	Would the proposed project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

The design of roadways must provide adequate sight distance and traffic control measures. This provision is normally realized through roadway design to facilitate roadway traffic flows. Roadway

[1] *Initial Study, VIP Moreno Valley, City of Moreno Valley, Riverside County, California,* prepared by LSA Associates, Inc., July 25, 2011 (see Appendix A).

improvements in and around the project site would be designed and constructed to satisfy all City requirements for street widths, corner radii, intersection control as well as incorporate design standards tailored specifically to site access requirements.

The final design of all roadways and intersections within the project site access would be reviewed by a licensed professional civil engineer to ensure adequate safety when traveling to and from the project site. The proposed project does not include any sharp curves or dangerous intersections in its design. Adherence to applicable existing requirements of the City of Moreno Valley consistent with the City's Circulation Element Objectives 5.1 (create a safe, efficient, and neighborhood-friendly street system), 5.5 (maximize efficiency of the local circulation system by using appropriate policies and standards to design, locate, and size roadways), and 5.11 (eliminate obstructions that impede safe movement of vehicles, bicyclists, and pedestrians) and other agencies would reduce impacts associated with this issue to a less than significant level and no mitigation is required.

4.5.5.2 Inadequate Emergency Access

Threshold	Would the proposed project result in inadequate emergency access?

The developers of the proposed project would be required to design, construct, and maintain structures, roadways, and facilities to provide for adequate emergency access and evacuation. Construction activities, which may temporarily restrict vehicular traffic, would be required to implement adequate and appropriate measures to facilitate the passage of persons and vehicles through/around any required road closures. The proposed project design would be submitted to and approved by the City's Fire and Police Departments prior the issuance of building permits. Adherence to applicable existing requirements of the City of Moreno Valley and other agencies would reduce impacts associated with this issue to a less than significant level and no mitigation is required.

4.5.5.3 Alternative Transportation

Threshold	Would the proposed project conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

The Riverside Transit Agency (RTA) has numerous bus routes that serve the City of Moreno Valley and bus service in the project area is via Route 19. Route 19 provides service along Perris Boulevard and provides a bus stop along Perris Boulevard north of Lateral B of the Perris Valley Storm Drain adjacent to the project site, at the intersection of Perris Boulevard and Nandina Avenue approximately one quarter mile north of the site, at the intersection of Perris Boulevard and E. Nance Street approximately one quarter mile south of the project site, at the intersection of Perris Boulevard and Markham Street approximately one half mile south of the project site, and at the intersection of Perris Boulevard and Ramona Expressway, approximately 1.0 mile south of the project site. RTA provides service along Perris Boulevard and provides service directly to the project site. The City also provides a multi-use trail system as part of the City's Master Plan of Trails. These trails provide for recreational and non-motorized travel throughout the City. The City's *Master Plan of Trails Map*[1] does not identify any existing or proposed trails in the vicinity of the project site.

The design of the proposed project would be required to adhere to applicable City of Moreno Valley standards that support and/or facilitate alternative modes of transportation, including but not limited to pedestrian pathways and sidewalks consistent with the City's Circulation Element Objective 5.8 (encourage development of an efficient public transportation system for the entire community). Through the City's project review process, policies, plans, and/or programs supporting alternative

[1] *Master Plan Trails Map*, City of Moreno Valley, print date October 26, 2010.

transportation would be reviewed and incorporated as applicable. Consequently, a less than significant impact would occur as a result of the proposed project and no mitigation is required.

4.5.5.4 Air Traffic Patterns

Threshold	Would the proposed project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

Airport facilities within the vicinity of the project site include the March Air Field, which is part of the March Air Reserve Base (MARB). The proposed project site is located approximately 0.75 mile east of March Air Field. The MARB encompasses approximately 6,500 acres of the Air Force Reserve's 452nd Air Mobility Wing, which provides host base support for numerous tenant active military units. It is also the home of 4th Air Force and multiple units of the California Air National Guard. When March Air Force Base (March AFB) was converted from an active duty base to a Reserve Base in 1996, the decision resulted in approximately 4,400 acres of property and facilities being declared surplus and available for disposal actions, as well as joint use of the airfield. With the realignment of March AFB, the MARB Redevelopment Project Area was established. The MARB Redevelopment Project Area includes the entire 6,500-acre former active duty base area, and approximately 450 acres adjacent to the base in the industrial area of the City of Moreno Valley.

To implement the MARB Redevelopment Project Area and to facilitate the transition of a portion of the MARB from military to civilian uses, the March Joint Powers Authority (March JPA), consisting of the County of Riverside and the Cities of Moreno Valley, Perris, and Riverside, was formed. The March JPA along with the U.S. Air Force pursued the establishment of March Air Field as a joint use airport.

The Air Force defines a "joint use airport" as one where the facilities which are owned and operated by the Air Force are made available for use by civil aviation. A joint use agreement between these parties was executed May 7, 1997, along with land leases for over 300 acres as the civilian airport name March Inland Port (MIP). Under the agreement, the civilian (March JPA) and the military (AFRC) entities share essential aviation facilities such as the control towers and runways, as well as maintenance of facilities, under this joint use arrangement. Under the provisions of the Joint Use Agreement, the MIP is the civilian facility that is managed and operated by the MIP Airport Authority (MIPAA). The MIP includes air cargo operations such as the March Global Port, a 350-acre commercial air cargo and distribution center.

The Department of the Defense (Air Force) completed an Air Installation Compatible Use Zone (AICUZ) study for MARB in 1998. The AICUZ study was designed and is intended to aid in the development of compatible land uses in non-government areas surrounding military airfields to protect public safety and health. The study established three zones based on potential crash patterns: a Clear Zone and two Accident Potential Zones (APZ). The Clear Zone reaches from along the extended runway centerline to a distance of 3,000 feet, APZ 1 extends from 3,000 feet to 8,000 feet, and APZ II extends from 8,000 feet to 15,000 feet. According to the AICUZ, outside of the Clear Zone and APZs “the risk of aircraft accidents is not significant enough to warrant special consideration in land use planning.” The proposed project site is not located within a Clear Zone, APZ 1, or APZ 2 for MARB as designated by the Air Force 2005 AICUZ Study.

In addition to the AICUZ, Airport Influence Area boundaries around MARB have been adopted by County of Riverside Airport Land Use Commission (ALUC) in its Airport Land Use Plan (ALUP). The project site is approximately 0.75 mile east of the March Air Field and is entirely within Airport Influence Area II. As part of the standard process for development within Airport Influence Areas for MARB, proposed projects are required to be reviewed by the ALUC for consistency with the ALUP.

As a standard condition imposed during ALUC reviews, developments located within the boundaries of Influence Area III are required to provide avigation easements. To ensure consistency with the ALUC recommendations is maintained, avigation easements will be required as part of a condition of approval for the project site. Development that would occur within Airport Influence II of MIP would not include any features that would alter air traffic patterns or the level of air traffic at the MIP; therefore, a less than significant air traffic safety impact would occur and no mitigation is required.

4.5.6 Significant Impacts

4.5.6.1 Existing Plus Project Intersection, Roadway Segment, and Freeway Segment Impacts.

Threshold	Would the proposed project conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways, and freeways, pedestrian and bicycle paths, and mass transit? Would the proposed project conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

Impact 4.5.6.1: *Two roadway segments and three freeway segments are forecast to exceed satisfactory levels of service in the existing plus project conditions creating a significant impact.*

The existing plus project levels of service for the study area intersections are summarized in Table 4.5.E. All study area intersections operate at a satisfactory level of service. No intersection level of service impacts would occur and no mitigation is required.

The existing plus project levels of service for the study area roadway segments are also summarized in Table 4.5.E. As shown in Table 4.5.E, the following roadway segments are projected to operate at unsatisfactory levels of service:

- Perris Boulevard north of Grove View Road (southbound); and
- Perris Boulevard south of South Project Driveway (northbound and southbound).

This is a significant impact and mitigation is required. It should be noted that these roadway segments also operate at unsatisfactory levels of service under existing without project conditions.

The existing plus project levels of service for the study area freeway segments are also summarized in Table 4.5.E. As shown in Table 4.5.E, the following freeway segments are projected to operate at unsatisfactory levels of service:

- Harley Knox Boulevard Off-Ramp (diverge area) at Southbound I-215 (a.m. peak hour); and
- Harley Knox Boulevard On-Ramp (merge area) at Southbound I-215 (a.m. peak hour).

This is a significant impact and mitigation is required. It should be noted that these two freeway segments also operate at unsatisfactory levels of service under existing without project conditions.

Mitigation Measures. To ensure existing plus project local traffic impacts are reduced to a less than significant level, the following mitigation measures shall be implemented.

4.5.6.1A. Prior to the issuance of building permits, the project applicant shall participate in the City of Moreno Valley Development Impact (DIF) Fee Program and pay the project's fair share for local circulation improvements as outlined in the VIP Moreno Valley Project Traffic Study. The City shall ensure that the intersection and street improvements outlined in the VIP Moreno Valley Project Traffic Study will be constructed pursuant to the timeframes established by the City of Moreno Valley Development Impact Fee Program.

4.5.6.1B. Prior to the issuance of building permits, the project applicant shall participate in the County of Riverside Transportation Uniform Mitigation Fee (TUMF) Program and pay the project's fair share for regional circulation improvements. The City shall ensure that the intersection and street improvements outlined in the VIP Moreno Valley Project Traffic Study will be constructed pursuant to the timeframe established by the County of Riverside TUMF Program.,

Level of Significant After Mitigation. As identified in Table 4.5.E, all study intersections are forecast to operate at acceptable levels of service in the existing plus project scenario. The two deficient roadway segments on Perris Boulevard were previously identified as deficient in the pre-project scenario; therefore, the project contributes to these existing deficiencies. Payment of the City's DIF and transportation TUMF fees as set forth in **Mitigation Measures 4.5.6.1A** and **4.5.6.1A** will provide full and complete mitigation of the project's impact on the local and regional roadway and intersection circulation system. The improvements to Perris Boulevard identified in the traffic study prepared for the project are consistent with the City's General Plan and are included in the County's TUMF program. A portion of the City's DIF is allocated toward funding improvements to the City's transportation system and the specific improvements are based on the General Plan Circulation Element. For these reasons, the project's impacts to affected roadway segments will be mitigated through payment of the City's DIF and the County's TUMF.

The City is currently in the process of implementing a Capital Improvement Project to widen Perris Boulevard from Cactus Avenue south to city limits. The improvement project will widen Perris Boulevard to a six-lane street section, consistent with the General Plan. Construction is scheduled to start in the summer of 2012 and end in May 2013. The widening will encompass the improvements defined in the project traffic study for two segments of Perris Boulevard. The resultant levels of service with implementation of the identified improvements are presented in Table 4.5.F.

Improvements to affected freeway segments are outside the City's jurisdiction. Since the City has no control over when and how these improvements will be in place, impacts associated with the two freeway segments (Harley Knox Boulevard Southbound I-215 Off-Ramp diverge area; and Harley Knox Boulevard Southbound I-215 On-Ramp merge area) would remain significant and unavoidable until such improvements are constructed.

4.5.6.2 Opening Year 2013 Cumulative With Project Conditions Intersection, Roadway Segment, and Freeway Segment Impacts

Impact 4.5.6.2: *Eleven intersections, four roadway segments, and four freeway segments are forecast to exceed satisfactory levels of service in the year 2013 cumulative plus project conditions, creating a significant impact.*

Table 4.5.E: Existing Plus Project and Year 2013 Cumulative Plus Project Levels of Service

Location	Traffic Control/Type	Level of Service (LOS)			
		Existing Plus Project		Opening Year (2013) Cumulative Plus Project	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Study Area Intersections					
I-215 Southbound Ramps/Harley Knox Boulevard	Signal	C	C	**F**	**F**
I-215 Northbound Ramps/Harley Knox Boulevard	Signal	C	C	**F**	**F**
Indian Street/Nandina Avenue	Signal	C	C	C	D
Indian Street/Grove View Road	TWSC	B	B	B	C
Indian Street/North Project Driveway	TWSC	B	B	C	C
Indian Street/South Project Driveway	TWSC	B	C	D	**E**
Indian Street/Harley Knox Boulevard	Signal	C	C	**F**	**F**
Perris Boulevard/Gentian Avenue	Signal	B	C	**F**	**F**
Perris Boulevard/Iris Avenue	Signal	D	C	F	F
Perris Boulevard/Krameria Avenue	Signal	C	C	**F**	**F**
Perris Boulevard/Nandina Avenue	Signal	B	B	**F**	**F**
Perris Boulevard/Grove View Road	Signal	B	B	**F**	**F**
Perris Boulevard/North Project Driveway	TWSC	A	A	A	A
Perris Boulevard/South Project Driveway	Signal	B	A	**F**	**F**
Perris Boulevard/Harley Knox Boulevard	Signal	B	B	**F**	**F**
West Project Driveway/Grove View Road	TWSC	A	A	A	A
Center Project Driveway/Grove View Road	TWSC	A	A	A	A
East Project Driveway/Grove View Road	TWSC	A	A	A	A
Study Area Roadway Segments					
Nandina Avenue west of Indian Street	NA	A	A	A	A
Harley Knox Boulevard west of Indian Street	NA	B	D	F	F
Indian Street north of Grove View Road	NA	A	A	D	D
Indian Street south of South Project Driveway	NA	B	B	F	F
Perris Boulevard north of Grove View Road	NA	A	F	C	F
Perris Boulevard south of South Project Driveway	NA	F	F	F	F

Table 4.5.E: Existing Plus Project and Year 2013 Cumulative Plus Project Levels of Service

Location	Traffic Control/Type	Level of Service (LOS)			
		Existing Plus Project		Opening Year (2013) Cumulative Plus Project	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Study Area Freeway Segments and Ramps					
I-215 Northbound					
North of Harley Knox Boulevard	Basic	C	C	C	D
Harley Knox Boulevard On-Ramp (merge area)	1 Lane Off	C	C	D	D
Between Harley Knox Boulevard Ramps	Basic	B	C	C	C
Harley Knox Boulevard Off-Ramp (diverge area)	1 Lane On	C	C	D	D
South of Harley Knox Boulevard	Basic	C	C	C	D
I-215 Southbound					
North of Harley Knox Boulevard	Basic	E	D	F	E
Harley Knox Boulevard Off-Ramp (diverge area)	1 Lane Off	F	D	F	F
Between Harley Knox Boulevard Ramps	Basic	E	D	E	D
Harley Knox Boulevard On-Ramp (merge area)	1 Lane On	F	D	F	D
South of Harley Knox Boulevard	Basic	E	D	F	D

Shaded = Exceeds LOS standard; **Bold** = Queue exceeds the available storage capacity (based on the 95th percentile queue length); TWSC = Two Way Stop Control
Source: *Traffic Study, VIP Moreno Valley, City of Moreno Valley, City of Moreno Valley, Riverside County, California,* LSA Associates, Inc., April 2012, Appendix G of this EIR.

Table 4.5.F: Existing Plus Project and Year 2013 Cumulative Plus Project Levels of Service With Mitigation

Location	Traffic Control/Type	Level of Service (LOS)			
		Existing Plus Project		Opening Year (2013) Cumulative Plus Project	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Study Area Intersections					
I-215 Southbound Ramps/Harley Knox Boulevard	Signal	NA	NA	C	D
I-215 Northbound Ramps/Harley Knox Boulevard	Signal	NA	NA	C	C
Indian Street/Nandina Avenue	Signal	NA	NA	C	D
Indian Street/Grove View Road	TWSC	NA	NA	B	C

Table 4.5.F: Existing Plus Project and Year 2013 Cumulative Plus Project Levels of Service With Mitigation

Location	Traffic Control/Type	Level of Service (LOS)			
		Existing Plus Project		Opening Year (2013) Cumulative Plus Project	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Indian Street/North Project Driveway	TWSC	NA	NA	C	C
Indian Street/South Project Driveway	TWSC	NA	NA	C	C
Indian Street/Harley Knox Boulevard	Signal	NA	NA	D	D
Perris Boulevard/Gentian Avenue	Signal	NA	NA	B	B
Perris Boulevard/Iris Avenue	Signal	NA	NA	D	D
Perris Boulevard/Krameria Avenue	Signal	NA	NA	D	D
Perris Boulevard/Nandina Avenue	Signal	NA	NA	C	C
Perris Boulevard/Grove View Road	Signal	NA	NA	A	B
Perris Boulevard/North Project Driveway	TWSC	NA	NA	A	A
Perris Boulevard/South Project Driveway	Signal	NA	NA	A	A
Perris Boulevard/Harley Knox Boulevard	Signal	NA	NA	D	D
West Project Driveway/Grove View Road	TWSC	NA	NA	A	A
Center Project Driveway/Grove View Road	TWSC	NA	NA	A	A
East Project Driveway/Grove View Road	TWSC	NA	NA	A	A
Study Area Roadway Segments					
Nandina Avenue west of Indian Street	NA	A	A	A	A
Harley Knox Boulevard west of Indian Street	NA	B	D	D	E
Indian Street north of Grove View Road	NA	A	A	D	D
Indian Street south of South Project Driveway	NA	B	B	B	B
Perris Boulevard north of Grove View Road	NA	A	A	C	C
Perris Boulevard south of South Project Driveway	NA	A	A	D	D
Study Area Freeway Segments and Ramps					
I-215 Northbound					
North of Harley Knox Boulevard	Basic	C	C	C	D
Harley Knox Boulevard On-Ramp (merge area)	1 Lane Off	C	C	D	D
Between Harley Knox Boulevard Ramps	Basic	B	C	C	C

Table 4.5.F: Existing Plus Project and Year 2013 Cumulative Plus Project Levels of Service With Mitigation

Location	Traffic Control/Type	Level of Service (LOS)			
		Existing Plus Project		Opening Year (2013) Cumulative Plus Project	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Harley Knox Boulevard Off-Ramp (diverge area)	1 Lane On	C	C	D	D
South of Harley Knox Boulevard	Basic	C	C	C	D
I-215 Southbound					
North of Harley Knox Boulevard	Basic	E	D	F	E
Harley Knox Boulevard Off-Ramp (diverge area)	1 Lane Off	F	D	F	F
Between Harley Knox Boulevard Ramps	Basic	E	D	E	D
Harley Knox Boulevard On-Ramp (merge area)	1 Lane On	F	D	F	D
South of Harley Knox Boulevard	Basic	E	D	F	D

Shaded = Exceeds LOS standard; **Bold** = Queue exceeds the available storage capacity (based on the 95th percentile queue length); TWSC = Two Way Stop Control
Source: *Traffic Study, VIP Moreno Valley, City of Moreno Valley, City of Moreno Valley, Riverside County, California,* LSA Associates, Inc., April 2012, Appendix G of this EIR.

Threshold	Would the proposed project conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways, and freeways, pedestrian and bicycle paths, and mass transit? Would the proposed project conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

Opening year (2013) cumulative with project conditions considers the addition of traffic generated by the proposed project to opening year (2013) cumulative without project conditions. As previously noted, the opening year (2013) cumulative scenario was developed using traffic volumes that would be generated by approved and pending projects in the project vicinity and year 2013 traffic volumes. Additionally, projects currently included in the City's CIP and planned for construction by 2013 have been considered as complete. An intersection LOS analysis was conducted to determine opening year (2013) cumulative intersection performance. As identified in Table 4.5.E, the addition of project traffic to the opening year (2013) cumulative scenario would result in conditions exceeding the established LOS standard at the following intersections:

- I-215 Southbound Ramps/Harley Knox Boulevard (a.m. and p.m. peak hours);
- I-215 Northbound Ramps/Harley Knox Boulevard (a.m. and p.m. peak hours);
- Indian Street/South Project Driveway (p.m. peak hour);
- Indian Street/Harley Knox Boulevard (a.m. and p.m. peak hours);
- Perris Boulevard/Gentian Avenue (a.m. and p.m. peak hours);
- Perris Boulevard/Iris Avenue (a.m. and p.m. peak hours);
- Perris Boulevard/Krameria Avenue (a.m. and p.m. peak hours);
- Perris Boulevard/Nandina Avenue (a.m. and p.m. peak hours);
- Perris Boulevard/Grove View Road (a.m. and p.m. peak hours);
- Perris Boulevard/South Project Driveway (a.m. and p.m. peak hours); and
- Perris Boulevard/Harley Knox Boulevard (a.m. and p.m. peak hours).

This is a significant impact and mitigation is required. It is important to note that ten of the eleven intersections also operate at unsatisfactory levels of service under year 2013 cumulative without project conditions. The unsatisfactory level of service at the Indian Street/South Project Driveway intersection is considered to be a project-specific impact.

A roadway segment level of service analysis was conducted for the year 2013 cumulative with project condition to determine projected roadway performance. Table 4.5.E summarizes the level of service analysis results. As shown in Table 4.5.E, the following four roadway segments are projected to operate at unsatisfactory levels of service:

- Harley Knox Boulevard west of Indian Street (eastbound and westbound);
- Indian Street south of South Project Driveway (northbound and southbound);
- Perris Boulevard north of Grove View Road (southbound only); and

- Perris Boulevard south of South Project Driveway (northbound and southbound).

This is a significant impact and mitigation is required. It is important to note that these roadway segments also operate at unsatisfactory levels of service under year 2013 cumulative without project conditions.

Previously referenced Table 4.5.E summarizes the year 2013 cumulative with project levels of service for freeway segments and ramp merge/diverge areas. As shown in Table 4.5.E, the following freeway segments and ramp merge/diverge areas operate at unsatisfactory levels of service:

- Freeway segment north of Harley Knox Boulevard (a.m. peak hour);
- Harley Knox Boulevard Off-Ramp (diverge area) at Southbound I-215 (a.m. and p.m. peak hours);
- Harley Knox Boulevard On-Ramp (merge area) at Southbound I-215 (a.m. peak hour); and
- Freeway segment south of Harley Knox Boulevard (a.m. peak hour).

This is a significant impact and mitigation is required. It should be noted that these freeway segments also operate at unsatisfactory levels of service under year 2013 without project conditions.

Mitigation Measures. To ensure cumulative plus project traffic impacts are reduced to a less than significant level, previously referenced **Mitigation Measures 4.5.6.1A** and **4.5.6.1B** and the following mitigation measure shall be implemented.

4.5.6.2A. Prior to the issuance of occupancy permits, the project applicant shall have constructed the site access roadway improvements outlined below.

- Indian Street/South Project Driveway: Restripe to convert center turn lane on Indian Street to a two-way left-turn lane. This location does not meet a peak hour signal warrant. This is a site-adjacent improvement to be constructed by the project applicant.

Level of Significance After Mitigation. As described in detail in Section 4.5.1.4, the level of service performance standards used in this EIR are as follows:

- Freeway mainline lanes: LOS E.
- Harley Knox Boulevard intersections with the I-215 ramps: mid LOS D.
- All other intersections and roadway segments: LOS D.

Based in these performance standards, a significant project-specific traffic impact would occur if the project would cause a decrease from a standard LOS to a less than standard LOS based on a study area intersection, roadway segment, freeway mainline lane, or freeway merge/diverge analysis. A significant cumulative traffic impact would occur if the project contributes traffic toward those facilities operating at less than standard LOS in the pre-project condition. As described above in the preceding discussion, all of the intersection, roadway, and freeway mainline traffic impacts identified for the year 2013 cumulative with project condition were also affected in the year 2013 cumulative without project condition. For this reason, all of the impacts identified for the 2013 cumulative with project scenario are cumulative in nature.

The following intersection and roadway improvements were identified in the traffic study performed for the proposed project in order to maintain or improve the operational level of service of the street

system in the vicinity of the project site. The list shows the incremental improvement at each intersection or roadway segment required to mitigate the cumulative impacts. It is anticipated that the improvements required to maintain or to improve the level of service operations of transportation facilities affected by the project will be constructed through the City's DIF as supplemented by the County's TUMF program. The project will participate with these programs as part of previously referenced **Mitigation Measures 4.5.6.1A** and **4.5.6.1B**. The list of improvements is as follows:

- I-215 Southbound Ramps/Harley Knox Boulevard: Restripe the left-most westbound through lane as a left-turn lane. Restripe the off-ramp to provide two left-turn lanes and a shared through/right-turn lane. This improvement is part of the TUMF program.
- I-215 Northbound Ramps/Harley Knox Boulevard: Restripe the northbound shared through/left-turn lane as a shared left-turn/through/right-turn lane. Add an eastbound free right-turn lane. This improvement is part of the TUMF program.
- Indian Street/Harley Knox Boulevard: Add an eastbound through lane. Provide overlap phasing for the southbound right-turn lane. These improvements are consistent with the City of Perris General Plan Circulation Element. This improvement is part of the TUMF program.
- Perris Boulevard/Gentian Avenue: Add a southbound through lane. This improvement is consistent with the City of Moreno Valley's General Plan Circulation Element. This improvement is part of the City DIF and County TUMF programs.
- Perris Boulevard/Iris Avenue: Add a second westbound left-turn lane and an eastbound right-turn lane. These improvements are consistent with the City of Moreno Valley's General Plan Circulation Element. This improvement is part of the City DIF and County TUMF programs.
- Perris Boulevard/Krameria Avenue: Add two southbound through lanes, a northbound through lane, and a northbound right-turn lane. These improvements are consistent with the City of Moreno Valley's General Plan Circulation Element. This improvement is part of the City DIF and County TUMF programs.
- Perris Boulevard/Nandina Avenue: Add a southbound through lane. This improvement is consistent with the City of Moreno Valley's General Plan Circulation Element. This improvement is part of the City DIF and County TUMF programs.
- Perris Boulevard/Grove View Road: Add a southbound through lane. This improvement is consistent with the City of Moreno Valley's General Plan Circulation Element. This improvement is part of the City DIF and County TUMF programs.
- Perris Boulevard/South Project Driveway: Add a southbound through lane. This improvement is consistent with the City of Moreno Valley's General Plan Circulation Element. This improvement is part of City DIF and TUMF programs.
- Perris Boulevard/Harley Knox Boulevard: Add two southbound through lanes, one northbound through lane, a second eastbound left-turn lane, and overlap phasing for the southbound right-turn lane. These improvements are part of the TUMF program.
- Harley Knox Boulevard west of Indian Street: Widen to a six-lane Divided Arterial. This improvement is consistent with the City of Perris General Plan Circulation Element. This improvement is part of the TUMF program.
- Indian Street south of South Project Driveway: Widen to a four-lane Undivided Arterial. This improvement is consistent with the City of Moreno Valley General Plan Circulation Element. This improvement is part of the City of Moreno Valley DIF and TUMF programs.
- Perris Boulevard north of Grove View Road: Widen to a six-lane Divided Arterial. This improvement is consistent with the City of Moreno Valley General Plan Circulation Element. This improvement is part of the City's DIF and TUMF programs.

- Perris Boulevard south of South Project Driveway: Widen to a six-lane Divided Arterial. This improvement is consistent with the City of Moreno Valley and City of Perris General Plan Circulation Elements. This improvement is part of the City of Moreno Valley DIF and County TUMF programs.

With implementation of the above mitigation measures, all intersections and roadway segments would operate at the applicable performance standard or better during peak hours for 2013 cumulative with project conditions as shown in Table 4.5.F, resulting in a less than significant impact.

With implementation of **Mitigation Measures 4.5.6.1A** and **4.5.6.1B**, the project will contribute toward future roadway improvements to maintain the City of Moreno Valley and Perris LOS standards on city arterials and collectors. Because the CMP LOS standard is LOS E (and in some cases LOS F for intersections already at LOS F when the CMP network was adopted), the project will contribute toward maintenance of intersection LOS exceeding the CMP LOS standard. Therefore, the project will be consistent with the CMP.

Improvements to the four affected freeway mainline segments are outside the City's jurisdiction. Since the City has no control over when and how these improvements will be in place, impacts associated with these identified freeway segments would remain significant and unavoidable until such improvements are constructed.

4.5.7 Cumulative Impacts

Cumulative impacts refer to incremental effects of an individual project when viewed in connection with the effects of past projects, current projects, and probable future projects. Cumulative projects are identified in Chapter 2, Table 2.A and Figure 2.1. Cumulative impacts associated with traffic volumes are determined based on a sum of existing traffic volumes, projected growth from an ambient growth rate, and traffic volumes from approved and pending projects in the area, and project traffic. Cumulative analysis forecasts that, with the development of the proposed project and the cumulative projects, eleven intersections would require improvements in order to maintain the City's LOS standard of D. Those intersections are as follows:

- I-215 Southbound Ramps/Harley Knox Boulevard (a.m. and p.m. peak hours);
- I-215 Northbound Ramps/Harley Knox Boulevard (a.m. and p.m. peak hours);
- Indian Street/South Project Driveway (p.m. peak hour);
- Indian Street/Harley Knox Boulevard (a.m. and p.m. peak hours);
- Perris Boulevard/Gentian Avenue (a.m. and p.m. peak hours);
- Perris Boulevard/Iris Avenue (a.m. and p.m. peak hours);
- Perris Boulevard/Krameria Avenue (a.m. and p.m. peak hours);
- Perris Boulevard/Nandina Avenue (a.m. and p.m. peak hours);
- Perris Boulevard/Grove View Road (a.m. and p.m. peak hours);
- Perris Boulevard/South Project Driveway (a.m. and p.m. peak hours); and
- Perris Boulevard/Harley Knox Boulevard (a.m. and p.m. peak hours).

Additionally, with the development of the proposed project and the cumulative projects, four roadway segments would require improvements in order to maintain the City's LOS standard of D. Those roadway segments are as follows:

- Harley Knox Boulevard west of Indian Street (eastbound and westbound);
- Indian Street south of South Project Driveway (northbound and southbound);
- Perris Boulevard north of Grove View Road (southbound only); and
- Perris Boulevard south of South Project Driveway (northbound and southbound).

Although the suggested improvements are consistent with the City's General Plan, the project will be responsible for contributing its fair share toward the funding of the future improvements via payment of the City's DIF and County TUMF programs. The affected intersections and roadways are covered by either the City's DIF or County TUMF programs. As part of its Capital Improvement program, the City determines the timing of necessary roadway improvements based on periodic review of citywide traffic counts, traffic trends, and a review of traffic accidents.

Because TUMF provides a mechanism for collecting fees from all development projects in the area that would contribute traffic to the existing roadway network, fees for the improvements to the impacted freeway intersections would be collected. Therefore, it is anticipated that since these freeway intersection improvements are programmed into the TUMF program, such improvements would be constructed in the future, the future improvements would accommodate future year traffic levels analyzed in the future year traffic scenario (Opening Year 2013 Cumulative Plus Project), resulting in a less than significant cumulative impact.

Access improvements to the project site are the responsibility of the project applicant and would be constructed during site development. These improvements would be constructed at the following study area intersections: Indian Street/Grove View Road; Indian street/ North Project Driveway; Indian Street/South Project Driveway; Perris Boulevard/North Project Driveway; West Project Driveway/Grove View Road; Center Project Driveway/Grove View Road; and East Project Driveway Grove View Road. Because these improvements would be constructed prior to the project opening and would function at a satisfactory level of service under the cumulative scenario (refer to Table 4.5.E), no significant cumulative impact would occur at these intersections.

Improvements to the four affected freeway mainline segments are outside the City's jurisdiction. Since the City has no control over when and how these improvements will be in place, impacts associated with these identified freeway segments would remain significant and unavoidable until such improvements are constructed.

5.0 ADDITIONAL TOPICS REQUIRED BY CEQA

Section 15126 of the *CEQA Guidelines* requires that all aspects of a project must be considered when evaluating its impacts on the environment, including planning, acquisition, development, and operation. As part of this analysis, the EIR must also identify (1) significant environmental effects of the proposed project, (2) significant environmental effects that cannot be avoided if the proposed project is implemented, (3) significant irreversible environmental changes that would result from implementation of the proposed project, and (4) growth inducing impact of the proposed project.

5.1 SIGNIFICANT ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED IF THE PROPOSED PROJECT IS IMPLEMENTED

Table 5.A illustrates the significant unavoidable impacts anticipated to result from the proposed project, even with implementation of the project-specific mitigation measures identified in the Section 4.0 analysis.

Table 5.A: Significant Environmental Effects Which Cannot Be Avoided

Topic	Type of Impact	Impact
Agricultural Resources	Conversion of State Designated Farmland	No mechanism for the mitigation of impacts to Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance and/or existing agricultural operations has been enacted by either the City of Moreno Valley or the County of Riverside. Therefore, impacts associated with the conversion of farmland remain significant and unavoidable.
Agricultural Resources	Conversion to a Non-agricultural Use	No feasible mitigation is available to mitigate for the direct impacts associated with the conversion of land previously utilized for agricultural uses. Therefore, impacts associated with the conversion of farmland to a non-agricultural use remain significant and unavoidable.
Agricultural Resources	Cumulative Agricultural Resources	The cumulative effect of development in the region will continue to result in the conversion of agricultural lands to non-agricultural uses. Construction of the proposed project, in conjunction with other planned developments within the cumulative study area, would contribute to the conversion of agricultural lands to non-agricultural uses. Therefore, cumulative impacts to agricultural resources would remain significant and unavoidable.
Air Quality	Construction Air Pollutant Emissions	Construction activities would result in exceedance of SCAQMD threshold for ROG, NOx, and $PM_{2.5}$. Even after application of mitigation measures, estimated air pollutant emissions during construction activities would remain significant and unavoidable for ROG, NOx, and $PM_{2.5}$.
Air Quality	Operational Air Pollutant Emissions	Operational activities would result in exceedance of SCAQMD thresholds for ROG, NOx, CO, and PM_{10}.No feasible mitigation is available. Estimated air pollutant emissions during operation of the project will remain significant and unavoidable for ROG, NOx, CO, and PM_{10}.
Air Quality	Cumulative Pollutant Air Emissions	The Basin is in nonattainment for PM_{10} and ozone at the present time. Construction of the proposed project, in conjunction with other planned developments within the cumulative study area, would contribute to the existing nonattainment status. Therefore, the proposed project would exacerbate nonattainment of air quality standards within the SCAQMD and contribute to adverse cumulative air quality impacts.

Table 5.A: Significant Environmental Effects Which Cannot Be Avoided

Topic	Type of Impact	Impact
Greenhouse Gas Emissions and Climate Change	Cumulative GHG Emissions	The proposed project will produce greenhouse gases (GHG) during construction and operation of the proposed warehouse and related truck trips. Given the uncertainty of data and appropriate methodology to accurately analyze, and the inability to quantify the reduction achieved through implementation of strategies and programs previously identified, the proposed project's GHG emission contribution would result in a cumulative impact regarding global climate change and the cumulative impacts of the proposed project on global climate change are considered to be significant and unavoidable.
Transportation	Existing Year (2007) with Project Level of Service	Improvements to affected freeway segments are outside the City's jurisdiction. Since the City has no control over when and how these improvements will be in place, impacts associated with these identified freeway segments would remain significant and unavoidable until such improvements are constructed.
Transportation	Opening Year (2013) Cumulative with Project Level of Service	Improvements to affected freeway segments are outside the City's jurisdiction. Since the City has no control over when and how these improvements will be in place, cumulative impacts associated with these identified freeway segments would remain significant and unavoidable until such improvements are constructed.

5.2 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL CHANGES WHICH WOULD BE CAUSED BY THE PROPOSED PROJECT SHOULD IT BE IMPLEMENTED

Section 15126(c) of the *CEQA Guidelines* mandates that the EIR must address any significant irreversible environmental changes which would be involved in the proposed action should it be implemented. An impact would fall into this category if it resulted in any of the following:

- The project would involve a large commitment of nonrenewable resources;
- The primary and secondary impacts of the project would generally commit future generations of people to similar uses;
- The project involves uses in which irreversible damage could result from any potential environmental incidents associated with the project; and/or
- The proposed consumption of resources is not justified (e.g., the project could waste energy).

Determining whether the proposed project may result in significant irreversible effects requires a determination of whether key resources would be degraded or destroyed in such a way that there would be little possibility of restoring them. The project site is generally fallow agricultural land with the site historically used for sod farming operations. However, as identified within the City's General Plan, the City anticipates the eventual conversion of agricultural uses to urban uses and the proposed project would permanently alter the site by converting predominantly agricultural uses to urban uses. This is a significant irreversible environmental change that would occur as a result of project implementation. Because no significant mineral resources were identified within the project limits, no significant impacts related to these issues would result from development of the project site. Natural resources in the form of construction materials would be utilized in the construction of the proposed project and energy resources in the form of electricity and natural gas would be used during the long-term operation of the project; however, their use is justified in supporting the City's planned use of the site and is not expected to negatively impact the availability of these resources.

In addition, this industrial warehouse project, in concert with the other built or approved industrial warehouse projects, will fundamentally change the character and land use pattern of this portion of the City. Many of the project-specific impacts are addressed, as outlined above, but the change in the use of the land from agricultural to industrial represents a substantial irreversible change for this area. However, this is an intended change a verified by the City's General Plan land use designations and zoning for the area.

5.3 GROWTH INDUCEMENT

CEQA Guidelines, Section 15126.2(d) requires the *discussion of the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment.* Examples of growth inducing actions include establishing a major new employment opportunity. Projects that may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively, would also be considered growth inducing. The potential for growth inducement from a project is evaluated in four ways according to CEQA Guidelines Section 15126.2(d):

Would the proposed project induce substantial population growth in the area?

The extent to which the new jobs created by a project are filled by existing residents is a factor that tends to reduce the growth inducing effect of a project. Construction of the proposed project will create short-term construction jobs. These short-term positions are anticipated to be filled by workers who, for the most part, reside in the project area; therefore, construction of the proposed project will not generate a permanent increase in population within the project area. As previously identified, the proposed project is expected to employ 646 people.

The California Department of Finance (DOF) estimates the City's current (2011) population at 195,216 persons.[1] SCAG projections estimate the population of the City, western Riverside County (Western Riverside Council of Governments [WRCOG]), and southern California (Southern California Association of Governments [SCAG]) will continue to grow. SCAG projects the City's population will grow to 206,657 persons by the year 2015 and 258,350 persons by the year 2035 (Table 5.B).

Table 5.B: Population, Housing, and Employment Forecasts

	2015	2025	2035
Population			
City of Moreno Valley	206,657	234,410	258,350
WRCOG	1,918,962	2,262,992	2,550,867
SCAG	20,465,830	22,395,121	24,057,286
Households			
City of Moreno Valley	55,407	64,699	72,977
WRCOG	609,219	727,622	828,547
SCAG	6,474,074	7,156,645	7,710,722
Employment			
City of Moreno Valley	49,414	71,359	91,642
WRCOG	691,260	901,163	1,098,233
SCAG	8,811,406	9,546,773	10,287,125

Source: SCAG Comments on the NOP for Vogel Industrial Park Moreno Valley Project [120110103], letter dated September 7, 2011.

[1] State of California, Department of Finance, *E-5 Population Estimates for Cities, Counties and the State, 2010-2011, with 2010 Benchmark.* Sacramento, California, May 2011.

The jobs-to-housing ratio measures the extent to which job opportunities in a given geographic area are sufficient to meet the employment needs of area residents. This ratio identifies the number of jobs available in a given region compared to the number of housing units in the same region. For example, a region with a jobs-to-housing factor of 1.5 would indicate that 1.5 jobs exist for every housing unit within that region. The standard used for comparison is the jobs-to-housing ratio of the SCAG region, which is 1.36 jobs for every household. This standard is used because most residents of the region are employed somewhere in the SCAG region. A City or sub-region with a jobs-to-housing ratio lower than the overall standard would be considered a "jobs poor" area, indicating that many of the residents must commute to places of employment outside the sub-area. The current and potential jobs/housing ratios for the City, WRCOG, and SCAG are identified in Table 5.C.

Table 5.C: Projected Future Jobs/Housing Ratios

	2015 Jobs/Housing Ratio	2035 Jobs/Housing Ratio
City	0.89	1.25
Riverside County	1.13	1.32
SCAG	1.36	1.33

The 2015 projected jobs-to-housing ratios for the City, sub-region, and region are 0.89, 1.13, and 1.36, respectively. The 2035 future jobs-to-housing ratios for the City, sub-region, and region are 1.25, 1.32, and 1.33, respectively. These ratios indicate that both Western Riverside County and the City of Moreno Valley are "jobs poor" because the jobs-to-housing ratios are below the Southern California region (as defined by SCAG). Given the fact that the City and the WRCOG are considered to be jobs-poor regions, and the City is currently experiencing high rates of unemployment, it is expected that the short-term construction jobs and long-term jobs created by the proposed project will be filled by current local residents. Therefore, there would be little migration to the area and, consequently, little effect on local population size. Because of the population of the City and the employment base, even if a large number of people were to relocate to the area because of employment opportunities created within the project area, no significant effect on the size of the local population would occur.

Would the proposed project have an effect on undeveloped land that may not be designated on any general plan for urban development, but would nonetheless experience increased growth pressure due to the presence of the project?

The area surrounding the project site is governed by the City of Moreno Valley General Plan and the area is guided by Specific Plan 208. Specific Plan 208 guides land use within the project area to ensure that new development and redevelopment is implemented consistent with the land use policies, controls, and standards contained in Specific Plan 208. Any development of remaining undeveloped land adjacent to the project site would require its own discretionary approvals and is not reliant on the proposed project. However, development of the project site may lead to indirect growth in the Specific Plan area by making available the extension of infrastructure such as water, sewer, drainage, etc. This growth has been planned for and is guided by Specific Plan 208.

Would the proposed project substantially alter the planned location distribution, density, or growth rate of the population of an area?

The proposed project would occur within an area currently designated for industrial uses. The proposed project would not require a General Plan Amendment nor does it require a change in the underlying zoning designation. In addition, the project reflects the City of Moreno Valley's vision for the area and is consistent with Specific Plan 208. Land uses surrounding the project site would be in conformance with the City's General Plan and Specific Plan 208. Impacts to population and housing

are less than significant; see Section 13 *Population and Housing* of the Initial Study (Appendix A of this EIR).

Would the proposed project have an affect by removing constraints, thereby facilitating the construction of previously approved projects?

The proposed project would not eliminate a constraint for development of an approved project within the City of Moreno Valley. There are no projects in the City of Moreno Valley or surrounding cities that have been approved but are conditioned or dependent on additional improvements at the project site. Specific Plan 208 guides land uses surrounding the project site to ensure compatibility between existing operations and adjacent surrounding development. Additionally, the proposed project would not add capacity to urban services or infrastructure that would be utilized by other project proponents in the surrounding area.

Would the proposed project influence redevelopment of areas at a higher intensity than already exists?

The proposed project would not result in any significant pressure to redevelop the area around the project site at a higher density. As previously stated, the development of remaining undeveloped land adjacent to the project site is independent and not reliant on the proposed project. Therefore, implementation of the proposed project would not result in redevelopment of adjacent lands at a higher intensity than already prescribed in the City of Moreno Valley's General Plan and Specific Plan 208.

5.4 CONSISTENCY WITH LOCAL AND REGIONAL PLANS

Section 15125 (d) of the CEQA Guidelines requires EIRs to "…discuss any inconsistencies between the proposed project and applicable general plans and regional plans." The objective of such a discussion is to find ways to modify the project, if warranted, to reduce any identified inconsistencies with relevant plans and policies. Pursuant to Section 15125 (d), the following discussion includes an evaluation of the consistency of the proposed project with the goals and policies of relevant adopted local and regional plans.

Regional Plans

South Coast Air Quality Management District (SCAQMD) Air Quality Management Plan. The California Air Resources Board (CARB) coordinates and oversees both State and federal air quality control programs. The CARB's primary functions include establishing and updating the California ambient air quality standards, monitoring existing air quality, controlling emissions from mobile sources, and developing the State Implementation Plan (SIP). The SIP is the state's overall air quality control strategy for both mobile and stationary sources. Control programs for these sources are carried out at the regional or county level.

As identified in Section 4.2 (Air Quality) of this EIR, the project site is located within the SCAQMD. The SCAQMD encompasses Orange County and the non-desert portions of Los Angeles County, Riverside County, and San Bernardino County and is responsible for air pollution control programs and regulations within the air basin. The current regional air quality plan is the 2007 Air Quality Management Plan (AQMP) adopted by the SCAQMD on June 1, 2007. The 2007 AQMP employs the most up-to-date science and analytical tools and incorporates a comprehensive strategy aimed at controlling pollution from all sources, including stationary sources, on-road and off-road mobile sources, and area sources. The 2007 AQMP also updates the attainment demonstration for the standards for ozone and PM_{10}, and proposes attainment demonstration with a more focused control of sulfur oxides, directly-emitted $PM_{2.5}$, nitrogen oxides, and volatile organic compounds by 2015.

Section 4.2 (Air Quality) of the EIR examines the proposed project's consistency with the adopted AQMP. The development scenario proposed is within the scope of what would be allowed under the current General Plan land use designation (General Industrial and Specific Plan) and is consistent with the uses permitted under the proposed General Industrial zoning designation. Implementation of the proposed project would not require a General Plan Amendment and Zone Change that would change the General Plan designations and zoning designations of the project site. Since the proposed project would not require a General Plan Amendment, the project has been considered in preparation of the General Plan and therefore is consistent with the AQMP.

Southern California Association of Governments (SCAG), Regional Comprehensive Plan (RCP), Regional Transportation Plan (RTP), and Compass Growth Vision (Compass). The SCAG (the designated metropolitan planning organization [MPO] for the Counties of Ventura, Orange, San Bernardino, Riverside, Imperial, and Los Angeles) is federally mandated to develop plans for transportation, growth management, hazardous waste management, and air quality. With its members and other regional planning entities, SCAG has prepared the 2008 Regional Comprehensive Plan (RCP) to serve as a framework to guide decision-making with respect to the growth and changes that can be anticipated in the region. The RCP is a major advisory plan prepared by the SCAG that addresses important regional issues like housing, traffic/transportation, water, and air quality. The RCP serves as an advisory document to local agencies in the Southern California region for their information and voluntary use for preparing local plans and handling local issues of regional significance.

The RCP identifies voluntary best practices to approach growth and infrastructure challenges in an integrated and comprehensive way. It also includes goals and outcomes to measure progress toward a more sustainable region. The RCP includes nine chapters, each based on specific areas of planning or resource management. Each of the nine chapters contains goals, policies, implementation, and strategies to achieve the SCAG's overall goals of improving the standard of living for all; improving the quality of life for all; and enhancing equity and access to government. Local governments are required to use the RCP as the basis for their own plans and are required to discuss the consistency of projects of "regional significance" with the RCP.

Regional Comprehensive Plan. The RCP's overall goal is to reinvigorate the region's economy, avoid social and economic inequities and the geographical dislocation of communities, and to maintain the region's quality of life. The document is described as a regional policy framework for future land use decisions in the SCAG area that respects the need for strong local control, but that also recognizes the importance of regional comprehensive planning for issues of regional significance. The RCP is laid out much like a General Plan and organizes recommended policies into nine chapters. The highlight of each chapter is the regional strategy that addresses the RCP's vision for that resource area. As such, each chapter includes three levels of recommendations for the region:

- **Goals.** Each goal will help define how sustainability is defined for that resource area.
- **Outcomes.** These focus on quantitative targets that define progress toward meeting the RCP's Goals. Where possible, they are clearly defined (e.g., a 20% reduction in greenhouse gas emissions from 2007 levels), capable of being monitored with existing or reasonably foreseeable resources, and have a strong link to sustainability goals.
- **Action Plan.** This critical part of the RCP lays out a comprehensive implementation strategy that recommends how the region can systematically move to meet the RCP's quantitative Outcomes and achieve its Goals, Guiding Principles, and Vision. Each Action Plan contains:
    - **Constrained Policies.** This includes a series of recommended near-term, feasible policies that stakeholders should consider for implementation. For example, the RCP calls on the

SCAG to adopt policies that reflect its role as a planning agency, council of governments, and metropolitan planning organization. The RCP also recommends voluntary policies for consideration by local governments and other key stakeholders.

- **Strategic Initiatives.** This encompasses longer-term strategies that require significant effort to implement but are necessary to achieve the RCP's desired Goals and Outcomes. For example, identifying technological breakthroughs that can reduce air pollution from the transportation sector requires both commitment and time. Most of these initiatives are not constrained and will require political will, enabling legislation, new funding sources, and other key developments to become a reality. In most cases, this tier of strategies is the key to achieving the region's sustainability Goals and Outcomes.

Other policies contained within the 2008 RCP were either not applicable to the proposed project or are directed at the SCAG and actions that the SCAG would undertake at the regional level that would not pertain directly to the proposed project. Policies within the 2008 RCP that are applicable to the proposed project were identified and are discussed below.

Land Use and Housing Chapter

Goal *Focusing growth in existing and emerging centers and along major transportation corridors.*

Consistent. The proposed project site is currently underdeveloped and consists of undeveloped land. Regional access to the City and project area is provided from I-215, which runs north-south. In addition, Perris Boulevard, which is adjacent to the project site, is a fully-paved road with existing water and sewage facilities. The development of the proposed project would occur in an area where commercial, residential, and industrial development already exists, is under construction, or has been previously approved. The existing roadway system and infrastructure surrounding the project site will be utilized to the maximum extent possible. As required, the proposed project will install improvements and/or pay necessary fees to facilitate the continuation of satisfactory operation. The proposed project is consistent with this SCAG policy in that it exists along a major transportation corridor of the City and will be connecting to the existing utilities underlying Perris Boulevard.

Goal *Targeting growth in housing, employment and commercial development within walking distance of existing and planned transit stations.*

Consistent. The proposed project would comply with all City development policies, standards, and programs pertaining to supporting alternative modes of transportation included in the General Plan Circulation Element. In addition, the proposed project is located within an urbanizing area of the City. As provided in the inventory of cumulative projects (Table 2.A and Figure 2.1), the approved and planned development in the project area includes residential, commercial, and industrial uses. As such, the project site is in an area which is developing with projects that have already been approved and constructed, or in the various stages of the planning process. Because the project site is located adjacent to existing RTA routes, the proposed project would be accessible to existing transit systems. Future bus stops will be located per RTA recommendations in the proximity of the project site. As the project site is located in an area where commercial, residential, and industrial uses are planned or approved, and because the project site is readily accessible from I-215 and from existing RTA bus routes, the proposed project would be consistent with this SCAG Policy.

Policy LU-6.2 *Developers and local governments should integrate green building measures into project design and zoning such as those identified in the U.S. Green Building Council's Leadership in Energy and Environmental Design, Energy Star Homes, Green Point Rated Homes, and the California Green Builder Program.*

Consistent. Table 4.3.C of the Climate Change and Greenhouse Gas Emissions Section summarizes the extent to which the project would comply with the strategies to help California reach the emission reduction targets. In addition, the proposed project will pursue the Leadership in Energy and Environmental Design (LEED) Core & Shell rating program. This is anticipated to be achieved with

the incorporation of Green Building concepts and the project is expected to reach the LEED "Certified" rating. Therefore, the proposed project is consistent with this SCAG policy.

Open Space and Habitat Chapter

Policy OSC-8 *Local governments should encourage patterns of urban development and land use, which reduce costs on infrastructure and make better use of existing facilities.*

Consistent. The proposed project will be developed in areas that are presently served by various existing water, sewer, storm drainage, electrical, natural gas, and transportation services. During the construction of the project and as needed throughout the process, necessary utility and roadway improvements will be installed or extended to the project site from adjacent existing facilities. The utility and roadway improvements will facilitate future growth in the surrounding area. The supply of electricity and natural gas is demand-responsive and the project proponent would be required to meet the service requirements of these utility providers. By maximizing the use of existing facilities, the costs of expanding infrastructure would be minimized. Because the proposed project would be located in close proximity to existing industrial, commercial and residential structures requiring a similar type of infrastructure, it is consistent with this growth management policy.

Water Chapter

Policy WA-11 *Developers and local governments should encourage urban development and land uses to make greater use of existing and upgraded facilities prior to incurring new infrastructure costs.*

Consistent. Existing industrial development is located in the immediate vicinity of the project site where infrastructure for water, sewer, storm drainage, electrical, natural gas, and transportation facilities currently exist. During the construction of the project and as needed throughout the process, necessary utility and roadway improvements will be installed or extended to the project site from adjacent existing facilities. The utility and roadway improvements will facilitate future growth in the surrounding area. The availability of this infrastructure would reduce the cost to public agencies that would provide services to the project area. The proposed project would be developed in an area where such infrastructure is accessible. Furthermore, the project applicant would pay all applicable development fees for the necessary infrastructure and public service improvements, including those associated with water, sewer, drainage, roadways, fire, and police; therefore, the proposed project is consistent with this policy.

Energy Chapter

Policy EN-9 *Local governments should include energy analyses in environmental documentation and general plans with the goal of conserving energy through the wise and efficient use of energy. For any identified energy impacts, appropriate mitigation measures should be developed and monitored. The SCAG recommends the use of Appendix F, Energy Conservation, of the California Environmental Quality Act.*

Consistent. An analysis of energy use has been provided in Section 4.3 (Climate Change and Greenhouse Gas Emissions) of this EIR. The analysis includes strategies that have the goal of conserving energy and efficient energy usage. Therefore, the proposed project is consistent with this policy.

Policy EN-10 *Developers and local governments should integrate green building measures into project design and zoning such as those identified in the U.S. Green Building Council's Leadership in Energy and Environmental Design, Energy Star Homes, Green Point Rated Homes, and the California Green Builder Program. Energy-saving measures that should be explored for new and remodeled buildings include:*

- *Using energy-efficient materials in building design, construction, rehabilitation, and retrofit.*
- *Encouraging new development to exceed Title 24 energy efficiency requirements.*
- *Developing Cool Communities measures including tree planting and light-colored roofs. These measures focus on reducing ambient heat, which reduces energy consumption related to air conditioning and other cooling equipment.*
- *Utilizing efficient commercial/residential space and water heaters. This could include the advertisement of existing and/or development of additional incentives for energy-efficient appliance purchases to reduce excess energy use and save money. Federal tax incentives are provided online at http://www.energystar.gov/index.cfm?c=Products.pr_tax_credits.*
- *Encouraging landscaping that requires no additional irrigation; utilizing native, drought-tolerant plants can reduce water usage up to 60 percent compared to traditional lawns.*
- *Encouraging combined heating and cooling (CHC), also known as cogeneration, in all buildings.*
- *Encouraging neighborhood energy systems, which allow communities to generate their own electricity.*
- *Orienting streets and buildings for best solar access.*
- *Encouraging buildings to obtain at least 20 percent of their electric load from renewable energy.*

Consistent. The strategies listed in Section 4.2 and Section 4.3 of this EIR are considered to be air pollution and greenhouse gas emission reduction strategies, which include green building measures. These strategies are either part of the project, required mitigation measures, or requirements under local or State ordinances. Since the project would implement these strategies into project design and operation, the project would be consistent with this SCAG policy.

Solid Waste Chapter

Policy SW-14 *Developers and local governments should integrate green building measures into project design and zoning including, but not limited to, those identified in the U.S. Green Building Council's Leadership in Energy and Environmental Design, Energy Star Homes, Green Point Rated Homes, and the California Green Builder Program. Construction reduction measures to be explored for new and remodeled buildings include:*

- *Reuse and minimization of construction and demolition (C&D) debris and diversion of C&D waste from landfills to recycling facilities.*
- *An ordinance that requires the inclusion of a waste management plan that promotes maximum C&D diversion.*
- *Source reduction through (1) use of building materials that are more durable and easier to repair and maintain, (2) design to generate less scrap material through dimensional planning, (3) increased recycled content, (4) use of reclaimed building materials, and (5) use of structural materials in a dual role as finish material (e.g., stained concrete flooring, unfinished ceilings).*
- *Reuse of existing building structure and shell in renovation projects.*

Building lifetime waste reduction measures that should be explored for new and remodeled buildings include:

- *Development of indoor recycling program and space;*
- *Design for deconstruction; and*
- *Design for flexibility through use of moveable walls, raised floors, modular furniture, moveable task lighting, and other reusable components.*

Consistent. The strategies listed in Section 4.2 and 4.3 of this EIR are considered to be air pollution and greenhouse gas emission reduction strategies, which include green building measures. These strategies are either part of the project, required mitigation measures, or requirements under local or State ordinances. With implementation of these strategies/measures, the project would be consistent with this SCAG policy.

Transportation Chapter

Goal *A more efficient transportation system that reduces and better manages vehicle activity.*

Consistent. The proposed project would result in the development of employment opportunities in close proximity to housing. In addition, the project proposes sidewalks and landscaping treatments to provide for pedestrian access throughout the project site. The type of uses proposed and their proximity to each other allow for increased pedestrian and bicycle activity, limiting the need for vehicle travel. Therefore, this project is consistent with this transportation goal.

Security and Emergency Preparedness Chapter

Goal *Ensure transportation safety, security, and reliability for all people and goods in the region.*

Consistent. The proposed project is consistent with this goal in that the proposed project would be required to adhere to the City of Moreno Valley's General Plan. The General Plan contains goals and policies which aim to provide adequate and reliable transportation facilities. The goals and policies identified in the City's General Plan resemble those of the RCP that address mobility, traffic safety, environmental concerns, and land use consistency as the major traffic study factors to identify existing traffic conditions and to assess the future effects on area traffic patterns/flow. Since the proposed project is consistent with the General Plan, the proposed project is consistent with this policy.

Economy Chapter

Goal *Enable business to be profitable and competitive (locally, regionally, nationally, and internationally).*

Consistent. The proposed project would add to the City's portfolio of industrial services. Through the addition of the proposed project, the City would also expand its economic competitiveness with other areas in the region. Therefore, the proposed project is consistent with this policy.

Goal *Promote sustained economic health through diversifying the region's economy, strengthening local self-reliance and expanding competitiveness.*

Consistent. As previously stated, the proposed project would add to the City's portfolio of industrial services, which would enable the City to be more self-reliant through the provision of goods and services to residents within the City. Through the addition of the proposed project, the City would also expand its economic competitiveness with other areas in the region. Therefore, the proposed project is consistent with this policy.

Goal *Ensure a healthy, flourishing economy that provides sufficient employment opportunities to decrease poverty and meet the basic needs of all the people who participate in our economy by promoting education and workforce training policies that give residents an opportunity to compete for the full range of jobs available with good wages and benefits.*

Consistent. The proposed project is a warehousing project which would provide additional employment opportunities in the community. In addition, the proposed project would meet the basic needs of those who participate in the economy through the use of training in the workforce. Therefore, the proposed project is consistent with this policy.

Outcome *Increase job growth to add three million jobs to the regional economy by 2035.*

Consistent. The proposed project would result in additional jobs in the City, which would contribute to job growth in the regional economy. Therefore, the proposed project is consistent with this policy.

Outcome *Increase the region's economic vitality and attractiveness by focusing housing and job additions in urban centers, employment centers, and transportation corridors, such that there will be a minimum of 35 percent of the region's household growth and 32 percent of employment growth in these areas from their levels in 2005 by 2035.*

Consistent. As previously identified, development of the proposed on-site uses would increase the number of jobs in the City by approximately 646 positions. The SCAG regional forecasts indicate an increase in employment in the City of Moreno Valley from approximately 50,432 jobs in 2010 to 55,407 jobs in 2015. A similar job trend forecast is predicted for western Riverside County from approximately 588,523 jobs in 2010 to 609,219 jobs in 2015. Compared to the broader SCAG region, the City is "jobs poor." A city or sub-region with a jobs-to-housing ratio lower than the overall standard would be considered a "jobs poor" area, indicating that many of the residents must commute to places of employment outside the sub-area. Since the proposed project would add jobs to a "jobs poor" region, the proposed project would increase the region's economic vitality and attractiveness by job additions in urban centers and along transportation corridors. Therefore, the proposed project is consistent with this SCAG policy.

Regional Transportation Plan (RTP). SCAG is currently in the process of preparing the 2012 RTP. Therefore, the most recent RTP adopted by SCAG is the 2008 RTP. The 2008 RTP, adopted by the SCAG in May 2008, contains a set of existing socioeconomic projections used as the basis for the SCAG's transportation planning efforts. They include projections of population, housing, and employment at the regional, county, sub-regional, jurisdictional, Census tract, and transportation analysis zone levels. The RTP includes policies and regulations set forth to ensure development within the SCAG regional area is within planned and forecast socioeconomic projections. Goals established within the RTP include the following:

- Maximize mobility and accessibility for all people and goods in the region (discussed in Section 4.5: Traffic and Circulation);
- Ensure travel safety and reliability for all people and goods in the region (discussed in Section 4.5: Traffic and Circulation);
- Preserve and ensure a sustainable regional transportation system (discussed in Section 4.5: Traffic and Circulation);
- Maximize the productivity of our transportation system (discussed in Section 4.5: Traffic and Circulation);
- Protect the environment, improve air quality, and promote energy efficiency (discussed in Section 4.2: Air Quality);

- Encourage land use and growth patterns that complement our transportation investments and improve the cost-effectiveness of expenditures (discussed in Section 4.5: Traffic and Transportation); and
- Maximize the security of our transportation system through improved system monitoring, rapid recovery planning, and coordination with other security agencies (discussed in Section 4.5: Traffic and Transportation).

The proposed project is consistent with the RTP such that the proposed project would be required to adhere to the City of Moreno Valley's General Plan. The General Plan contains goals and policies that aim to minimize traffic congestion, provide adequate transportation facilities, and require development to pay its share of costs. The goals and policies identified in the City's General Plan resemble those of the RTP that address mobility, traffic safety, environmental concerns, and land use consistency as the major traffic study factors to identify existing traffic conditions and to assess the future effects on area traffic patterns/flow. Furthermore, the project shall be consistent with the General Plan and, since the General Plan shall be consistent with the RTP, it is reasonable to infer that the project is consistent with policies set forth in the RTP.

Compass Growth Vision. The Compass Growth Vision plan provides a framework for local and regional decision-making regarding growth, transportation, land use, and economic development. The framework includes principles and a specific set of strategies intended to achieve and improve a quality of life that promotes and sustains for future generations the region's mobility, livability, and prosperity. The main objective of the Compass Growth Vision is to manage the forecast growth while improving future living conditions for all people within the SCAG area, including live, work, and play activities. The following discussion includes the principles within the Compass Growth Vision plan and their association to the proposed project.

- ***Principle 1:*** Improve mobility for all residents.
- ***Principle 2:*** Foster livability in all communities.
- ***Principle 3:*** Enable prosperity for all people.
- ***Principle 4:*** Promote sustainability for future generations.

The proposed project is consistent with the four principles identified above. The nature of the proposed project allows the transport of commodities from a single area rather than multiple areas, minimizing vehicle trip generation. The proposed project supports the prosperity for all people by providing employment opportunities close to existing housing within the City of Moreno Valley. The proposed project is located in an area that is already developed with urban uses and where existing infrastructure (freeway, sewer, electrical, water, etc.) is accessible. During the construction of the project and as needed throughout the process, necessary utility and roadway improvements will be installed or extended to the project site from adjacent existing facilities. The utility and roadway improvements will facilitate future growth in the surrounding area. The development of the proposed project is consistent with the land use vision for the site and will augment existing services available in the City and region.

6.0 ALTERNATIVES

6.1 INTRODUCTION

An EIR must identify ways to mitigate or avoid the significant effects that a project may have on the environment. In compliance with *CEQA Guidelines* Section 15126.6(a), this Draft EIR must also describe "a range of reasonable alternatives to the project, or to the location of the project which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project." The EIR need not consider every conceivable alternative; rather it must consider a reasonable range of potentially feasible alternatives to the project, or to the location of the project, which would avoid or substantially lessen significant effects of the project, even if "these alternatives would impede to some degree the attainment of the project objectives, or would be more costly" (*CEQA Guidelines* Section 15126.6(b)). The discussion of project alternatives must "include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project." An EIR must evaluate a "No Project" alternative in order to allow decision-makers to compare the effect of approving the project to the effect of not approving the project.

The City, acting as the CEQA Lead Agency, is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. The range of alternatives addressed in an EIR is governed by a "rule of reason," which requires the EIR to set forth only those alternatives necessary to permit a reasoned choice. Of the alternatives considered, the EIR need examine in detail only those the Lead Agency determines could feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project. Per *CEQA Guidelines* Section 15364, "feasible" has been defined as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors."

6.1.1 Summary of the Proposed Project

The proposed project consists of the development of approximately 1,616,133 square feet of warehouse distribution uses, necessary parking, and associated site improvements on an approximately 71-acre site. The proposed Project would consist of one building which would be constructed with 264 vertical-lift dock-high roll up doors on the long (north and south) sides of the building to allow access for the loading and unloading of products from diesel truck/trailers. Building interiors are typically large and open to accommodate the temporary storage of the products to be distributed. The building will include a total of approximately 44,000 square feet of business office space for the management of the warehouse. Parking at the warehouse will be provided for 368 truck trucks and trailers as well as 589 parking stalls for passenger vehicles in accordance with City standards for light industrial uses. The proposed Project is consistent with the General Plan designation of Business Park/Light Industrial and zoning for the site of industrial/business park uses which is governed by Specific Plan (SP) 208 (Moreno Valley Industrial Area Plan).

Access to the proposed Project site will be provided via two driveways on Indian Street, three driveways on Grove View Road, and two driveways on Perris Boulevard. The northern driveway on Perris Boulevard will be for passenger vehicle and emergency access only. The southern driveway on Perris Boulevard will align with the existing signalized intersection at the Ross Distribution Warehouse entrance. The north Project driveway on Indian Street will be for passenger vehicle and emergency access only; all other driveways will be used by both passenger vehicles and trucks. The proposed Project is anticipated to be constructed by the year 2013.

The proposed Project will function as a trucking distribution hub for several types of items. Goods imported from the ports of California as well as other locations will be delivered via truck to the proposed distribution centers and distributed via truck to both in and out of state locations, thus benefiting both local and interstate commerce.

Within the past two years, the proposed Project site has received approximately 80,000 cubic yards of fill as part of an approved stockpile permit previously issued by the City. Due to the Project site's topography and drainage requirements, approximately 220,000 additional cubic yards of fill will be required. Analysis of the proposed Project's impacts is based on 220,000 cubic yards of imported fill required to complete the Project. It is reasonable to estimate that the fill may be obtained from a site located within 10 miles of the proposed Project in order to reduce import hauling costs, consistent with typical soil import/export hauling distances for projects in Moreno Valley.

In addition to construction of required street frontage improvements on Indian Street, Perris Boulevard, and Grove View Road, the Project includes construction of necessary infrastructure to provide water, sewer, phone, cable, natural gas, and electricity service. Drainage will be handled by a system of on-site collection/routing pipes, landscaped swales, sand filters, and paved landscape features.

Site and building design attributes for the proposed Project will incorporate many sustainability and Green Building concepts. Green Building is the practice of increasing building efficiency through site planning, water and energy management, material use, control of indoor air quality and the use of innovative design concepts. These practices help to improve building operational efficiency, conserve water, reduce waste, and lessen the heat island effect of development.

6.1.2 Project Objectives

The purpose of the proposed project is to provide a new facility that specializes in warehouse distribution services. Upon development, the proposed project will achieve the following:

- Create employment-generating opportunities for the citizens of Moreno Valley and surrounding communities;
- Encourage industrial development as attractive and productive uses while minimizing conflicts with the surrounding existing uses;
- Encourage warehouse distribution services that take advantage of the area's close proximity to various freeways and transportation corridors;
- Provide the infrastructure improvements required to meet Project needs in an efficient and cost-effective manner;
- Encourage new development consistent with the capacity and municipal service capabilities;
- Provide a high density, high-quality large-scale industrial development to provide jobs for residents at a variety of income levels;
- Facilitate the efficient and cost-effective movement of goods in and through the City, which, in turn, allows the City to compete economically on a domestic and international scale;
- Provide an industrial warehouse facility that meets the substantial and unmet demands of businesses located in the City and County;
- Cluster industrial warehouse uses near efficient access points to the state highway system to reduce traffic congestion on surface streets and to reduce concomitant air pollutant emissions from vehicle sources;

- Implement the City's General Plan Industrial/Business Park Land Use designations that are applicable to the site;
- Accommodate new development that channels land uses in a phased, orderly manner and is coordinated with the provision of necessary infrastructure and public improvements;
- Provide new development that will assist the City in obtaining fiscal balance in the years and decades ahead; and
- Address community circulation, both vehicular and pedestrian, utilizing available capacity within the existing circulation system, and provide fair share improvements to various future-year deficient intersections or road segments.

6.1.3 Summary of Proposed Project Significant Impacts

The analysis provided in Section 4.0 determined that, despite the implementation of mitigation measures, significant environmental impacts would result from the construction and operation of the proposed on-site uses. To satisfactorily provide the CEQA-mandated alternatives analysis, the alternatives considered must reduce any of the following project-related significant impact(s):

- Conversion of agricultural land and agricultural uses to urban land and urban uses;
- Emissions of NO_X and PM_{10} during construction operations;
- Long-term emissions of ROG, NO_X, CO, and PM_{10} resulting from increased vehicular trips and operation of the proposed on-site uses;
- Project contributions to cumulatively considerable greenhouse gas emissions;
- Impacts to level of service at roadway segments and freeway segments in the existing plus project condition (2007); and,
- Impacts to level of service at intersections, roadway segments, and freeway segments in the cumulative opening year (2013).

6.2 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD FOR ANALYSIS

In determining an appropriate range of alternatives to be evaluated in the EIR, three possible alternatives were considered and rejected because they could not accomplish the basic objectives of the project as listed above or they were considered infeasible. Per the *CEQA Guidelines* (Section 15126.6(c)), factors that may be considered when addressing the feasibility of alternatives include failure to meet most of the stated project objectives, infeasibility, or inability to avoid significant environmental effects. The purpose of the proposed project is to provide for and expand employment and revenue opportunities within the City of Moreno Valley. The proposed project would expand employment options in a location that is convenient to existing and future City residents and augment the City's economic base. The following three development scenarios were considered and rejected as potential alternatives to implementation of the proposed project:

- No Build Alternative;
- Residential Alternative; and
- Mixed Commercial/Residential Alternative.

Based on Section 15126.6 of the *CEQA Guidelines*, the following alternatives were rejected based on the criteria of not feasibly attaining most of the basic objectives of the project while reducing or

avoiding any of the significant effects of the proposed project. The reason or reasons for not selecting each of the rejected alternatives are discussed below.

6.2.1 No Build Alternative

Under the No Build Alternative, no development would take place within the project limits. No ground-disturbing activities would take place, nor would any form of structure or facility be erected. Impacts associated with this alternative, when compared to the proposed project, would not occur. In the absence of development, no impacts would occur and this alternative would be the environmentally superior alternative. However, disallowing development of the site, as suggested by this alternative, would not fulfill the primary objectives of the proposed project. Retention of the project site in its current condition would not expand employment opportunities to residents of the City. Retaining the site in its current undeveloped condition would not generate the revenue (e.g., property tax) that could augment the City's current revenue stream. Therefore, the No Build Alternative was rejected from further consideration in the EIR.

6.2.2 Residential Alternative

The Residential Alternative consists of the development of the 71-acre project site with approximately 355 single-family units[1] based on the City's R5 zone. The R5 zone was utilized as this is the zoning designation of the nearest residential uses to the north along Perris Boulevard north of the Perris Valley Storm Drain channel. A zone change, General Plan Amendment, and Specific Plan Amendment would be required for this alternative to change the project site from its existing Business Park/Light Industrial (BP) General Plan designation and Industrial Area Plan (SP208 I) zoning designation to a residential R5 designation. Furthermore, a Specific Plan Amendment would be required to remove the project site from the underlying Industrial Specific Plan 208. Since the Residential Alternative consists only of residential uses, employment-generating opportunities would not occur aside from temporary construction work, which would be filled predominantly by those already residing in the area. The project's full potential to utilize the area's close proximity to various freeways and transportation corridors would not be realized as only residential uses would occur under the Residential Alternative. Additionally, the development of the entire 71-acre project site under this alternative would result in the placement of the residential uses adjacent to a major transportation corridor alongside SP208 I industrial/business park uses which could potentially result in additional adverse impacts such as exposure to air pollutants, noise, and land use incompatibilities. This alternative has been rejected because it would result in greater impacts and would not satisfy the basic City objectives for development of the project site. A discussion of existing zoning for the entire project has been analyzed under Alternative 1: No Project.

6.2.3 Mixed Commercial/Residential Alternative

The Mixed Commercial/Residential Alternative would include the development of the 71-acre project site with approximately 690,000 square feet[2] of Community Commercial[3] uses and 532 multiple-family units.[4] A zone change, General Plan Amendment, and Specific Plan Amendment would be required for this alternative to change the project site from its existing Business Park/Light Industrial

[1] Based on assumption that the site is rezoned R5, which allows up to 5 dwelling units per acre; 71 acres × 5 dwelling units per acre = 355 dwelling units.

[2] The City's Municipal Code does not identify maximum lot coverage for Community Commercial uses; therefore, this figure assumes an approximately 25 percent lot coverage which is representative of similarly sized commercial uses in the region.

[3] Community Commercial zones allow for the development of a variety of business, retail, personal, and related or similar services.

[4] Based on assumption that half of the site is rezoned R15, which allows up to 15 dwelling units per acre; 35.5 acres × 15 dwelling units per acre = 532 dwelling units.

(BP) General Plan designation and SP208 I zoning designation to a residential designation and commercial designation. Additionally, a Specific Plan Amendment would be required to remove the project site from the underlying Industrial Specific Plan 208. These land use changes would produce additional environmental impacts not created by the proposed project. While the commercial component of this Alternative would utilize the project site's close proximity to nearby transportation corridors, the development of the remainder of the site with residential uses would not provide the varied employment and service uses and revenue associated with the proposed project. The development of approximately half of the project site under this alternative with residential uses would result in the placement of the residential uses adjacent to a major transportation corridor alongside SP208 I industrial/business park uses which could potentially result in additional adverse impacts such as exposure to air pollutants, noise, and land use incompatibilities. The residential component of this alternative would produce demand for public services that would exceed the amount of municipal revenues it would generate, and there would be little to no employment opportunities created. Therefore, the mixed commercial/residential alternative would not meet the project objectives of providing new employment and revenue generation options in close proximity to local consumers to the same degree as the proposed project. The employment opportunities and economic benefits derived from the proposed project are superior to the Mixed Commercial/Residential Alternative. This alternative has been rejected because it would result in greater impacts and would not satisfy the basic City objectives for development of the project site.

6.3 ALTERNATIVES ANALYSIS

Table 6.A summarizes the four alternatives have been identified and evaluated to provide decision-makers with a reasonable range of alternatives that would eliminate or reduce the impacts of the project. Factors considered in selecting the alternatives include site suitability, availability of infrastructure, other plans or regulatory limitations, economic viability, and whether the project proponent can reasonably acquire, control, or otherwise have access to the alternative site. An EIR need not consider an alternative whose impact cannot be reasonably ascertained and whose implementation is remote or speculative. In accordance with *CEQA Guidelines*, the alternatives considered in this EIR include those that 1) could accomplish most of the basic objectives of the project, 2) are reasonably feasible given the nature of the project and surrounding land uses, and 3) could avoid or substantially lessen one or more of the significant effects of the project.

Table 6.A: Summary of Analyzed Alternatives

Project Alternative	Alternative Description
Alternative 1 (No Project)	No change in General Plan designation or zoning of project site would occur. The project site would be developed with existing zoning resulting in the construction of 1,420,000 square feet of industrial warehouse uses on approximately 63 acres and approximately 180,000 square feet of commercial on 8 acres.
Alternative 2 (Reduced Intensity)	Total warehouse uses would be reduced to 1,212,100 square feet on 71 acres.
Alternative 3 (Commercial Center [Mixed Retail/Office])	General Plan and zoning designations for the site would be amended to accommodate the business and professional offices. Approximately 760,000 square feet of commercial service uses would be developed on approximately 35 acres. The balance of the site (35 acres) would be developed with up to approximately 760,000 square feet of office uses.

Table 6.A: Summary of Analyzed Alternatives

Project Alternative	Alternative Description
Alternative 4 (Off-Site)	Warehouse distribution uses consisting of 1,616,133 square feet on 70.3 acres bounded by Kramaria Street (extended) to the north, vacant and partially developed property and March Air Reserve Base to the west, Indian Street to the east, and the Perris Valley Storm Drain and vacant land to the south. The off-site location is approximately 1.3 miles northwest of the project site. No zone change or General Plan Amendment would be required. The applicant does not have control of this property.

Source: LSA Associates, Inc. 2011

Figure 6.1 illustrates the development scenarios have been identified as potential alternatives to implementation of the proposed project.

6.3.1 Environmental Impact Issues that are Generally Similar to the Proposed Project

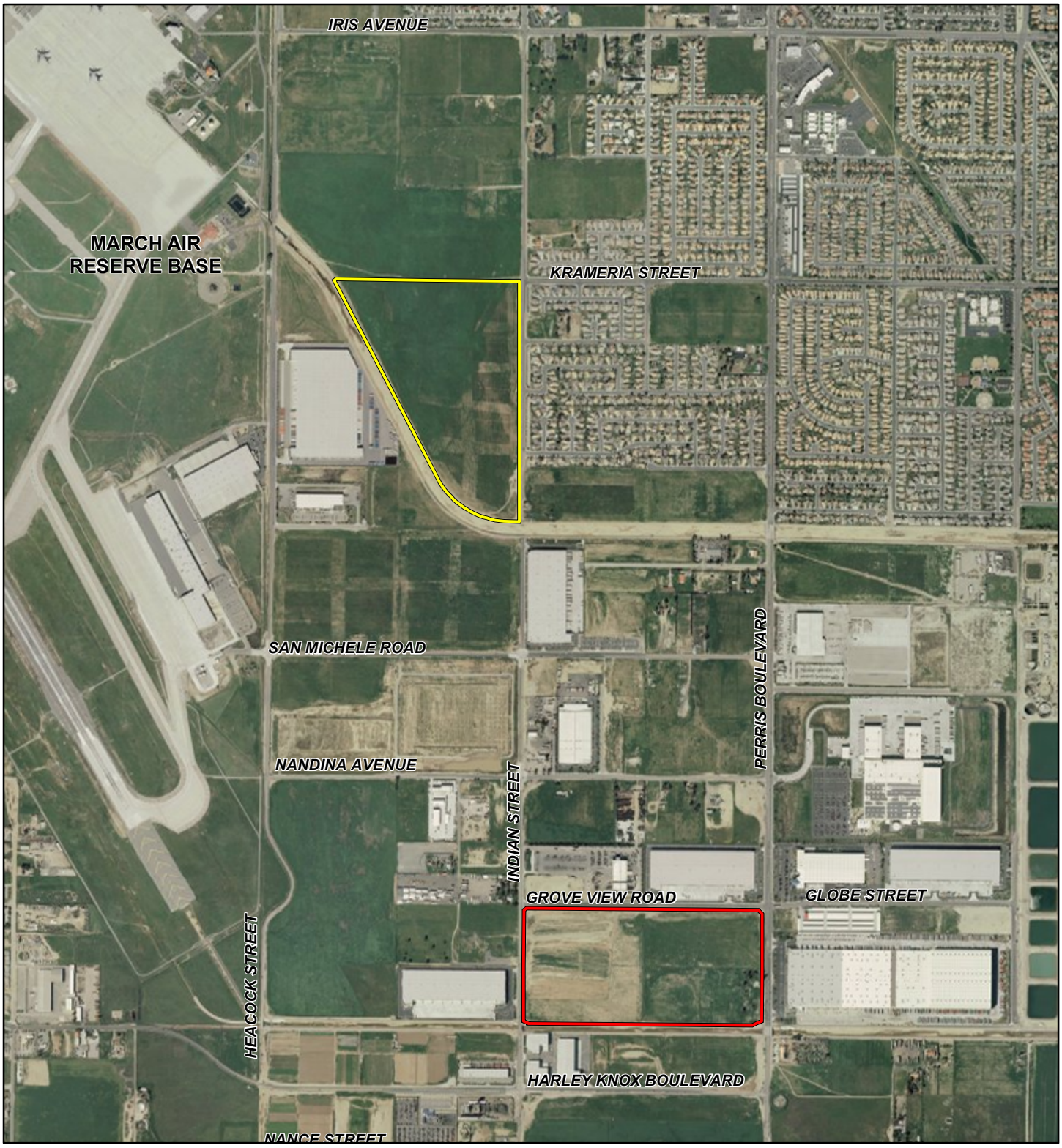
Eight of the seventeen environmental issues for all the alternatives considered would result in a similar level of impact when compared to the project. Rather than repeat a discussion of these non-significant impacts under each alternative, a summary of these impacts is analyzed below.

- Agriculture and Forestry Resources
- Biological Resources
- Cultural Resources
- Geology and Soils
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Mineral Resources
- Recreation

The level of impact associated with these topics would be similar if developed as proposed by the project or if developed with any of the alternatives. Where impacts related to any of these issues do differ among project alternatives, an appropriate discussion is provided for the respective alternative.

6.3.1.1 Agriculture and Forestry Resources

Development of any of the alternatives, with the exception of the Off-Site Alternative, would have similar agricultural- and forestry-related impacts. Section 4.1 of the EIR concluded that there are no forest resources located within the City limits. As such, no impacts to forest resources would occur with implementation of any of the alternatives, including the Off-Site Alternative. The Moreno Valley General Plan policies and zoning designations support agriculture only as an interim use, and no land in the City is designated solely for agricultural use or for agricultural preservation. No property within the City limits is located within a Williamson Act contract area. As such, no impacts related to Williamson Act land would occur with implementation of any of the alternatives, including the Off-Site Alternative. As identified in Sections 4.1.6.1 and 4.1.6.2 of the EIR, the development of the project site with urban uses would result in the conversion of State-designated Farmland (Prime Farmland, Farmland of Statewide Importance, and Farmland of Local Importance). Because no feasible mitigation measure is available to fully mitigate for the loss of State-designated Farmland, impacts associated with development of any of the on-site alternatives would remain significant and unavoidable. Therefore, compared with the proposed project, all on-site alternatives would have a significant and unavoidable impact on agricultural resources. A separate discussion for State-Designated Farmland impacts at the off-site location is provided in Section 6.3.2.4.



LSA

FIGURE 6.1

N

Proposed Project Location

Alternate Site

0 750 1,500

FEET

VIP Moreno Valley
Environmental Impact Report

Alternative Site Location

SOURCE: Thomas Bros., 2009

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6.3.1.2 Biological Resources

All build alternatives would require site development resulting in the grading of the entire project site. No plant species listed by the State and/or Federal government as endangered or threatened was identified on-site during the field reconnaissance. Based on the *General Habitat Assessment* [1] prepared for the proposed project site, no evidence of a natural stream course, riparian area, or vernal pool was observed during the field reconnaissance. No impacts to endangered or threatened species would occur with implementation of all on-site alternatives. No impacts to riparian habitat, other sensitive natural communities[2], or federally-protected wetlands would occur with implementation of all on-site alternatives.[3]

While the project site is located within the Western Riverside County MSHCP, the project site is not within any MSHCP criteria cell or habitat linkage.[4] Furthermore, the project site is not located within an MSHCP mammal or amphibian survey area. The project site is within the Stephen's Kangaroo Rat Habitat Conservation Plan (SKR HCP) Fee Area, but is not within a Stephen's Kangaroo Rat Core Area. Focused surveys for SKR are not required for this project because the project lies within the SKR Fee Area; therefore, under the SKR HCP, only payment of a local mitigation fee is required.

The *General Habitat Assessment* concluded that the project site lacks suitable habitat to support special status plant species and no special status plant species observed on-site. However, the proposed project has the potential to affect one non-listed sensitive species, the burrowing owl. Burrowing owls or their sign (pellets, fecal material, or prey remains) were not observed during the habitat assessment surveys (February 2007) or focused surveys (August 2009) conducted on site.[5] Due to intensive disking that had occurred on site, only a few marginally suitable potential burrows were identified. Although burrowing owl is known to occur on land that has been disturbed, it tends to avoid heavily disked areas because potential burrows occlude/collapse. However, burrowing owls, and other native bird species protected under the Migratory Bird Treaty Act (MBTA), are very mobile and opportunistic species that can occupy a site. Adherence to identified **Mitigation Measures BIO-1** through **BIO-4** (refer to Section 2.5.2) would reduce impacts to a less than significant level. As was identified for the proposed project, these alternatives would produce less than significant impacts to biological resources with the adherence to identified mitigation measures. A separate discussion for the off-site location is provided in Section 6.3.2.4.

6.3.1.3 Cultural Resources

Development of any of the identified build alternatives, including the off-site alternative, would result in extensive ground-disturbing activities affecting the entire project site and off-site location, and similar paleontological impacts would be anticipated when compared to the proposed project. The *Phase I Cultural Resources Assessment and Paleontological Records Review*[6] prepared for the proposed project concluded that while the site contains a historic site and historic isolate, which were recorded and evaluated in accordance with CEQA, these historic resources were determined to be less than significant. The report also concluded that the project site has a low probability for containing archaeological resources and due to the disturbed nature of the site, impacts to archaeological resources would be less than significant. While no such resources have previously

1 *General Habitat Assessment,* 71± Site (APNs: 316-210-071, -073, -075, -076), Moreno Valley, Riverside County California, Ecological Sciences, Inc., August 1, 2010.

2 *Focused Surveys for Selected Criteria Area and Narrow Endemic Plant Species,* 71± Site (APNs: 316-210-071, -073, -075, -076), Moreno Valley, Riverside County California, Ecological Sciences, Inc., November 9, 2009.

3 *Jurisdictional Survey and MSHCP Riparian/Riverine/Vernal Pools Evaluation,* 71± Site (APNs: 316-210-071, -073, -075, -076), Moreno Valley, Riverside County California, Ecological Sciences, Inc., November 1, 2009.

4 *Western Riverside County Multiple Species Habitat Conservation Plan, Volume I, Part I*, Dudek & Associates, June 17, 2003.

5 *Focused Western Burrowing Owl Survey,* 71± Site (APNs: 316-210-071, -073, -075, -076), Moreno Valley, Riverside County California, Ecological Sciences, Inc., November 11, 2009.

6 *Phase I Cultural Resources Assessment and Paleontological Records Review Perris Boulevard Project, Moreno Valley, Riverside County, California,* Michael Brandman Associates, March 22, 2007. ,

been detected within the project limits, activities undertaken for all alternatives (as with the proposed project) could encounter previously undetected paleontological resources. Adherence to the paleontological **Mitigation Measure CUL-1** (refer to Section 2.5.3) identified for the proposed project in the Initial Study (Appendix A of this EIR) would reduce impacts to less than significant. Compared with the proposed project, no greater impact would occur with any of the build alternatives.

6.3.1.4 Geology and Soils

Development of any of the on-site build alternatives would have similar geologic and soil-related impacts. The project site is not located in the vicinity of an active fault. Like all of southern California, the project site is located in a seismically active area and is subject to ground shaking resulting from activity on local and regional faults. However, the maximum credible earthquake event on the San Jacinto Fault zone affecting the project site would measure magnitude 7.2. This earthquake event is less than or equal to design levels as defined by the Uniform Building Code (UBC). The California Building Code (California Code of Regulations, Title 24) established engineering standards appropriate for the seismic zone in which development may occur. Development of the proposed project site would be required to adhere to UBC, the California Building Code, and City design and engineering standards. Impacts associated with this issue would be considered less than significant. The geotechnical analysis prepared for the proposed project concluded that the project site is not susceptible to seismic-related ground failure including liquefaction and landslides. Potential soil erosion impacts that may occur with development on the project site would be less than significant as all development within the City is required to adhere to the City's Grading Ordinance, obtain an NPDES Permit, and prepare an SWPPP, construction and operational, impacts associated with soil erosion hazards are less than significant.

The geotechnical analysis prepared for the proposed project[1] did indicate that on-site soils are potentially unstable. Adherence to **Mitigation Measure GEO-1** (refer to Section 2.5.4) would reduce impacts related to unstable soils to a less than significant level. Additionally, the geotechnical analysis also determined the presence of expansive soils on-site. Adherence to **Mitigation Measure GEO-2** (refer to Section 2.5.4) would reduce impacts related to expansive soils to a less than significant level. Compared with the proposed project, no greater impact would occur with any of the on-site build alternatives. A separate discussion for the off-site location is provided in Section 6.3.2.4.

6.3.1.5 Hazards/Hazardous Materials

Development of the any of the on-site build alternatives would still result in the on-site handling of hazardous substances, both during project construction and operation. It is assumed that, like any current use, these substances would continue to be applied in accordance with applicable local, state, and federal standards. There are no existing or proposed schools within a quarter mile of the proposed project site and the site is not identified on the DTSC's hazardous materials sites[2]. Air traffic related hazards would not occur at the proposed project site as the project site is not located within the safety hazard zones of March Air Reserve Base. Furthermore, the project site is not located within a Fire Hazard Area or within an area susceptible to wildfires identified by the City of Moreno Valley. With the adherence to existing hazardous materials regulations, impacts associated with hazards and hazardous materials under any of the on-site build alternatives would remain less than significant. A separate discussion for the off-site location is provided in Section 6.3.2.4.

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1 *Geotechnical Engineering Investigation Proposed Industrial Development Southwest Corner of Perris Boulevard and Grove View Road Moreno Valley, California*, NorCal Engineering, March 7, 2007.

2 *Phase I Environmental for the Evaluation of Potentially Hazardous Materials*, Centec Engineering, February 23, 2007.

6.3.1.6 Hydrology and Water Quality

As with the proposed project, the development of any of the on-site alternatives would require the modification of the existing on-site pattern of drainage and would require the installation of drainage improvements that may include on-site collection/routing pipes, landscaped swales, sand filters, and paved landscape features[1]. While the extent of the impermeable surfaces (parking area) required under each alternative is reduced from that required for the proposed project, the environmental impact of these improvements would be similar. All local, state, and federal policies and regulations pertaining to surface water and groundwater resources would remain in effect under these alternatives. Sedimentation and erosion from any on-site development has the potential to affect water quality. Similar to the proposed project, the construction of any on-site use would be required to follow applicable NPDES requirements, including the preparation of and adherence to a SWPPP and BMPs.[2] These requirements have been incorporated as **Mitigation Measures HYD-01** through **HYD-03** (refer to Section 2.5.6). As with the proposed project, runoff from paved surfaces, especially during a "first-flush" event, may be contaminated by a mixture of sediment, debris, and other contaminants. A standard condition with any such development would be preparation and implementation of a Water Quality Management Plan, which would effectively mitigate post-construction water quality impacts from the developed area. This requirement has been incorporated as **Mitigation Measure HYD-04** (refer to Section 2.5.6). All on-site alternatives would not interfere with groundwater recharge as the project site is not identified as a groundwater recharge area. To reduce the on-site flows to below or equal to pre-development conditions, the anticipated on-site flows would be routed to the water quality features such as vegetated swales, clarifiers, and sand filters to reduce flows leaving the site to pre-development flow rates. This requirement to reduce on-site flows to below or equal to pre-development conditions is incorporated as **Mitigation Measure HYD-05** (refer to Section 2.5.6). The project site is not located within a flood zone and the project site is not susceptible to mudslides, tsunamis, seiches, or flooding as a result of dam or levee failure. Similar to the proposed project, potential impacts related to hydrology and water quality would be less than significant for all on-site alternatives. A separate discussion for the off-site location is provided in Section 6.3.2.4.

6.3.1.7 Mineral Resources

The City of Moreno Valley General Plan does not identify the project site as a locally important mineral resource recovery site as there are no identified Mineral Resource Zones located with the City of Moreno Valley. Development of the project site or off-site location with any build alternatives would not result in the loss of or reduce the availability of mineral resources or the resource base from which they would be derived. Compared with the proposed project, no greater impact would occur for any of the project build alternatives.

6.3.1.8 Recreation

As with the proposed project, none of the build alternatives would include a residential component and potential jobs generated by the build alternatives would be filled predominantly by people already residing in the City because Moreno Valley is jobs poor. Therefore, there would be no increase in existing population and no increase in demand for park and recreation facilities resulting from development of Alternatives 2, 3, and 4. Because no increase in demand for recreational facilities would occur, impacts associated with recreation for any of the build alternatives would be similar in magnitude as the proposed project. Compared with the proposed project, no greater impact would occur for any of the project build alternatives.

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1 *Preliminary Hydrology Report and Hydraulic Analysis for PA09-0004 VIP Moreno Valley, SWC Perris Boulevard and Grove View Road,* Robert A. Bebensee, R.C.E., March 27, 2009.

2 *Preliminary Water Quality Management Plan, for PA09-0004 VIP Moreno Valley, SWC Perris Boulevard and Grove View Road*, Robert A. Bebensee, R.C.E., July 24, 2009.

6.3.2 Description and Impact Analysis of Alternatives

The following discussion compares the impacts of each alternative with the impacts of the proposed project, as detailed in Section 4.0 of this EIR. A conclusion is provided as to whether each alternative would result in one of the following:

- Reduction or elimination of the impact;
- A greater impact than the project;
- The same impact as the project; or
- A new impact in addition to the impacts of the proposed project impacts.

6.3.2.1 Alternative 1: No Project

Pursuant to CEQA (§15126.6[e][2]), the No Project Alternative should discuss what would reasonably be expected to occur, based on current plans and consistent with available infrastructure and community services, in the foreseeable future. The project site is currently zoned Industrial Specific Plan 208 (SP208 I). The project site is currently designated by the General Plan for Business Park/Light Industrial (BP). Given the goals and objectives of the City of Moreno Valley, it is highly reasonable in the event the proposed project were not approved, the site would be developed with some type of business park and/or industrial use. For analysis purposes, it is assumed that the No Project Alternative would result in the development of approximately 1,420,000 square feet of industrial warehouse uses on approximately 63 acres and approximately 180,000 square feet of commercial service uses on approximately 8 acres as would be allowed under the existing zoning and land use designations. The commercial service component of this alternative would be located along the frontage of Perris Boulevard while the industrial warehouse uses would occupy the remaining portion of the site.

Impact Analysis. Nine environmental issues would have impacts similar to those identified for the proposed project. These include the following:

- Aesthetics
- Agriculture and Forestry Resources;
- Biological Resources;
- Cultural Resources;
- Geology and Soils;
- Hydrology and Water Quality;
- Land Use;
- Mineral Resources; and
- Recreation.

Impacts associated with these topics would be similar to the proposed project because development of the site under the No Project Alternative would result in a similar footprint of development with no additional demand to services from residential uses. For this reason, impacts to these land-oriented impact topics would be similar resulting in the same level of impact.

The remaining environmental issues would, in some cases, result in similar impacts, but would be different enough to be discussed separately.

Air Quality. The No Project Alternative would require site grading and construction similar to that required of the proposed project. As identified in Section 4.2 of this EIR, short-term construction emission impacts associated with construction activities on the project site were mitigated to a less than significant impact with the exception of NO_X and PM_{10}. Since the No Project Alternative would require that the same amount of land be graded, the alternative would require similar grading and construction activities on site. Therefore, it is reasonable to anticipate that short-term construction

emission impacts would also be less than significant for all criteria pollutants, with the exception of NO_X and PM_{10}, under this alternative. Air quality impacts associated with NO_X and PM_{10} would significant and unavoidable with this alternative, similar to what was identified for the proposed project.

Under the No Project Alternative, the site would be developed with 1,420,000 square feet of industrial warehouse uses on approximately 63 acres and approximately 180,000 square feet of commercial service uses on approximately 8 acres as would be allowed under the existing zoning and land use designations. Based on these land uses, the No Project Alternative would generate approximately 6,738 daily vehicle trips and 572 p.m. peak hour trips (see Table 6.B).

The volume of each operational pollutant emitted during operation of this alternative would be correspondingly increased due to an increase of total daily vehicle trips. However, the traffic increase under the proposed project did not contribute to CO concentrations in excess of the state or federal standards. It is anticipated that this alternative would not exceed the state or federal one-hour and eight-hour standards. Because no CO hot spots would occur, the alternative would not have a significant impact on local air quality for CO. The long-term air quality impacts resulting from this alternative would still contribute criteria pollutants to an air basin that is in nonattainment for these criteria pollutants, similar to the proposed project. As identified in Table 6.B, long-term operational air pollutant emissions associated with the No Project Alternative would exceed SCAQMD emissions thresholds for CO, ROC, and NO_X, and reduced to less than significant for PM_{10}, and $PM_{2.5}$.

Table 6.B: Alternative 1 Operational Emissions

Source	Pollutant Emissions, lbs/day					
	CO	**ROC**	**NOx**	**SOx**	**PM_{10}**	**$PM_{2.5}$**
Proposed Project	830	143	990	1.5	170	42
Alternative 1	596	112	593	0.8	85	22
Net Change	-234	-31	-397	-0.7	-85	-20
SCAQMD thresholds	**550**	**55**	**55**	**150**	**150**	**55**
Alt. 1 exceeds thresholds?	**Yes**	**Yes**	**Yes**	**No**	**No**	**No**

Source: LSA Associates, Inc., October 2011.

When compared with the proposed project, air quality impacts associated with the No Project Alternative would be correspondingly increased in magnitude. Similar to the proposed project, the generation of these emissions would still result in a cumulative contribution of air pollutants in a nonattainment basin; therefore, impacts remain significant and unavoidable.

Hazards and Hazardous Materials. Development of the No Project Alternative would still result in the on-site handling of hazardous substances, both during project construction and operation. It is reasonable to assume that, like any current use, these substances would continue to be applied in accordance with applicable local, state, and federal standards. However, the No Project Alternative would result in the development of commercial service uses, which may include but is not limited to, gas stations and food service uses. These types of uses use and transport additional potentially hazardous materials not accounted for in the analysis of the proposed project. Because the No Project Alternative results in the development of commercial service uses, impacts associated with the transport or use of hazardous materials or potential upsets or accidents would be increased in magnitude due to the increased quantities of hazardous materials that would be present on site. However, with the adherence to existing hazardous materials regulations, impacts associated with hazards and hazardous materials under the No Project Alternative would remain less than significant.

Noise. The No Project Alternative would result in the construction of warehouse distribution and commercial service uses. As identified in Section 4.4 of this EIR, short-term construction noise impacts associated with the development of the project site were mitigated to a less than significant impact. Since the No Project Alternative would require similar site development during construction, short-term construction noise impacts would also be less than significant and similar in magnitude compared to the proposed project. The increase in project-related traffic under the No Project Alternative would result in an incremental increase in traffic noise. When compared to the proposed project, noise impacts associated with the No Project Alternative would be increased in magnitude. However, impacts would remain less than significant as some noise would still be generated under this alternative.

Population and Housing. The No Project Alternative would result in the development of 1,420,000 square feet of industrial warehouse uses on approximately 63 acres and approximately 180,000 square feet of commercial service uses on approximately 8 acres. Construction of the development envisioned under this alternative would create temporary construction jobs; however, these jobs would be likely filled by people already residing within the City. Utilizing an employment factor of one employee for every 629 square feet of service space,[1] the No Project Alternative is anticipated to generate approximately 286 commercial service jobs.[2] an employment factor of one employee for every 2,500 square feet of warehousing space,[3] the No Project Alternative is anticipated to generate approximately 568 warehousing jobs.[4] While additional jobs would be generated by the introduction of commercial service uses (addition of 286 jobs), the reduction in warehousing space would result in less warehousing jobs as the proposed project (reduction of 78). When this alternative is compared to the proposed project, the number of new jobs in the City would be a 32 percent increase over the proposed project.

The No Project Alternative would result in a greater amount of jobs created due to the development of commercial service uses. However, a large influx of new residents to the City is not anticipated due to the nature of the jobs generated by this alternative. The project would not directly affect population growth as compared with new residential development, because it is not creating homes. While the proposed project would generate employment opportunities, the jobs created are not expected to induce substantial growth in the City or region over and above the growth anticipated by the City's General Plan and the SCAG's regional growth forecasts. Population and housing impacts under this alternative would be similar in magnitude when compared to the proposed project. Therefore, impacts associated with this issue would remain less than significant.

Public Services. The No Project Alternative would result in the development of 1,420,000 square feet of industrial warehouse uses on approximately 63 acres and approximately 180,000 square feet of commercial service uses on approximately 8 acres within the project site. Similar to the proposed project, demands on schools, parks, other public facilities, law enforcement, and fire protection services would be similar in magnitude as no residential uses (impacts to schools and parks) are proposed under this alternative. Like the proposed project, development under this alternative would require payment of development impact fees for schools, police services, and fire services. The payment of development impact fees would offset any impacts to these public services that may result from the development of this alternative. Therefore, when compared to the proposed project, impacts associated with public services would remain less than significant with the payment of development impact fees.

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1 *Table IIB Average Number Employee per Square Foot, Employment Density Report*, Southern California Association of Governments, Natelson Company, Inc, October 2001.

2 Utilizing 1 employee/629 square feet of service use × 180,000 square feet of service use = 286 jobs.

3 *Table IIB Average Number Employee per Square Foot, Employment Density Report*, Southern California Association of Governments, Natelson Company, Inc, October 2001.

4 1 employee/2,500 square feet of warehousing use × 1,420,000 square feet of service use = 568 jobs.

Traffic. As indicated in Table 6.C, the No Project Alternative would generate approximately 6,738 daily vehicle trips and 572 p.m. peak hour trips. Compared to the proposed project, the No Project Alternative, which assumes development of existing zoning uses, would result in an increase of 33.4 percent of daily traffic trips. It is reasonable to assume that an increase of 33.4 percent in traffic trips would increase traffic on local roadways and intersections The increase in traffic may cause an existing intersection or roadway segment to operate at a deficient LOS. While significant traffic impacts may occur under this alternative, these impacts would be mitigated in a manner similar to those of the proposed project. However, despite the identification of mitigation measures, certain freeway segments and the I-215/Harley Knox Interchange improvements would not be under the jurisdiction of the City and cannot be guaranteed to be in place when development under Alternative 1 would become operational. Therefore, when compared to the proposed project, traffic impacts would be greater due to the additional trip generation. However, the resulting impact significance would be similar and would remain significant and unavoidable until the improvements are in place.

Table 6.C: Comparison of Average Daily and P.M. Peak Hour Trips

Type of Development	PM Peak Hour	Average Daily Trips
Proposed Project	388	5,052
Alternative 1 (No Project)	572	6,738
Alternative 2 (Reduced Intensity)	291	3,791
Alternative 3 (Commercial Center)	2,113	18,065
Alternative 4 (Off-Site Location)	388	5,052

Source: *ITE Trip Generation Handbook, 7th Edition*, LSA Associates, Inc., October 2011.

Utilities and Service Systems. Existing utility infrastructure for stormwater and wastewater is present in adjacent roadways or parcels. Like the proposed project, the applicant would connect to existing utility infrastructure subject to the terms and conditions of the City, EMWD, and RCFCWCD. As indicated in Table 6.D, the No Project Alternative would generate approximately 109,420 gallons of wastewater per day, which is approximately 73.5 percent more than the amount of wastewater that would be generated by the proposed project. However, similar to the proposed project, development under this alternative would be required to pay infrastructure fees and obtain approval from the wastewater treatment provider that would ensure there is excess capacity for the wastewater that would be generated by the proposed development. Therefore, impacts related to wastewater and wastewater treatment would remain less than significant when compared to the proposed project.

Table 6.D: Comparison of Average Wastewater Generation

Type of Development	Gallons per day (gpd)
Proposed Project	63,070
Alternative 1 (No Project)	109,420
Alternative 2 (Reduced Intensity)	47,260
Alternative 3 (Commercial Center)	456,000
Alternative 4 (Off-Site Location)	63,070

Wastewater Factor Source: *Sewage Generation Rates,* Draft CEQA Thresholds Guide, 2006.

The development of the service commercial and industrial warehouse uses associated with this alternative would also require the installation of water supply infrastructure to serve the project site. As indicated in Table 6.E, the No Project Alternative would require approximately 31,020 gallons of water per day, which is a 37.7 percent reduction than what would be required by the proposed project. When compared to the proposed project, water usage demands would be reduced in magnitude. As identified for the proposed project, EMWD has indicated that it has water available to

serve the proposed project[1]. Therefore, it is reasonable to conclude that water would be available for development proposed for the No Project Alternative.

Like the proposed project, the No Project Alternative would also generate solid waste. As identified in Table 6.F, this alternative would generate 805 tons of solid waste per year, which is 89.9 percent more than what the proposed project would generate. Therefore, demands on solid waste services and landfill capacity would be increased in magnitude. However, similar to the proposed project, development under the No Project Alternative would be required to adhere to the provisions of the solid waste provider that would service the project site. When compared to the proposed project, solid waste impacts under this alternative would remain less than significant.

Table 6.E: Comparison of Average Water Use

Type of Development	Gallons per day (gpd)
Proposed Project	49,805
Alternative 1 (No Project)	31,020
Alternative 2 (Reduced Intensity)	37,354
Alternative 3 (Commercial Center)	140,000
Alternative 4 (Off-Site Location)	49,805

Water Use Factor Source: *Water Supply Assessment* Eastern Municipal Water District, January 20, 2010.

Table 6.F: Comparison of Average Solid Waste Generation

Type of Development	Tons per year (tons/yr)
Proposed Project	424
Alternative 1 (No Project)	805
Alternative 2 (Reduced Intensity)	319
Alternative 3 (Commercial Center)	3,648
Alternative 4 (Off-Site Location)	424

Solid Waste Factor Source: *Estimated Solid Waste Generation Rates,* California Integrated Waste Management Board, http://www.ciwmb.ca.gov/WASTECHAR/WasteGenRates/Commercial.htm, website accessed October 4, 2011.

Global Climate Change. GHG emissions associated with the No Project Alternative are correspondingly increased as the No Project Alternative would increase the number of daily trips made to the site. In addition, the No Project Alternative would decrease the amount of water utilized and wastewater generated. As identified in Table 6.G, the No Project Alternative would generate 20,600 tons of carbon (CO_2), 0.77 ton of methane (CH_4), and 0.004 ton of nitrous oxide (N_2O) per year. The total CO_2 equivalent[2] (Tg/yr CO_2 Eq.) for the No Project Alternative would be 0.02 Tg/yr CO_2 Eq., which is approximately 33 percent less than what was identified for the proposed project.

Table 6.G: Comparison of Greenhouse Gas Emissions

Alternatives	Greenhouse Gas Emissions (tons/yr)			Total CO_2 equivalent (Tg/yr CO_2 Eq.)*
	CO_2	CH_4	N_2O	
Proposed Project	39,000	1.3	0.004	0.03
Alternative 1 (No Project)	20,600	0.77	0.004	0.02

1 *Water Supply Assessment for City of Moreno Valley Plot Plan Application PA09-004*, Eastern Municipal Water District, January 20, 2010.

2 Carbon dioxide equivalent (CO_2 Eq.) is an internationally accepted measure that expresses the amount of other greenhouse gases (e.g., methane and nitrous oxide) in terms of the amount of carbon dioxide (CO_2). The CO_2 Eq. measure is used as a way to measure the warming potential of a greenhouse gas as compared to CO_2, which has the highest global warming potential.

Table 6.G: Comparison of Greenhouse Gas Emissions

Alternatives	Greenhouse Gas Emissions (tons/yr)			Total CO_2 equivalent ($Tg/yr\ CO_2\ Eq.$)*
	CO_2	CH_4	N_2O	
Alternative 2 (Reduced Intensity)	12,200	0.45	0.004	0.01
Alternative 3 (Commercial Center)	49,000	1.9	0.005	0.04
Alternative 4 (Off-Site Location)	39,000	1.3	0.004	0.03

* $Tg/yr\ CO_2$ Eq. = teragrams or one million metric tons per year; this denotation is the standard metric unit utilized worldwide.
Source: LSA Associates, Inc. October 2011 and Greenhouse Gas Emissions and Global Climate Change Study, LSA Associates, Inc., August 2011 (Appendix E).

Cumulative Impacts. Similar to the proposed project, this alternative would contribute toward the permanent conversion of farmland, air quality operational emissions, and increased traffic operations on local roadways and at local intersections. Because this alternative would have a greater amount of traffic, the amount of operational emissions would be greater in magnitude. Because there are no feasible mitigation measures to reduce the cumulative impacts associated with long-term operational air pollutant emissions and increased traffic, long-term air quality and traffic impacts would remain significant and unavoidable. The No Project Alternative would also require the development of the project site. Since there is no feasible mitigation that would reduce the cumulative impacts associated with the conversion of farmland, cumulative impacts associated with farmland conversion would remain significant and unavoidable.

Conclusion. Under the No Project Alternative, impacts related to short-term construction-related air quality would be similar to the proposed project as the same amount of land would be disturbed and the same mix of equipment would be utilized. Long-term operational-related air quality emissions would be greater than the proposed project and would remain significant and unavoidable. Under this alternative, population and housing impacts would be similar in magnitude as no residential uses are proposed and the associated increases in employment are accounted for in the City General Plan and other applicable local and regional plans.

The development of the No Project Alternative would have similar demands on public services and recreation facilities. The payment of fees and adherence to development requirements would reduce these impacts to a less than significant level. Water supply is expected to be available as water demand is reduced and water demand was determined to be available for the proposed project. Because of the increase in vehicle trips achieved under this alternative, impacts to the operation of local roadways and intersections would be proportionally greater that what was identified for the proposed project; therefore, long-term traffic impacts would remain significant and unavoidable. Although traffic-related noise would be greater in magnitude, noise impacts would be similarly mitigated like the proposed project and would remain less than significant. Under this alternative, many of the proposed project objectives would be met as warehouse uses would be built. Development of this alternative would provide new employment opportunities for residents of Moreno Valley.

6.3.2.2 Alternative 2: Reduced Intensity

With the intent of avoiding or substantially reducing significant impacts created by the project traffic, air quality, and noise, the City has considered a Reduced Intensity Warehouse Alternative. This alternative includes one warehouse building covering approximately 1,212,100 square feet. Under this alternative, the proposed warehouse uses would represent a net decrease of approximately 25 percent compared to the proposed project. The existing BP General Plan designation and SP208 I zoning would be retained.

Impact Analysis. Nine environmental issues would have similar impacts as for the proposed project. These include the following:

- Agriculture and Forestry Resources;
- Biological Resources;
- Cultural Resources;
- Geology and Soils;
- Hazards and Hazardous Materials;
- Hydrology and Water Quality;
- Land Use;
- Mineral Resources; and
- Recreation.

Impacts associated with these topics would be similar to the proposed project because development of the site under the Reduced Intensity Alternative would result in a similar footprint of development with no additional demand to services from residential uses. For this reason, impacts to these land-oriented impact topics would be similar resulting in the same level of impact.

The remaining environmental issues would, in some cases, result in similar impacts, but would be different enough to be discussed separately.

Aesthetics. The proposed project site is not within a scenic vista identified by the City's General Plan or Specific Plan 208. Proposed development envisioned under the Reduced Intensity Alternative would be consistent with development envisioned in the General Plan and Specific Plan 208. The project site is not located along a state scenic highway, nor are any state scenic highways located in the project vicinity. The City's General Plan identifies major scenic resources as being visible from SR-60 and the development of the project site would not affect views of these major scenic resources. In addition, the project site does not contain rock outcroppings, historic buildings of significance, or other features that have been identified as scenic resources by either the City or State. The site does contain several ornamental trees (Eucalyptus, pine, and Peruvian pepper). Similar to the proposed project, prior to development of the site, the developer will be required to replace all mature trees 4 inches in diameter or greater in accordance with the City's tree removal replacement policy. Development that may occur on the project site would be required to adhere to City requirements for site development, similar to the proposed project. Although the visual characteristic of the project site would change, there would be no demonstrable negative aesthetic effect to the existing visual character or quality of the project site or its surroundings. The installation of on-site lighting to accommodate nighttime activities and for safety purposes would be required for this alternative, similar to the proposed project. Development of the warehouse uses envisioned under this alternative would be required to comply with design standards, such as lighting, setbacks, building height, lot dimensions, and maximum lot coverage contained in the City of Moreno Valley Municipal Code. While the total amount of square footage is reduced under the Reduced Intensity Alternative, site development would occur in a similar manner as the proposed project and would be required to adhere to the underlying development standards. Therefore, impacts associated with aesthetics for the Reduced Intensity Alternative are similar in magnitude to what was identified for the proposed project. Like the proposed project, impacts associated with this issue would be less than significant.

Air Quality. Because the amount of land to be graded with Alternative 2 would be equal to that of the proposed project, a similar mix of equipment as the proposed project would operate during earthmoving activities. The entire site will be graded and require import of soil to raise the building for drainage purposes. Therefore, construction emissions from the development of Alternative 2 would be similar to the proposed project, which is significant and unavoidable for NO_X and PM_{10}. Under this alternative, average daily traffic volumes would be reduced by 25 percent in comparison with the proposed project. As indicated in Table 6.H, the volume of each operational pollutant emitted during

operation of this alternative would be correspondingly reduced. However, unlike the proposed project, operational emissions for CO, and PM_{10} would not exceed daily SCAQMD thresholds. NOx and ROC operational emissions will exceed daily SCAQMD thresholds which is similar to the proposed project. Application of Leadership in Energy and Environmental Design (LEED) standards and green building design principles could reduce emissions from building operations such as heating and cooling; however, such standards and principles would not reduce emissions to below SCAQMD thresholds.

Table 6.H: Alternative 2 Operational Emissions

Source	Pollutant Emissions, lbs/day					
	CO	ROC	NOx	SOx	PM_{10}	$PM_{2.5}$
Proposed Project	830	143	990	1.5	170	42
Alternative 2	323	69	333	0.5	50	13
Net Change	-507	-74	-657	-1.0	-120	-29
SCAQMD thresholds	**550**	**55**	**55**	**150**	**150**	**55**
Alt. 2 exceeds thresholds?	**No**	**Yes**	**Yes**	**No**	**No**	**No**

Source: LSA Associates, Inc., August 2011.

Although operational air quality emissions would be reduced when compared to the proposed project during operations only, impacts would remain significant and unavoidable as there are no feasible mitigation measures identified that would reduce emissions to below the SCAQMD threshold for ROC and NO_X.

Noise. Under the proposed project, construction-related noise impacts were reduced to a less than significant level through the implementation of mitigation measures. Under this alternative, a similar amount of land would be disturbed; therefore, noise impacts associated with the construction of this alternative would be similar to those identified under the proposed project. With the implementation of mitigation identified for the proposed project, the short-term construction-related noise impacts associated with this alternative would remain less than significant, as identified for the proposed project. As with the proposed project, Alternative 2 would have truck deliveries and noise that would be generated during loading/unloading, trash compacting, and truck movements. Additionally, there would be noise associated with parking lot activities. These operational-related noise impacts associated with this alternative would remain less than significant, as identified for the proposed project.

The reduction in project-related traffic under this alternative would result in a decrease in long-term traffic noise due to a reduction of daily traffic trips to the project site. Under the proposed project, the increase in future traffic noise along local roadway segments would not increase beyond the threshold of perception. Under this alternative, future increases in traffic-related noise would not be above the threshold of perception due to a decreased contribution of future traffic volumes. When compared to the proposed project, this alternative's contribution to future traffic noise would be reduced, thereby reducing overall mobile source noise impacts within the area. When compared to the proposed project, operational noise associated with the Reduced Intensity Alternative would result in a less than significant impact, as identified for the proposed project.

Population and Housing. This alternative would result in the development of 1,212,100 square feet of warehouse uses. Utilizing an employment factor of one employee for every 2,500 square feet of warehouse space,[1] the Reduced Intensity Alternative is anticipated to generate approximately 485

[1] Inland Empire Distribution Center Operations Profile, WCL Consulting, June 10, 2008. 2,500 square feet per employee is an average of the Inland Empire rates.

employment opportunities.[1] Since warehouse jobs do not require skills that would require a specialized workforce that may not reside in the City, it is anticipated that these warehouse jobs would be filled predominately by persons already residing in the area. Therefore, no population increase would occur with the development of these warehouse jobs. When this alternative is compared to the proposed project, the number of new jobs would be 25 percent less than the proposed project. Similar to the proposed project, impacts related to population and housing would remain less than significant as this alternative would continue the existing development trend envisioned by the City.

Public Services. Compared to the proposed project, this alternative would result in a reduction of approximately 25 percent of proposed warehouse uses as compared to the proposed project. Similar to the proposed project, demands on schools, parks, other public facilities, law enforcement, and fire protection services would be similar in magnitude as no residential uses (impacts to schools and parks) are proposed under this alternative. Like the proposed project, development under this alternative would require payment of development impact fees for schools, police services, and fire services. The payment of development impact fees would offset any impacts to these public services that may result from the development of this alternative. Therefore, when compared to the proposed project, impacts associated with public services would remain less than significant with the payment of development impact fees.

Traffic. Based on trip generation rates published in *ITE Trip Generation Handbook, 7th Edition*, this alternative would generate approximately 3,791 daily vehicle trips, which is approximately 25 percent less than what was identified for the proposed project. With a 25 percent reduction in daily trips, it is reasonable to conclude that traffic volumes on local roadways and intersections would be reduced under this alternative. Although the volume of traffic is reduced under this alternative, impacts to LOS levels at nearby intersections and roadway segments would still occur and would require mitigation. The addition of traffic volumes associated with this alternative could result in a deficient LOS level at one or more of the intersections in the project vicinity during the lifetime of the development. While significant traffic impacts may occur under this alternative, these impacts would be mitigated in a manner similar to those of the proposed project. However, despite the identification of mitigation measures, certain freeway segments and the I-215/Harley Knox Interchange improvements would not be under the jurisdiction of the City and cannot be guaranteed to be in place when development under Alternative 2 would become operational. Therefore, when compared to the proposed project, traffic impacts would be lessened due to the reduced trip generation. However, the resulting impact significance would be similar and would remain significant and unavoidable until the improvements are in place.

Utilities and Service Systems. Existing utility infrastructure for stormwater and wastewater are present in adjacent roadways or parcels. Like the proposed project, development under this alternative would connect to existing utility infrastructure subject to the terms and conditions of the City, EMWD, and RCFCWCD. As indicated in previously identified Table 6.D, this alternative would generate approximately 47,260 gallons of wastewater per day, which is a 25 percent decrease in wastewater than would be generated by the proposed project. When compared to the proposed project, this alternative's demands on wastewater treatment and capacity at existing wastewater treatment facilities would be reduced in magnitude. However, like the proposed project, adherence to existing requirements identified by the City and EMWD would result in impacts remaining at a less than significant level.

[1] 1 employee/2,500 square feet of warehouse use × 1,212,100 square feet of warehouse use = 485 warehouse jobs.

The development of the warehouse uses associated with this alternative would also require the installation of water supply infrastructure. However, as previously indicated in Table 6.E, this alternative would require approximately 37,354 gallons of water per day, which is an approximately 25 percent decrease from that required by the proposed project. When compared to the proposed project, water usage demands would be reduced. However, similar to the proposed project, development under this alternative would be required to obtain verification from the water purveyor that water is available to serve the development. Since this alternative would utilize less water than the proposed project and since water supply for the proposed project is available, it is reasonable to conclude that if this alternative was built instead of the proposed project, adequate water would be available. Therefore, impacts related to water usage and water treatment/conveyance facilities would remain less than significant, similar to the proposed project.

Like the proposed project, the Reduced Intensity Alternative would also generate solid waste. As previously identified in Table 6.F, this alternative would generate 319 tons of solid waste per year, which is an approximately 25 percent decrease to what the proposed project would generate. Therefore, demands on solid waste services and landfill capacity would be reduced in magnitude. However, similar to the proposed project, development under the Reduced Intensity Alternative would be required to adhere to the provisions of the solid waste provider that would service the project site. When compared to the proposed project, solid waste impacts would remain less than significant.

Global Climate Change. GHG emissions under this alternative are correspondingly reduced as traffic trips are reduced. As previously identified in Table 6.G, this alternative would generate 12,200 tons of carbon (CO_2), 0.45 ton of methane (CH_4), and 0.004 ton of nitrous oxide (N_2O) per year. The total CO_2 equivalent for this alternative would be 0.01 Tg/yr CO_2 Eq., which is 67 percent less than the 0.03 Tg/yr CO_2 Eq. that would result from the operation of the proposed project.

Cumulative Impacts. Similar to the proposed project, the Reduced Intensity Alternative would contribute to the permanent conversion of farmland, long-term operational air pollutant emissions, and increased traffic operations on local roadways and at local intersections. Although the amount of operational air pollutant emissions and traffic would be reduced in magnitude, because there are no feasible mitigation measures to reduce long-term air pollutant operational emissions and increased traffic, cumulative impacts would remain significant and unavoidable.

As with the proposed project, the Reduced Intensity Alternative would also be consistent with the strategies to reduce California's emissions to the levels proposed in Executive Order S-3-05. However, given the uncertainty of data and appropriate methodology to accurately analyze, and the inability to quantify the reduction achieved through implementation of strategies and programs to reduce GHGs, the Reduced Intensity Alternative GHG emission contribution would result in a cumulative impact regarding global climate change. The cumulative impacts of the Reduced Intensity Alternative as with the proposed project on global climate change are considered to be significant and unavoidable.

This alternative would also require the development of the project site. Since there is no feasible mitigation that would reduce the cumulative impacts associated with the conversion of farmland, cumulative impacts associated with farmland conversion would remain significant and unavoidable.

Conclusion. Under the Reduced Intensity Alternative, impacts related to short-term construction-related air quality would be similar to the proposed project as the same amount of land would be disturbed and the same mix of equipment would be utilized. Long-term operational-related air quality impacts would be reduced in magnitude when compared to the project but would remain significant and unavoidable. The decrease in warehouse uses would result in a reduction of permanent jobs that

would be created. This alternative would have a reduced demand on public services and utilities and service systems. However, similar to the proposed project, the payment of fees and adherence to utility requirements would reduce these impacts to a less than significant level.

Because of the decrease in vehicle trips achieved under this alternative, impacts to the operation of local roadways and intersections would be proportionally reduced from what was identified for the proposed project; however, long-term traffic impacts would remain significant and unavoidable. Construction-related noise would be similarly mitigated like the proposed project and would remain less than significant. Water use for this alternative would be less than the proposed project and would generate less wastewater and solid waste. Under this alternative, the proposed project objectives are met and warehouse uses would still be built, but on a smaller scale.

6.3.2.3 Alternative 3: Commercial Center (Mixed Commercial/Office)

The Commercial Center Alternative would result in the development of commercial service and office uses on the project site. Although business and professional offices, financial institutions, and medical clinics are permitted in SP208, they are permitted only in the industrial support areas while commercial service-oriented uses are a permitted throughout the SP208 Industrial designation. For this reason, the General Plan and zoning designations for the site would need to be amended to accommodate the business and professional offices. Permitted commercial service uses include, but are not limited to, Automotive Sales/Rental/Leasing & Accessories, Automotive/Truck Repair, Business Supply/Equipment Sales/Rental & Services, and Repair Services. Approximately 760,000 square feet of commercial service uses would be developed on approximately 35 acres. The balance of the site (35 acres) would be developed with up to approximately 760,000 square feet of office uses.[1]

Impact Analysis. Eight environmental issues would have similar impacts as for the proposed project. These include the following:

- Agriculture and Forestry Resources;
- Biological Resources;
- Cultural Resources;
- Geology and Soils;
- Hazards and Hazardous Materials;
- Hydrology and Water Quality;
- Land Use and Planning; and,
- Mineral Resources.

Impacts associated with these topics would be similar to the proposed project because development of the site under the Commercial Center Alternative would result in a similar footprint of development with no additional demand to services from residential uses. For this reason, impacts to these land-oriented impact topics would be similar resulting in the same level of impact.

The remaining environmental issues would, in some cases, result in similar impacts, but would be different enough to be discussed separately.

Aesthetics. The proposed project site is not within a scenic vista identified by the City's General Plan or Specific Plan 208. Proposed development envisioned under the Commercial Center Alternative would be consistent with development permitted for the site in the General Plan and Specific Plan 208. The project site is not located along a state scenic highway, nor are any state scenic highways located in the project vicinity. The City's General Plan identifies major scenic resources as being visible from SR-60 and the development of the project site would not affect views of these major

[1] Square footage is based on a 50 percent development of the project site.

scenic resources. In addition, the project site does not contain rock outcroppings, historic buildings of significance, or other features that have been identified as scenic resources by either the City or State. The site does contain several ornamental trees (Eucalyptus, pine, and Peruvian pepper). Similar to the proposed project, prior to development of the site, the developer will be required to replace all mature trees 4 inches in diameter or greater in accordance with the City's tree removal replacement policy. Development that may occur on the project site would be required to adhere to City requirements for site development, similar to the proposed project. Although the visual characteristic of the project site would change, there would be no demonstrable negative aesthetic effect to the existing visual character or quality of the project site or its surroundings. The installation of on-site lighting to accommodate nighttime activities and for safety purposes would be required for this alternative, similar to the proposed project. Development of the warehouse uses envisioned under this alternative would be required to comply with design standards, such as lighting, setbacks, building height, lot dimensions, and maximum lot coverage contained in the City of Moreno Valley Municipal Code. While the visual character of the development proposed under the Commercial Center Alternative would differ from that of the proposed project, the development that may occur would be required to adhere to site development standards in accordance with the underlying land use designation. It is expected that the visual character of the Commercial Center Alternative would be compatible with existing and future adjacent development. Therefore, impacts associated with aesthetics for the Commercial Center Alternative are similar in magnitude to what was identified for the proposed project. Like the proposed project, impacts associated with this issue would be less than significant.

Air Quality. Since the amount of land to be developed under this alternative would equal that developed under the proposed project, it is reasonable that a similar mix of equipment would operate during earthmoving and construction activities. As with the proposed project, peak daily construction emissions would be similar, which is significant and unavoidable for NO_X and PM_{10}. Although SCAQMD regulations and project-specific mitigation measures would reduce the amount of construction emissions, impacts associated with construction emissions for NO_X and PM_{10} remain significant and unavoidable.

As previously identified in Table 6.C, the Commercial Center Alternative would generate approximately 18,065 daily vehicle trips, which is more than the trips associated with the proposed project. Because the total number of trips is increased, the volume of each operational pollutants emitted during operation of this alternative would also be correspondingly increased. As indicated in Table 6.I, operational emissions would continue to exceed SCAQMD significance thresholds for ROG, NO_X, CO, and PM_{10} as identified for the proposed project.

Table 6.I: Alternative 3 Operational Emissions

Source	Pollutant Emissions, lbs/day					
	CO	**ROC**	**NOx**	**SOx**	**PM_{10}**	**$PM_{2.5}$**
Proposed Project	830	143	990	1.5	170	42
Alternative 3	1,368	218	1,391	1.9	201	51
Net Change	+537	+75	+401	+0.4	+31	+9
SCAQMD thresholds	**550**	**55**	**55**	**150**	**150**	**55**
Alt. 3 exceeds thresholds?	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**No**

Source: LSA Associates, Inc., October 2011

When this alternative is compared to the proposed project, impacts to air quality would be increased in magnitude. The volume of pollutants emitted would be increased and the long-term air quality impacts resulting from this alternative, as with the proposed project, would continue to be significant and unavoidable.

Noise. The extent and duration of construction activities for this alternative are anticipated to be similar to those of the proposed project. Therefore, construction noise resulting from the construction of this mix of uses would be generally similar to the proposed project. Development of this alternative would require the implementation of mitigation measures to reduce construction noise impacts to a less than significant level. Compared with the proposed project, the short-term noise impacts resulting from project construction and stationary noise impacts associated with the operation of the commercial/office uses would be similar and remain less than significant with mitigation incorporated.

The increase in project-related traffic for this alternative would result in an incremental increase in traffic noise. This alternative's contribution to future traffic noise would result in more trips on the road, which increases the overall mobile source noise impact as compared to the proposed project. Parking lot noise and mechanical ventilation noise would still occur under this alternative and noise from the loading docks would still be present as the alternative includes a commercial component. However, the uses envisioned under this alternative would increase the number (i.e., more commercial/office buildings) and extent of noise sources but would still have noise approaching levels identified for the proposed project. When compared to the proposed project, operational noise impacts would be similar.

Population and Housing. The Commercial Center Alternative would result in the development of approximately 760,000 square feet of commercial service uses and 760,000 square feet of office uses. Commercial service jobs are likely to be filled by persons already residing in the area. However, unlike commercial jobs, which can often be filled by most working adults, office jobs under this alternative may require the employment of persons in specialized fields, which may not include persons already living in the area. Persons from outside of the area may be required to relocate to Moreno Valley to fill positions for office uses, resulting in a population increase in the City. To analyze a worst-case scenario, it is assumed that 50 percent of the office jobs would be filled by people who are not living in the area. Utilizing employment factors of one employee for every 629 square feet of commercial use[1] and one employee for every 481 square feet of office uses, this alternative would create up to 2,788 jobs (1,208 commercial jobs and 1,580 office jobs).

When this alternative is compared to the proposed project, the number of new residents would be greater than that identified for the proposed project as the proposed project would not result in population growth. However, this alternative would not directly affect population growth as compared with new residential development, because it is not creating homes. While development under this alternative would generate employment opportunities, the jobs created are not expected to induce substantial growth in the City or region over and above the growth anticipated by the City's General Plan and the SCAG's regional growth forecasts. Infrastructure, including roads, sewers, water, and electricity, already exists around the project site. Impacts related to population and housing would remain less than significant as this alternative would continue the existing development trend envisioned by the City.

Public Services. As discussed above, the Commercial Center Alternative could result in population increase within the City. Because of the population increase associated with this alternative that would occur within the project limits, demands on schools, parks, other public facilities, law enforcement, and fire protection services would be greater in magnitude than what was identified for the proposed project. However, similar to the proposed project, development under this alternative would require payment of development impact fees for schools, police services, and fire services. The payment of development impact fees would offset any impacts to these public services that may result from the development of this alternative. Therefore, when compared to the proposed project,

[1] *Table IIB, Average Number of Employees per Square Foot, Employment Density Report*, Southern California Association of Governments, Natelson Company, Inc., October 2001.

impacts associated with public services would remain less than significant with the payment of development impact fees.

Recreation. As previously discussed, the Commercial Center Alternative could result in population increase within the City. Because of the population increase associated with this alternative that would occur within the project limits, demands on recreational facilities would be greater in magnitude than what was identified for the proposed project. However, similar to the proposed project, development under this alternative would require payment of development impact fees for recreation facilities. The payment of development impact fees would offset any impacts to these recreational facilities that may result from the development of this alternative. Therefore, when compared to the proposed project, impacts associated with recreation would remain less than significant with the payment of development impact fees.

Traffic. As identified in Table 6.C, this alternative would generate approximately 18,065 daily vehicle trips. In comparison to the proposed project, this alternative would result in a 257.6 percent increase in daily traffic. With an increase in daily traffic, an increase in volumes on nearby roads and intersections would occur and be greater in magnitude when compared to the proposed project. With the increase in traffic under this alternative, impacts to LOS levels at nearby intersections and roadway segments would still occur and would require mitigation. The addition of traffic volumes associated with this alternative could result in a deficient LOS level at one or more of the intersections in the project vicinity during the lifetime of the development. While significant traffic impacts may occur under this alternative, these impacts would be mitigated in a manner similar to those of the proposed project. However, despite the identification of mitigation measures, certain freeway segments and the I-215/Harley Knox Interchange improvements would not be under the jurisdiction of the City and cannot be guaranteed to be in place when development under this alternative would become operational. Therefore, when compared to the proposed project, traffic impacts would be greater due to the additional trip generation. However, the resulting impact significance would be similar and would remain significant and unavoidable until the improvements are in place.

Utilities and Service Systems. Similar to the proposed project, development under the Commercial Center Alternative would connect to existing utility infrastructure subject to the terms and conditions of the City, EMWD, and RCFCWCD. As indicated in previously identified Table 6.D, this alternative would generate approximately 456,000 gallons of wastewater per day, which is a 623.0 percent increase over what the proposed project would generate. When compared to the proposed project, wastewater treatment demand would be increased in magnitude as more wastewater would be generated under this alternative. However, like the proposed project, adherence to existing requirements identified by the City and EMWD would result in impacts remaining at a less than significant level.

The development of the commercial and office uses associated with this alternative would also require the installation of water supply infrastructure to serve the project site. The Water Supply Assessment indicated that adequate water supply exists and is forecast to be available in the future to accommodate the proposed project. As previously indicated in Table 6.E, the Commercial Center Alternative would require approximately 140,000 gallons of water per day, which is 181.1 percent greater than what would be required by the proposed project. When compared to the proposed project, therefore, water usage demands for this Alternative would be greater. However, similar to the proposed project, development under this alternative would be required to obtain verification from the water purveyor (EMWD) that water is available to serve the development. In the event that the amount of water required for this alternative is available, impacts associated with this issue would be less than significant. However, in the event that water is not available for the alternative, a new and significant impact associated with this issue would occur.

Like the proposed project, the Commercial Center Alternative would also generate solid waste. As previously identified in Table 6.F, this alternative would generate 3,648 tons of solid waste per year, which is 760.4 percent more than what the proposed project would generate. Therefore, demands on solid waste services and landfill capacity would be increased in magnitude. However, similar to the proposed project, development under the Commercial Center Alternative would be required to adhere to the provisions of the solid waste provider that would service the project site. When compared to the proposed project, solid waste impacts under this alternative would remain less than significant.

Global Climate Change. GHG emissions are correspondingly increased as the Commercial Center Alternative would increase the number of daily trips made to the site. As previously identified in Table 6.G, the Commercial Center Alternative would generate 49,000 tons of carbon (CO_2), 1.9 tons of methane (CH_4), and 0.005 ton of nitrous oxide (N_2O) per year. The total CO_2 equivalent for this alternative would be 0.04 Tg/yr CO_2 Eq., which is approximately 33 percent more than what was identified for the proposed project.

Cumulative Impacts. Similar to the proposed project, this alternative would contribute toward the permanent conversion of farmland, long-term operational air pollutant emissions, and increased traffic operations on local roadways and at local intersections. The amount of operational air pollutant emissions and traffic levels would be greater when compared to the proposed project. In addition, there are no mitigation measures that would reduce long-term air quality operational impacts to below SCAQMD threshold standard and no mitigation measures that would reduce impacts associated with increased traffic in the area. Therefore, cumulative impacts associated with long-term air quality and long-term traffic would remain significant and unavoidable. This alternative would also require the development of the project site. Since there is no feasible mitigation that would reduce the cumulative impacts associated with the conversion of farmland, cumulative impacts associated with farmland conversion would remain significant and unavoidable like the proposed project.

Conclusion. Under the Commercial Center Alternative, impacts related to short-term construction emissions would be similar to the proposed project as the same amount of land would be disturbed and the same mix of equipment would be utilized. Long-term operational-related air quality emissions would be increased in magnitude when compared to the project and would remain significant and unavoidable. Because of the increase in vehicle trips under this alternative, impacts to the operation of local roadways and intersections would be proportionally greater than what was identified for the proposed project. Long-term traffic impacts would remain significant and unavoidable. Traffic-related noise would be increased in magnitude but would be similarly mitigated like the proposed project and would remain less than significant.

This alternative would result in the development of office uses that would generate permanent jobs, which may require workers who are not current residents of the City. The proposed office uses would increase the total number of people that would be added to the City's population. This alternative would have greater demands on public services and recreation. However, the payment of fees would reduce these impacts to a less than significant level. This alternative would increase the amount of water utilized and increase the amount of wastewater and solid waste that would be generated on site. Similar to the proposed project, adherence to wastewater and solid waste requirements would reduce these impacts to a less than significant level. In the event that water is not available for development envisioned under this alternative, impacts to water resources would be significant and avoidable. Under this alternative, some of the proposed project objectives are not met as warehouse uses would not be built. However, development of this alternative would provide new employment opportunities for residents of Moreno Valley.

6.3.2.4 Alternative 4: Off-Site Location

This alternative would result in the same intensity of development of approximately 1,616,133 square feet of warehouse uses on approximately 70.3 acres. The alternative project site identified by the City is bounded by Kramaria Street (extended) to the north, vacant and partially developed property and March Air Reserve Base to the west, Indian Street to the east, and the Perris Valley Storm Drain and vacant land to the south. The off-site location is approximately 1.0 miles northwest of the project site and is within the same Industrial Area Specific Plan as the proposed project. This alternative off-site property is not owned or under the control of the applicant. The off-site location is currently zoned SP 208 I and is designated BP in the City's General Plan, identical to the proposed project, as properties within the existing Specific Plan 208 area within the City is planned for industrial development and contains properties comparable in size. The Specific Plan 208 area provides for business park, mixed use, light industry, and heavy industry districts on approximately 1,500 acres in southwestern Moreno Valley. Since the proposed uses are consistent with the uses identified for the off-site location, no zone change or General Plan Amendment would be required. Development of this site would not require soil import, inherently reducing impacts form air pollution emissions during construction.

Impact Analysis. Nine environmental issues would have similar impacts as the proposed project. These include the following:

- Cultural Resources;
- Geology and Soils;
- Hydrology and Water Quality;
- Land Use and Planning;
- Mineral Resources
- Population and Housing;
- Public Services;
- Recreation; and
- Utilities and Service Systems.

Impacts associated with these topics would be similar to the proposed project because development of the site under the Off-site Alternative would result in a similar footprint of development with no additional demand to services from residential uses. For this reason, impacts to these land-oriented impact topics would be similar resulting in the same level of impact.

The remaining environmental issues would, in some cases, result in similar impacts, but would be different enough to be analyzed separately under this alternative.

Aesthetics. The Off-Site Location Alternative would consist of similar warehouse structures and uses as the proposed project, just on a different project site. With the off-site location, surrounding views would include similar industrial uses, March Air Reserve Base, single-family residential uses, and vacant land. Under this alternative, development of the project site would still be required to comply with design standards contained in the City's Development Code such as setbacks, building height, lot dimensions, and maximum lot size. No significant visual resource has been identified within the limits of the alternative project site. Similar to the proposed project, this alternative would change the existing character of the site, replacing the current open space with developed uses. Like the proposed project, the warehouse uses would still require the installation and operation of parking and building lighting. Adherence to the City's lighting standards would reduce the significance of any impact associated with the generation of light or glare to a less than significant level. This alternative site is not identified as being within an area that would have scenic resources. Development of the alternative would result in a less than significant impact on aesthetics, similar to that identified for the proposed project.

Agriculture and Forestry Resources. Development of the off-site location would include the development of 70.3 acres with warehousing uses. As identified by the California Department of Conservation Farmland Mapping and Monitoring Program, the off-site location is identified as Farmland of Local Importance.[1] Similar to the proposed project, the off-site location is not under a Williamson Act contract. The total amount of farmland that would be converted to urban uses under the Off-Site Location Alternative would be similar when compared to the amount of farmland that would be converted under the proposed project. Similar to the proposed project, the off-site location is located in an area that has been developed with urban uses and is still in the process of developing with more urban uses. Unlike the proposed project, development that may occur on the off-site location would only result in the conversion of Farmland of Local Importance while the proposed project would result in the conversion of Prime Farmland, Farmland of Statewide Importance, and Farmland of Local Importance. Therefore, the potential for additional agricultural lands to be converted to urban uses would be similar in magnitude when compared to the proposed project. Since there are no mitigation measures to fully mitigate for the loss of farmland to urban development, impacts remain significant and avoidable, similar to the proposed project.

Air Quality. Under the Off-Site Location Alternative, the total amount of land to be graded would be approximately the same as the off-site location consists of approximately 70.3 acres. It is anticipated that a similar mix of equipment would operate during earthmoving and construction activities on the project site. Therefore, construction emissions from the development of Alternative 4 would be similar to the proposed project, which is significant and unavoidable for NO_X and PM_{10}. Although SCAQMD regulations and project-specific mitigation measures would reduce the amount of construction emissions, impacts associated with construction emissions for NO_X and PM_{10} remain significant and unavoidable.

Implementation of the Off-Site Alternative would result in the development of the same amount of warehouse space (1,616,133 square feet) as the proposed project. Since the Off-Site Location Alternative would have the same amount of square footage as the proposed project, it is reasonable to conclude that the Off-Site Location Alternative would generate the same amount of traffic. As previously indicated in Table 6.C, this alternative would generate approximately 5,052 daily vehicle trips. As identified in Table 6.J, the volume of each operational pollutant emitted during operation of this alternative would be similar to that identified for the proposed project.

Table 6.J: Alternative 4 Operational Emissions

Source	Pollutant Emissions, lbs/day					
	CO	**ROC**	**NOx**	**SOx**	**PM_{10}**	**$PM_{2.5}$**
Proposed Project	830	143	990	1.5	170	42
Alternative 5	830	143	990	1.5	170	42
Net Change	0	0	0	0	0	0
SCAQMD thresholds	**550**	**55**	**55**	**150**	**150**	**55**
Alt. 4 exceeds thresholds?	**No**	**Yes**	**Yes**	**No**	**Yes**	**No**

Source: LSA Associates, Inc., October 2011.

Although the off-site location would be located on a different site, CO hot spot conditions are anticipated to be similar to the proposed project as the off-site location is in close proximity to the project site. Because traffic associated with this alternative would be similar to what was identified for the proposed project, CO concentrations at local intersections would not be anticipated to exceed the state or federal one-hour and eight-hour standards. No CO hot spots would occur, and the proposed project would not have a significant impact on local air quality for CO. When the Off-Site Location

[1] *Farmland Mapping and Monitoring Program 2008,* California Department of Conservation Division of Land Resources, ftp://ftp.consrv.ca.gov/pub/dlrp/FMMP/pdf/2008/riv08_west.pdf, website accessed October 5, 2011.

Alternative is compared to the proposed project, impacts to air quality would be similar. Although the volume of pollutants emitted would be similar during the operational phase of the project, the long-term air quality impacts resulting from this alternative would still contribute criteria pollutants to a non-attainment air basin. Therefore, long-term air quality impacts associated with this alternative would continue to be significant and unavoidable, similar to the proposed project.

Biological Resources. The Off-Site Location Alternative would require site development in a similar manner as would be required for the proposed project. Although no site-specific surveys have been conducted for the off-site location, it is anticipated that biological communities present at the off-site location would be similar to biological communities present at the proposed project location. However, the potential exists for sensitive species to be present at the off-site location. While the presence of sensitive species on the alternative site cannot be confirmed without a biological survey, if sensitive species were absent from the Off-Site Location Alternative project site, biological resource impacts would be similar to the proposed project. However, if sensitive species are present at the off-site location, impacts to biological resources resulting from development of this alternative would be mitigated based on existing biological protocols or surveys that are required for such species. As identified for the proposed project, mitigation to address potential impacts to the sensitive species would also be required. When compared to the proposed project, this alternative would result in a similar impact on biological resources.

Hazards and Hazardous Materials. The off-site location is not identified on a list of hazardous waste generators or hazardous waste handlers.[1] While the presence of hazardous materials cannot be confirmed for the off-site location without a site-specific survey, because the off-site location has been utilized for agricultural production and because of the surrounding vacant land, it is anticipated that hazards materials that could be found on site would be similar to what was identified for the proposed project. Because this alternative includes warehouse uses similar to the proposed project, development under this alternative would still result in the on-site handling of hazardous substances, both during project construction and during operations.

The off-site location would be located within the MARB Safety Zone Area 2.[2] MARB Safety Zone Area 2 limits residential development to one dwelling unit per 2.5 acres and allows agricultural, industrial, and commercial uses. Although the off-site location is within MARB Safety Zone Area 2, the type of development that would occur under this alternative would be consistent with the development allowed in Safety Zone Area 2. Therefore, airport hazards associated with this alternative would be less than significant. The off-site location is located approximately one mile from an existing school (El Potrero Elementary School to the east). However, because the same regulations and standards associated with hazards and hazardous materials would apply under this alternative, impacts associated with the Off-Site Location Alternative would remain less than significant; similar to what was identified for the proposed project.

Noise. The nearest sensitive receptors to the off-site location would be an existing single family residential development across Iris Avenue, immediately adjacent to the northeast of the off-site location's northeastern boundary. The distance between the off-site location and the nearest sensitive receptor is closer than the distance between the proposed project site boundary and its nearest sensitive receptor is adjacent. Although the type of noise generated by the construction of the Off-Site Location Alternative is anticipated to similar to that of the proposed project, the noise experienced at the closest sensitive receptor would be increased due to a closer distance. No significant noise-

[1] *EnviroStor Database,* Department of Toxic Substances Control, http://www.envirostor.dtsc.ca.gov/public/, website accessed September 30, 2011.

[2] *March Air Reserve Base Safety Zone Map*, http://www.rcaluc.org/filemanager/plan/old//March%20Air%20Reserve%20Base%20(MARB).pdf, website accessed September 30, 2011.

related impact was identified with the construction or operation of the proposed project. Noise generated from construction operations, parking lots, loading areas, truck deliveries, and building machinery with this alternative would be increased to that identified for the proposed project. Traffic related noise is anticipated to be similar to the proposed project as the Off-Site Location Alternative would generate the same amount of daily vehicle trips. When compared to the proposed project, noise impacts would be greater in magnitude and would remain less than significant with mitigation.

Traffic. As identified in Table 6.C, this alternative would generate approximately 5,052 daily trips which is the same number that would occur with the proposed project. With the level of traffic remaining the same, volumes on nearby roads and intersections would be similar in magnitude when compared to the proposed project. However, despite the volume of traffic remaining the same, impacts to LOS levels at nearby intersections and roadway segments would still occur and would require mitigation. The addition of traffic volumes associated with this alternative could result in deficient LOS level at one or more of the intersections in the project vicinity during the lifetime of the development. While significant traffic impacts may occur under the Off-Site Location Alternative, these impacts would be mitigated in a manner similar to those of the proposed project. However, despite the identification of mitigation measures, certain freeway segments and the I-215/Harley Knox Interchange improvements would not be under the jurisdiction of the City and cannot be guaranteed to be in place when development under this alternative would become operational. Therefore, when compared to the proposed project, traffic-related impacts would be the same ad the proposed project and would remain significant and unavoidable.

Global Climate Change. GHG emissions are the same as the proposed project as the Off-Site Alternative is the proposed project on a nearby site in the City. As previously identified in Table 6.G, the Off-Site Location Alternative would generate 39,000 tons of carbon (CO_2), 1.3 tons of methane (CH_4), and 0.004 ton of nitrous oxide (N_2O) per year. The total CO_2 equivalent for this alternative would be 0.03 Tg/yr CO_2 Eq., which is the same amount that the proposed project would generate.

Cumulative Impacts. Similar to the proposed project, this alternative would contribute toward the permanent conversion of farmland, long-term operational air pollutant emissions, and increased traffic operations on local roadways and at local intersections. The amount of operational air pollutant emissions and traffic generated by the Off-Site Location Alternative would be similar to the proposed project, only on a different site. Similar to the proposed project, there are no mitigation measures that would reduce long-term air quality operational impacts to below SCAQMD threshold standard. Additionally, there are no mitigation measures that would reduce impacts associated with increased traffic in the area. Therefore, cumulative impacts associated with long-term air quality and long-term traffic would remain significant and unavoidable. This alternative would also require the development of the alternative site, resulting in a loss of farmland. Since there is no feasible mitigation that would reduce the cumulative impacts associated with the conversion of farmland, cumulative impacts associated with farmland conversion would remain significant and unavoidable similar to the proposed project.

Conclusion. With the Off-Site Location Alternative, impacts related to air quality and traffic impacts would be similar to those identified with the proposed project. Short-term construction and long-term air quality operational impacts under this alternative would remain significant and unavoidable and would result in similar conditions as identified for the proposed project. Additionally, due to adjacent sensitive receptors, potential impacts to these receptors would be greater in magnitude when compared to the proposed project. Similarly, noise impacts would be greater in magnitude due to the adjacent sensitive receptors. Operational traffic would result in increased traffic on existing roadways and may impact existing intersection's level of service within the area. This alternative would require

the same amount of water as the proposed project and would generate the same amount of wastewater and solid waste when compared to the proposed project. Similar to the proposed project, adherence to utility requirements would reduce these impacts to a less than significant level.

6.4 COMPARISON OF PROJECT ALTERNATIVES

The following discussion compares the impacts of each alternative with the impacts of the proposed project, as detailed in Section 4.0 of this EIR. Table 6.K compares the impacts of the alternatives with those of the proposed project. This table identifies whether the alternative results in (1) a reduction of the impact; (2) a greater impact than the project; or (3) the same impact as the project.

Table 6.K: Comparison of Alternatives to the Proposed Project

Environmental Issue	Proposed Project	Alternative 1: No Project	Alternative 2: Reduced Intensity	Alternative 3: Commercial Center	Alternative4: Off-Site Location
Aesthetics	LTS	=	=	=	=
Agricultural Resources	SIG	=	=	=	← SIG
Air Quality	SIG	→ SIG	← SIG	→ SIG	=
Biological Resources	LTS/mit	=	=	=	=
Cultural Resources	LTS/mit	=	=	=	=
Geology and Soils	LTS.mit	=	=	=	=
Global Climate Change	SIG	← SIG	← SIG	→ SIG	=
Hazards and Hazardous Materials	LTS/mit	=	=	=	=
Hydrology and Water Quality	LTS/mit	=	=	=	=
Land Use and Planning	LTS	=	=	=	=
Mineral Resources	NI	=	=	=	=
Noise	LTS/mit	=	=	=	→
Population and Housing	LTS	=	=	=	=
Public Services	LTS	=	=	→	=
Recreation and Parks	LTS	=	=	=	=
Transportation and Traffic	SIG	→SIG	← SIG	→ SIG	=
Utilities and Service Systems	LTS	=	=	=	=

Proposed Project
NI: No Impact
LTS: Less than Significant Impact
LTS/mit: Less than Significant Impact with Mitigation
SIG: Significant Impact with or without Mitigation
Project Alternatives
= Compared with the proposed project, no change in the significance of impact will occur.
→ Compared with the proposed project, the significance of the impact is increased.
← Compared with the proposed project, the significance of the impact is reduced.
+ Compared with the proposed project, a new impact has been identified.
←SIG Compared with the proposed project, the volume or extent of the impact is reduced, yet still significant.

6.5 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

As detailed in Table 6.K, Alternative 2 (Reduced Intensity Alternative) reduces the severity of project-related air quality impacts. Though reduced, long-term air quality impacts would remain significant after mitigation for this alternative for NOx. In a similar manner, Alternative 2 would reduce the volume of daily traffic trips when compared to the proposed project; however, such impacts would remain significant and unavoidable until roadway improvements are completed. And, Alternative 2 would reduce the quantity of greenhouse gas emission when compared to the proposed project; however, impacts to Global Climate Change would remain significant and unavoidable. While Alternative 4 reduces impacts associated with the proposed project related to agricultural resources, impacts would still remain significant. Additionally, Alternative 4 would result in greater impacts related to air quality, hazards and hazardous materials, and noise. Impacts related to air quality would remain significant similar to the proposed project; however, impacts related to hazards and hazardous materials and noise would remain less than significant and less than significant with mitigation, respectively. The remaining environmental issues would ultimately be similar to the proposed project through adherence to existing standards and mitigation measures.

CEQA (*CEQA Guidelines Section 15126.6 (e[2])* requires that the environmentally superior alternative be identified in the EIR. Based on the analysis in this section and the summary contained in Table 6.K, Alternative 2, the Reduced Intensity Alternative, is the environmentally superior alternative. The amount of development under this alternative would be reduced when compared to the proposed project; however, the Alternative 2 would not satisfy several of the project objectives shown in Table 6.L.

Table 6.L: Comparison of Alternative 2 to the Proposed Project Objectives

Project Objectives	Reasons Why Alternative 2 Satisfies the Project Objectives
Create employment-generating opportunities for the citizens of Moreno Valley and surrounding communities	**Meets Objective**
Encourage industrial development as attractive and productive uses while minimizing conflicts with the surrounding existing uses	**Meets Objective**
Encourage warehouse distribution services that take advantage of the area's close proximity to various freeways and transportation corridors.	**Meets Objective**
Provide the infrastructure improvements required to meet Project needs in an efficient and cost-effective manner.	**Meets Objective**
Encourage new development consistent with the capacity and municipal service capabilities.	**Meets Objective**
Provide a high density, high-quality large-scale industrial development to provide jobs for residents at a variety of income levels.	**Does not meet objective.**
Facilitate the efficient and cost-effective movement of goods in and through the City, which, in turn, allows the City to compete economically on a domestic and international scale.	**Meets Objective**
Provide an industrial warehouse facility that meets the substantial and unmet demands of businesses located in the City and County	**Meets Objective**
Cluster industrial warehouse uses near efficient access points to the state highway system to reduce traffic congestion on surface streets and to reduce concomitant air pollutant emissions from vehicle sources	**Does not meet objective**
Implement the City's General Plan Industrial/Business Park Land Use designations that are applicable to the site.	**Meets Objective**
Accommodate new development that channels land uses in a phased, orderly manner and is coordinated with the provision of necessary infrastructure and public improvements.	**Meets Objective**

Table 6.L: Comparison of Alternative 2 to the Proposed Project Objectives

Project Objectives	Reasons Why Alternative 2 Satisfies the Project Objectives
Provide new development that will assist the City in obtaining fiscal balance in the years and decades ahead.	**Meets Objective**
Address community circulation, both vehicular and pedestrian, utilizing available capacity within the existing circulation system, and provide fair share improvements to various future-year deficient intersections or road segments.	**Meets Objective**

Because the Reduced Intensity Alternative allows the development of warehouse uses and the provision of new employment opportunities, it meets many of the City's stated project objectives, while at the same time reduces the impacts associated with the proposed project. Therefore, the Reduced Intensity Alternative has been determined to be the environmentally superior alternative. However, because of the location of the Alternative site and the lower industrial density, the Alternative fails to meet several objectives related to location and density efficiencies.

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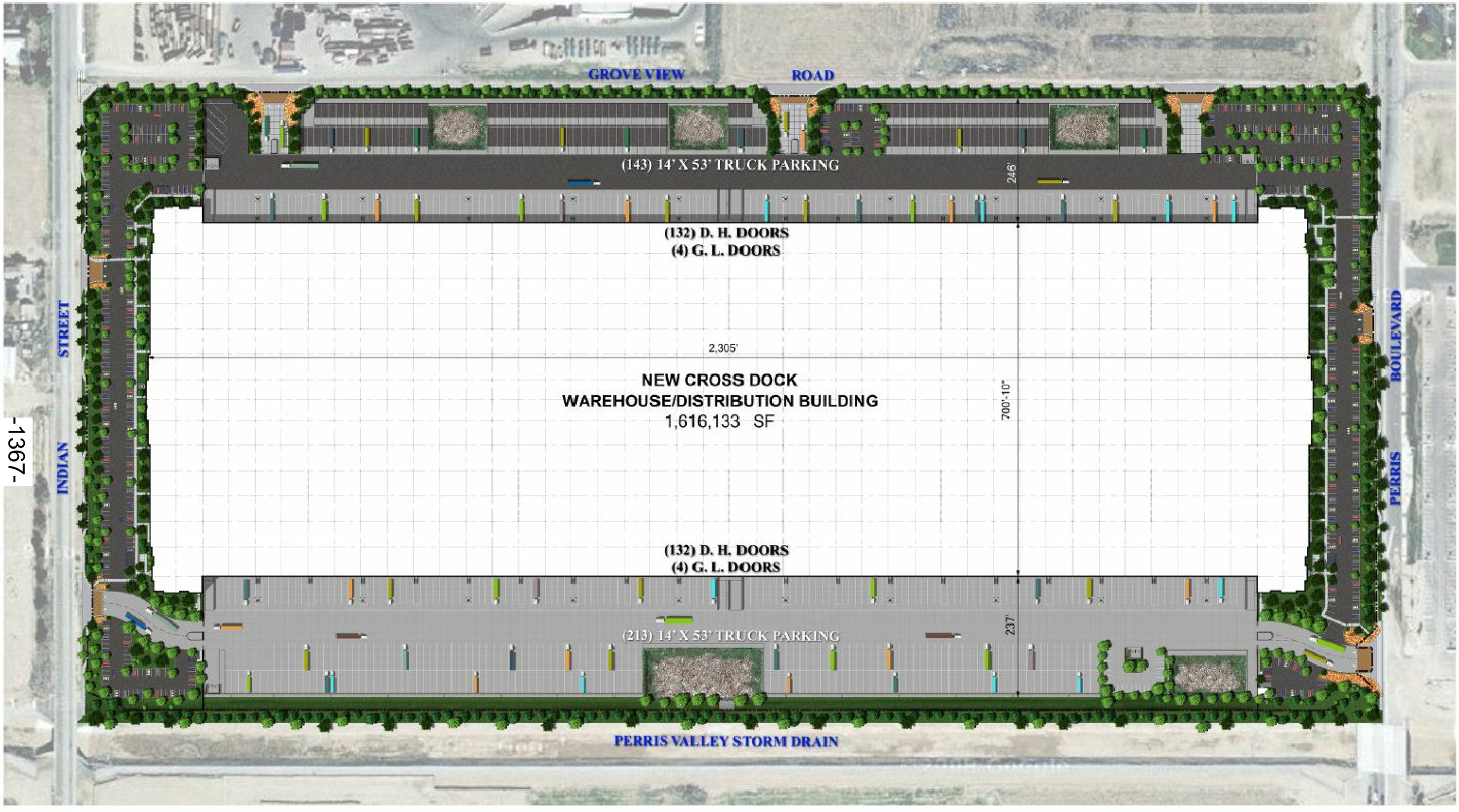
9.0 ACRONYMS AND ABBREVIATIONS

$\mu g/m^3$	micrograms per cubic meter
AADT	Annual Average Daily Traffic
AAQS	ambient air quality standards
AB	Assembly Bill
ADT	Average Daily Traffic
AER	Annual Emission Reporting
AFV	alternative fuel vehicle
AFY	acre-feet per year
AICUZ	Air Installation Compatible Use Zone
ALUC	Airport Land Use Commission
ALUP	Airport Land Use Plan
ANSI	American National Standards Institute
APN	Assessor's Parcel Number
APZ	Accident Potential Zone
AQMP	Air Quality Management Plan
ARB	California Air Resources Board
Basin	South Coast Air Basin
BMPs	Best Management Practices
CAA	Federal Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAFÉ	Corporate Average Fuel Economy
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CAPS	Criteria Area Plant Species
CARB	California Air Resources Board
CAT	Climate Action Team
CBSC	California Building Standards Commission
CCAA	California Clean Air Act
CDC	California Department of Conservation
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFCP	California Farmland Conservancy Program
CFCs	Chlorofluorocarbons
CH_4	methane
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CO_2E	carbon dioxide equivalent
CRA	California Resource Agency

dBA	A-weighted decibels
DIF	Development Impact Fee
DOF	Department of Finance
DTSC	Department of Toxic Substance Control
EIR	Environmental Impact Report
EMWD	Eastern Municipal Water District
EPA	U.S. Environmental Protection Agency
EPAct	Energy Policy Act
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FMMP	Farmland Mapping and Monitoring Program
ft	Feet
FTA	Federal Transit Administration
F-WQMP	Final Water Quality Management Plan
GHG	greenhouse gas
gpd	gallons per day
GWP	Global Warming Potential
HCP	Habitat Conservation Plan
HFCs	Hydrofluorocarbons
HI	Hazard Indices
HVAC	Heating, Ventilating, And Air Conditioning
I-215	Interstate 215
IPCC	Intergovernmental Panel on Climate Change
IS	Initial Study
JPA	Joint Powers Authority
LCC	Land Capability Classification
L_{dn}	Day-Night Average Noise Level
LE	Land Evaluation
LEED	Leadership in Energy and Environmental Design
L_{eq}	Equivalent Continuous Sound Level
LESA	Land Evaluation and Site Assessment
L_{max}	Maximum Noise Level
LOS	Level of Service
LSA	LSA Associates, Inc.
LST	Local Significance Threshold
MARB	March Air Reserve Base
MBTA	Migratory Bird Treaty Act
MCE	maximum credible earthquake
MEI	Maximum Exposed Individual
Metropolitan	Metropolitan Water District
mg/m^3	milligrams per cubic meter
mgd	million gallons per day

MICR	Maximum Individual Cancer Risk
MIP	March Inland Port
MIPAA	MIP Airport Authority
MMRP	Mitigation Monitoring and Reporting Program
MMT	million metric tons
mpg	miles per gallon
mph	miles per hour
MPO	Metropolitan Planning Organization
MRZ	Mineral Resource Zone
MSHCP	Western Riverside County Multiple Species Habitat Conservation Plan
mty	million tons per year
MVPD	Moreno Valley Police Department
MVRWRF	Moreno Valley Regional Water Reclamation Facility
MVUSD	Moreno Valley Unified School District
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEPS	Narrow Endemic Plant Species
NFMA	National Forest Management Act of 1976
NHTSA	National Highway Traffic and Safety Administration
NO_2	Nitrogen dioxide
NOI	Notice of Intent
NOP	Notice of Preparation
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
O_3	Ozone
OMB	Office of Management and Budget
OPR	Office of Planning and Research
Pb	Lead
PCE	Passenger Car Equivalent
PFCs	Perfluorocarbons
PM	Particulate Matter
PM_{10}	Particulate matter with a diameter of 10 microns or less
$PM_{2.5}$	Fine particulate matter less than 2.5 microns in diameter
POU	Publicly Owned Utility
ppb	parts per billion
ppm	parts per million
P-WQMP	Preliminary Water Quality Management Plan
RCP	reinforced concrete pipe
RCP	Regional Comprehensive Plan
RCPG	Regional Comprehensive Plan and Guide
ROC	reactive organic compounds
ROG	reactive organic gases
RPA	Resources Planning Act of 1974

RTA	Riverside Transit Agency
RTP	Regional Transportation Plan
RUWMP	Regional Urban Water Master Plan
RWQCB	Regional Water Quality Control Board
SA	Site Assessment
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SF_6	sulfur hexafluoride
SIP	State Implementation Plan
SKR	Stephens' Kangaroo Rat
SKR HCP	Stephens' Kangaroo Rat Habitat Conservation Plan
SO_2	Sulfur dioxide
SO_X	sulfur oxides
SP	Specific Plan
SR-60	State Route 60
SRA	Source Receptor Area
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	Toxic Air Contaminants
T-BACT	Best Available Control Technology for Toxics
TDM	Transportation Demand Management
TPM	Tentative Parcel Map
tpy	tons per year
TUMF	Transportation Uniform Mitigation Fee
UBC	Uniform Building Code
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
USFS	United States Forest Service
VMT	Vehicle Miles Traveled
VOC	volatile organic compounds
WDID	Waste Discharge Identification Number
WQMP	Water Quality Management Plan
WRCOG	Western Riverside Council of Governments
WSA	Water Supply Assessment
ZNE	Zero Net Energy
ZOI	Zone of Influence



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VIP
VIGEL INDUSTRIAL PARK
MORENO VALLEY CA

RKZ JOB #06-28 MAY 21, 2009

NEW INDUSTRIAL BUILDING FOR : VIP MORENO VALLEY

MORENO VALLEY, CALIFORNIA 92551

ATTACHMENT 6

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SOUTH ELEVATION (WEST SIDE)

SOUTH ELEVATION (EAST SIDE)

NORTH ELEVATION (EAST SIDE)

NORTH ELEVATION (WEST SIDE)

EAST ELEVATION

WEST ELEVATION

DUNN-EDWARDS
DE 6143 "ALMOND LATTE"

"DUNN-EDWARDS
DE 6145 "ROCKY RIDGE"

"DUNN-EDWARDS
DE 6172 "BUNGALOW TAUPE"

GLASS PANE
1/4" THICK PILKINGTON EVERGREEN
LOW-E # 2

ENLARGED PARTIAL EAST ELEVATION

ENLARGED PARTIAL NORTH ELEVATION

VIP
VOGEL INDUSTRIAL PARK
MORENO VALLEY CA

RKZ JOB #08-28 JUNE 16, 2012

NEW INDUSTRIAL BUILDING FOR: VIP MORENO VALLEY rkz

MORENO VALLEY CALIFORNIA 92551

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V I P MORENO VALLEY

PERRIS BLVD. AND INDIAN STREET
MORENO VALLEY, CALIFORNIA
RKZ JOB # 06-28 JUNE 18, 2012

1" INSULATED DUAL PANE GLAZING
(AT OFFICE VISION WINDOWS ONLY)

EXTERIOR PANE:
1/4" THICK PILKINGTON EVERGREEN - LOW-E #2
INTERIOR PANE:
1/4" THICK CLEAR

CLEAR ANODIZED ALUMINUM FRAME

A DUNN EDWARDS - DE6143
"ALMOND LATTE"

B DUNN EDWARDS - DE6145
"ROCKY RIDGE"

C DUNN EDWARDS - DE6172
"BUNGALOW TAUPE"

VOGEL ENGINEERS, INC.
300 PASEO TESORO, WALNUT, CALIFORNIA 91785-2791

EXTERIOR COLOR BOARD
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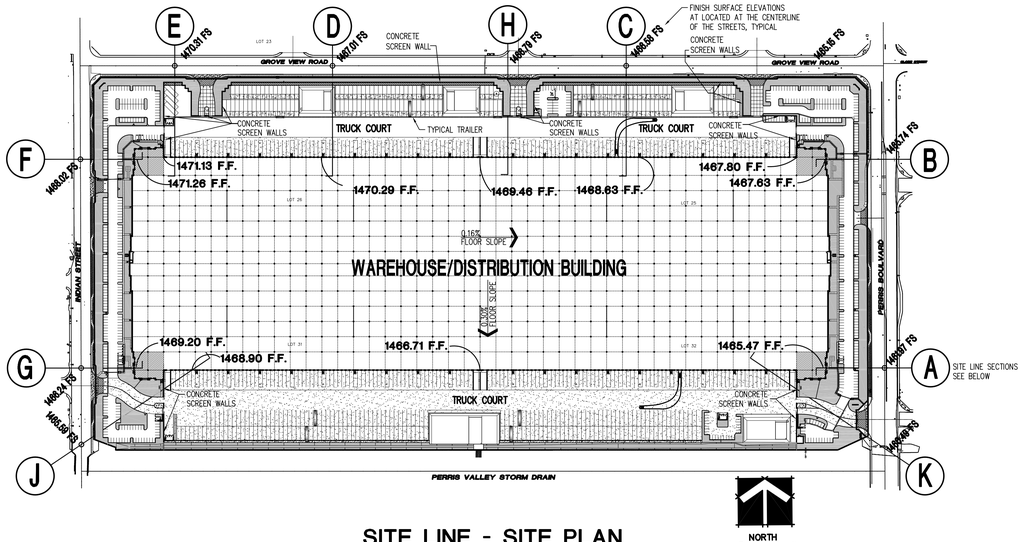

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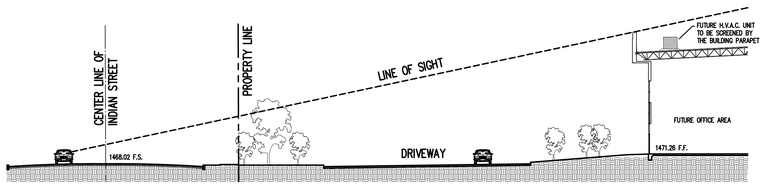

SECTION - F

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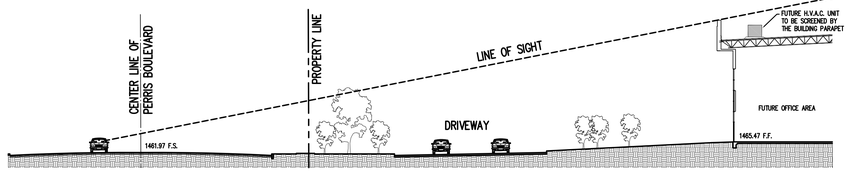

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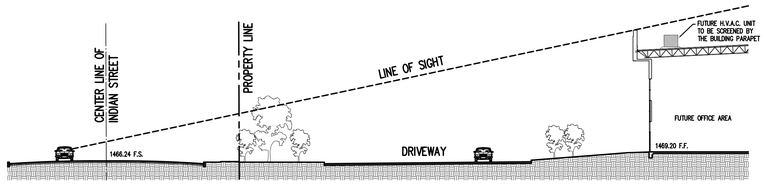

SECTION - G

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SECTION - B

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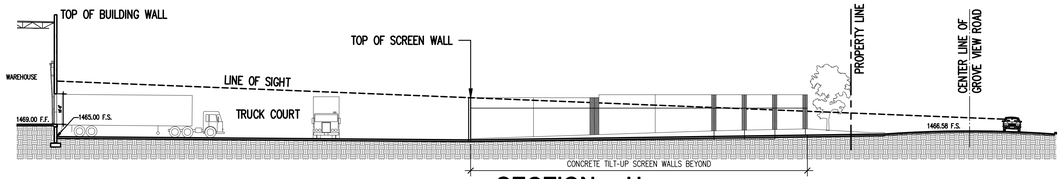

SECTION - H

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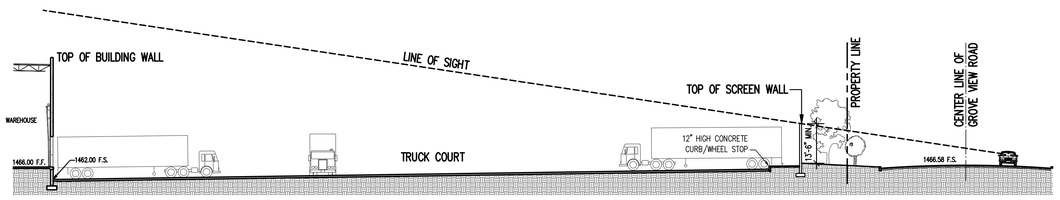

SECTION - C

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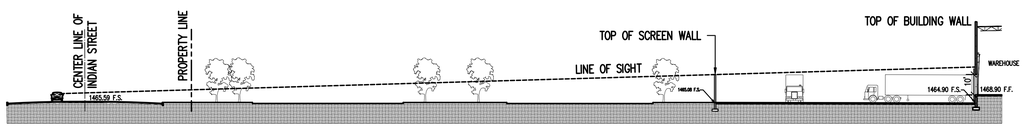
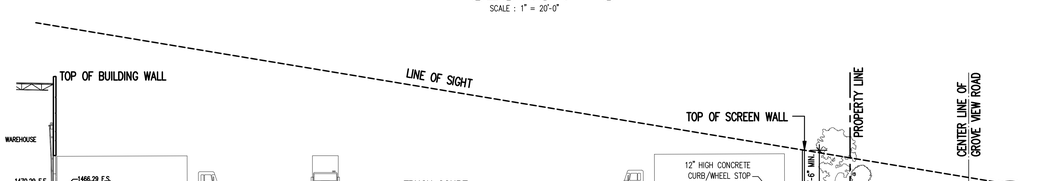


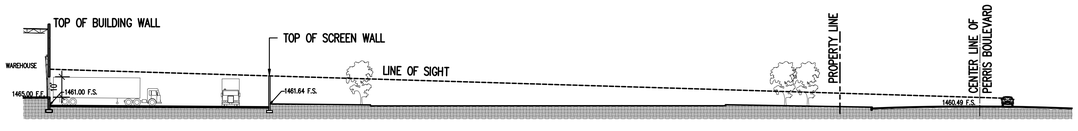
SECTION - J

SCALE : 1" = 30'-0"



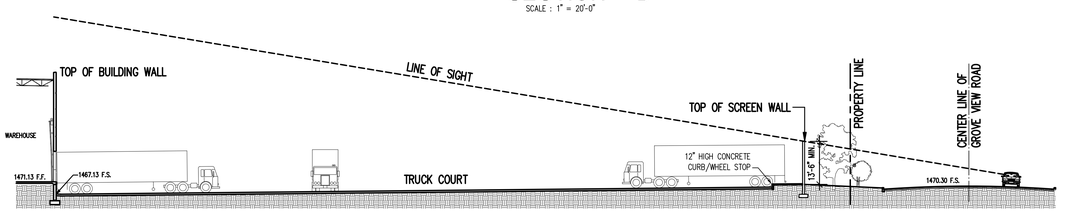
SECTION - D

SCALE : 1" = 20'-0"



SECTION - K

SCALE : 1" = 30'-0"



SECTION - E

SCALE : 1" = 20'-0"

-1373-

rkz architects, inc.
3002 DOW AVENUE SUITE 226
TUSTIN, CALIFORNIA 92780
PH: 714.731.1140 FAX: 714.731.1090
www.rkzinc.com

OWNER/DEVELOPER:
VOGEL ENGINEERS, INC.
300 PASEO TESORO
WALNUT, CA 91765-2791
PHONE: 909 598-7065
FAX: 909 598-2917

VIP MORENO VALLEY

17777 PERRIS BOULEVARD
17700 INDIAN STREET
MORENO VALLEY CALIFORNIA 92551

VIP
VOGEL INDUSTRIAL PARK
MORENO VALLEY CA

REVISIONS
CONSTR.
BID
PLAN CHECK
DRAWN 10-16-08
JOB NO. 06-28
SHEET NAME
SITE LINE
SITE PLAN &
SECTIONS
SHEET NO.
A-7
OF SHEETS
PROJECT #PA09-0004 & PA09-0012

0628AS3.dwg / 07.02.12 / 15:39

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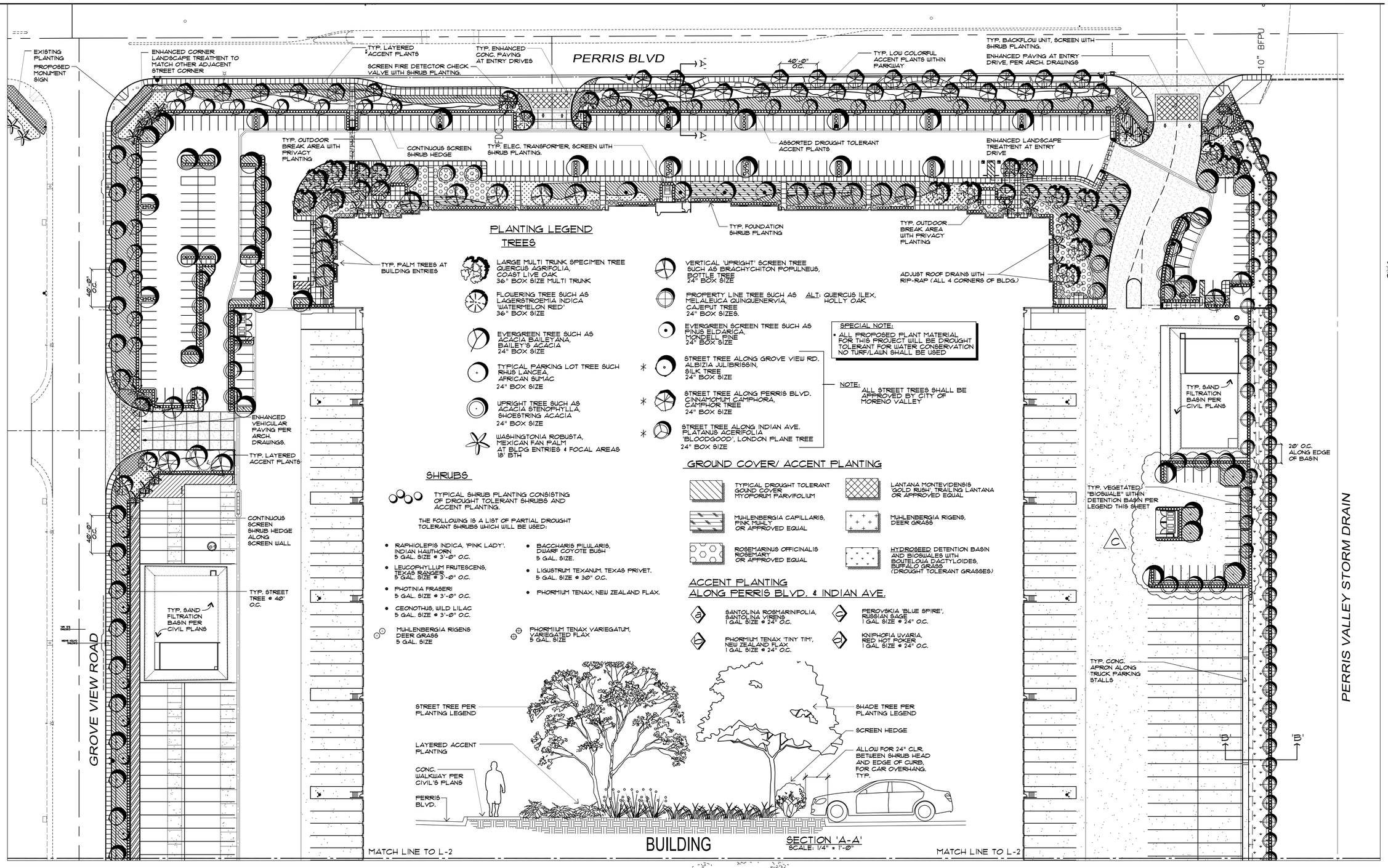

PLANTING LEGEND

TREES

- LARGE MULTI TRUNK SPECIMEN TREE — QUERCUS AGRIFOLIA, COAST LIVE OAK, 36" BOX SIZE MULTI TRUNK
- FLOWERING TREE SUCH AS LAGERSTROEMIA INDICA 'WATERMELON RED' — 36" BOX SIZE
- EVERGREEN TREE SUCH AS ACACIA BAILEYANA, BAILEY'S ACACIA — 24" BOX SIZE
- TYPICAL PARKING LOT TREE SUCH RHUS LANCEA, AFRICAN SUMAC — 24" BOX SIZE
- UPRIGHT TREE SUCH AS ACACIA STENOPHYLLA, SHOESTRING ACACIA — 24" BOX SIZE
- WASHINGTONIA ROBUSTA, MEXICAN FAN PALM — AT BLDG ENTRIES & FOCAL AREAS 18' BTH
- VERTICAL 'UPRIGHT' SCREEN TREE SUCH AS BRACHYCHITON POPULNEUS, BOTTLE TREE — 24" BOX SIZE
- PROPERTY LINE TREE SUCH AS MELALEUCA QUINQUENERVIA, CAJEPUT TREE — 24" BOX SIZES. ALT: QUERCUS ILEX, HOLLY OAK
- EVERGREEN SCREEN TREE SUCH AS PINUS ELDARICA, MONDELL PINE — 24" BOX SIZE
- STREET TREE ALONG GROVE VIEW RD. ALBIZIA JULIBRISSIN, SILK TREE — 24" BOX SIZE
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- STREET TREE ALONG INDIAN AVE. PLATANUS ACERIFOLIA 'BLOODGOOD', LONDON PLANE TREE — 24" BOX SIZE

NOTE: ALL STREET TREES SHALL BE APPROVED BY CITY OF MORENO VALLEY

SPECIAL NOTE:
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SHRUBS

TYPICAL SHRUB PLANTING CONSISTING OF DROUGHT TOLERANT SHRUBS AND ACCENT PLANTING.

THE FOLLOWING IS A LIST OF PARTIAL DROUGHT TOLERANT SHRUBS WHICH WILL BE USED:

- RAPHIOLEPIS INDICA, 'PINK LADY', INDIAN HAWTHORN — 5 GAL. SIZE @ 3'-0" O.C.
- LEUCOPHYLLUM FRUTESCENS, TEXAS RANGER — 5 GAL. SIZE @ 3'-0" O.C.
- PHOTINIA FRASERI — 5 GAL. SIZE @ 3'-0" O.C.
- CEONOTHUS, WILD LILAC — 5 GAL. SIZE @ 3'-0" O.C.
- BACCHARIS PILULARIS, DWARF COYOTE BUSH — 5 GAL. SIZE.
- LIGUSTRUM TEXANUM, TEXAS PRIVET. — 5 GAL. SIZE @ 30" O.C.
- PHORMIUM TENAX, NEW ZEALAND FLAX.

MUHLENBERGIA RIGENS DEER GRASS — 5 GAL. SIZE

PHORMIUM TENAX VARIEGATUM, VARIEGATED FLAX — 5 GAL. SIZE

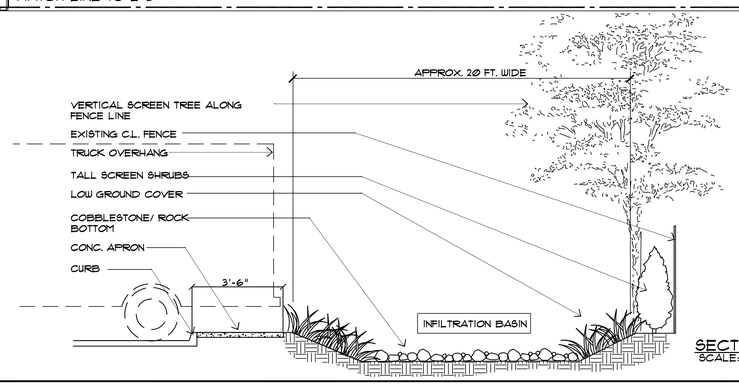
GROUND COVER/ ACCENT PLANTING

- TYPICAL DROUGHT TOLERANT GOUND COVER — MYOPORUM PARVIFOLIUM
- LANTANA MONTEVIDENSIS 'GOLD RUSH', TRAILING LANTANA OR APPROVED EQUAL
- MUHLENBERGIA CAPILLARIS, PINK MUHLY OR APPROVED EQUAL
- MUHLENBERGIA RIGENS, DEER GRASS
- ROSEMARINUS OFFICINALIS ROSEMARY OR APPROVED EQUAL
- HYDROSEED DETENTION BASIN AND BIOSWALES WITH BOUTELOUA DACTYLOIDES, BUFFALO GRASS (DROUGHT TOLERANT GRASSES)

ACCENT PLANTING ALONG PERRIS BLVD. & INDIAN AVE.

- SANTOLINA ROSMARINIFOLIA, SANTOLINA VIRENS — 1 GAL SIZE @ 24" O.C.
- PEROVSKIA 'BLUE SPIRE', RUSSIAN SAGE — 1 GAL SIZE @ 24" O.C.
- PHORMIUM TENAX 'TINY TIM', NEW ZEALAND FLAX — 1 GAL SIZE @ 24" O.C.
- KNIPHOFIA UVARIA, RED HOT POKER — 1 GAL SIZE @ 24" O.C.

SECTION 'A-A'
SCALE: 1/4" = 1'-0"



SECTION 'B-B'
SCALE: 1/4" = 1'-0"

WATER CONSERVATION STATEMENT

THE IRRIGATION SYSTEM WILL BE DESIGNED UTILIZING 'STATE OF THE ART' IRRIGATION EQUIPMENT SUCH AS MULTIPLE START TIMES FOR CONTROLLERS, 'RAIN SHUT OFF' DEVICE @ CONTROLLERS, PRESSURE REGULATING MASTER VALVE & LOW FLOW IRRIGATION SPRAY/ROTOR & BUBBLER HEADS UTILIZING PC SCREENS THROUGHOUT.

THIS LANDSCAPE DESIGN GROUPS PLANTS WITH SIMILAR WATER NEEDS TOGETHER INTO TWO DISTINCT HYDROZONES OF LOW/MODERATE AND HIGH AREAS. THE HIGH WATER USE HYDROZONES ARE COMPRISED OF TURF AND ANNUAL COLOR AND ARE LIMITED WITHIN THE OVERALL SQUARE FOOTAGE OF THE SITE. THE LOW HYDROZONE, WHICH IS MADE UP OF DROUGHT TOLERANT PLANT SPECIES COMPRISES OVER 75% OF THE TOTAL LANDSCAPE AREA. THE IRRIGATION SYSTEM HAS BEEN DESIGNED TO GROUP SIMILAR HYDROZONES WITHIN THE SAME IRRIGATION VALVE. IN ADDITION A MINIMUM OF 2" LAYER OF MULCH IS USED OVER THE ENTIRE SHRUB AREAS TO RETAIN SOIL MOISTURE.

THE PROJECT WILL BE DESIGNED WITH LOW ROTOR/OR BUBBLER IRRIGATION SYSTEMS WHENEVER POSSIBLE

- ALL IRRIGATION SHALL COMPLY WITH EASTERN MUNICIPAL WATER DISTRICT. (E.M.W.D.)

ATTACHMENT 10

NORTH

0' 40' 80' 120' 160'
SCALE:1"=40'-0"

DIG ALERT
DIAL TOLL FREE
1-800-227-2600
UNDERGROUND SERVICE ALERT OF SOUTHERN CALIFORNIA

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SCOTT PETERSON
LANDSCAPE ARCHITECT, INC.
P.O. BOX 2157
LAKE ARROWHEAD, CA. 92352
PH: 909-337-9095
FX: 909-337-8884

REGISTERED LANDSCAPE ARCHITECT
SCOTT PETERSON
NO. 2076
SIGNATURE
DATE
EXP. 11-30-10
STATE OF CALIFORNIA

OWNER/DEVELOPER:
VOGEL ENGINEERS, INC.
300 PASEO TESORO
WALNUT, CA 91785-2791
PHONE: 909 598-7065
FAX: 909 598-2917

VIP MORENO VALLEY
XXXXX & XXXXX PERRIS BOULEVARD
XXXXX & XXXXX INDIAN STREET
MORENO VALLEY CALIFORNIA 92551

VIP
VOGEL INDUSTRIAL PARK
MORENO VALLEY CA

1-26-09
UP DATED 5-12-09
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C 12-03-09 PLANNING DEPT.

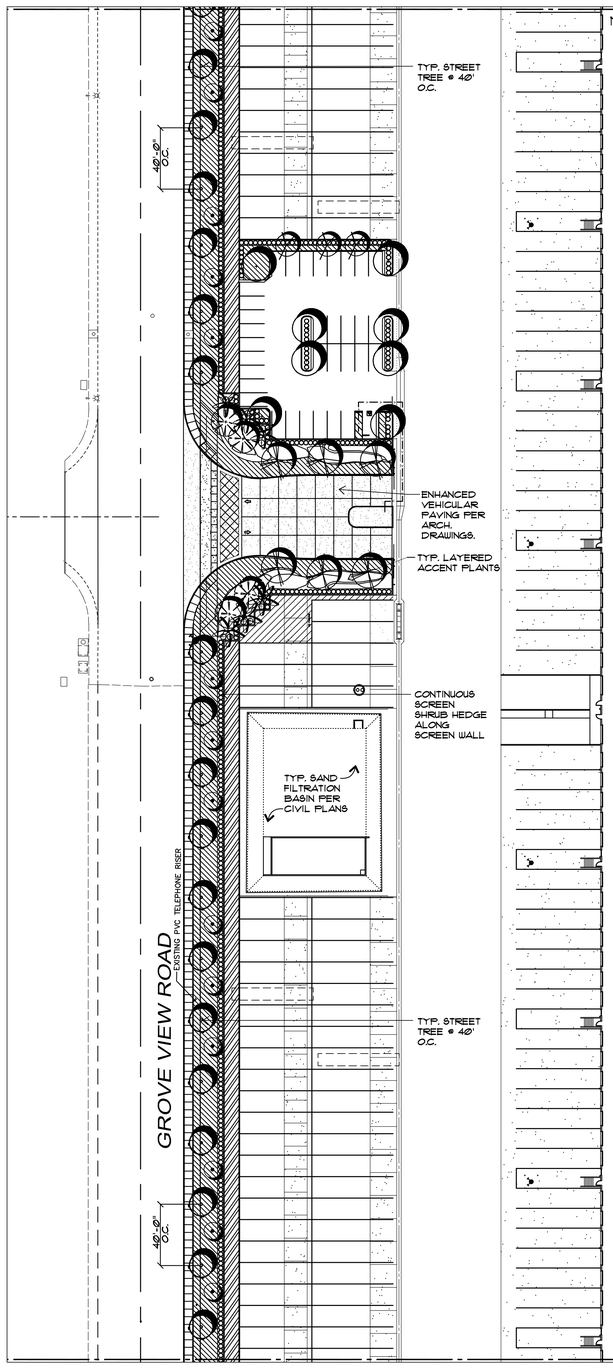
REVISIONS
CONSTR.
BID
PLAN CHECK
DRAWN 12-01-08 LR
JOB NO. 06-28
SHEET NAME

CONCEPTUAL LANDSCAPE PLAN
SHEET NO.
L-1
OF SHEETS
PROJECT # P07-050

-1375-

MATCH LINE TO L-1

MATCH LINE TO L-1



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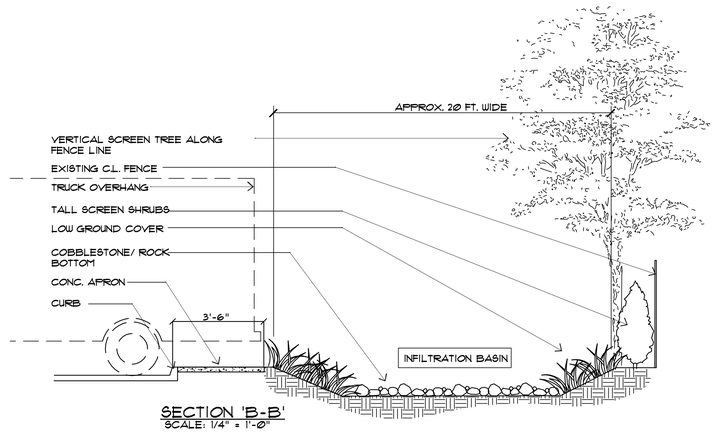
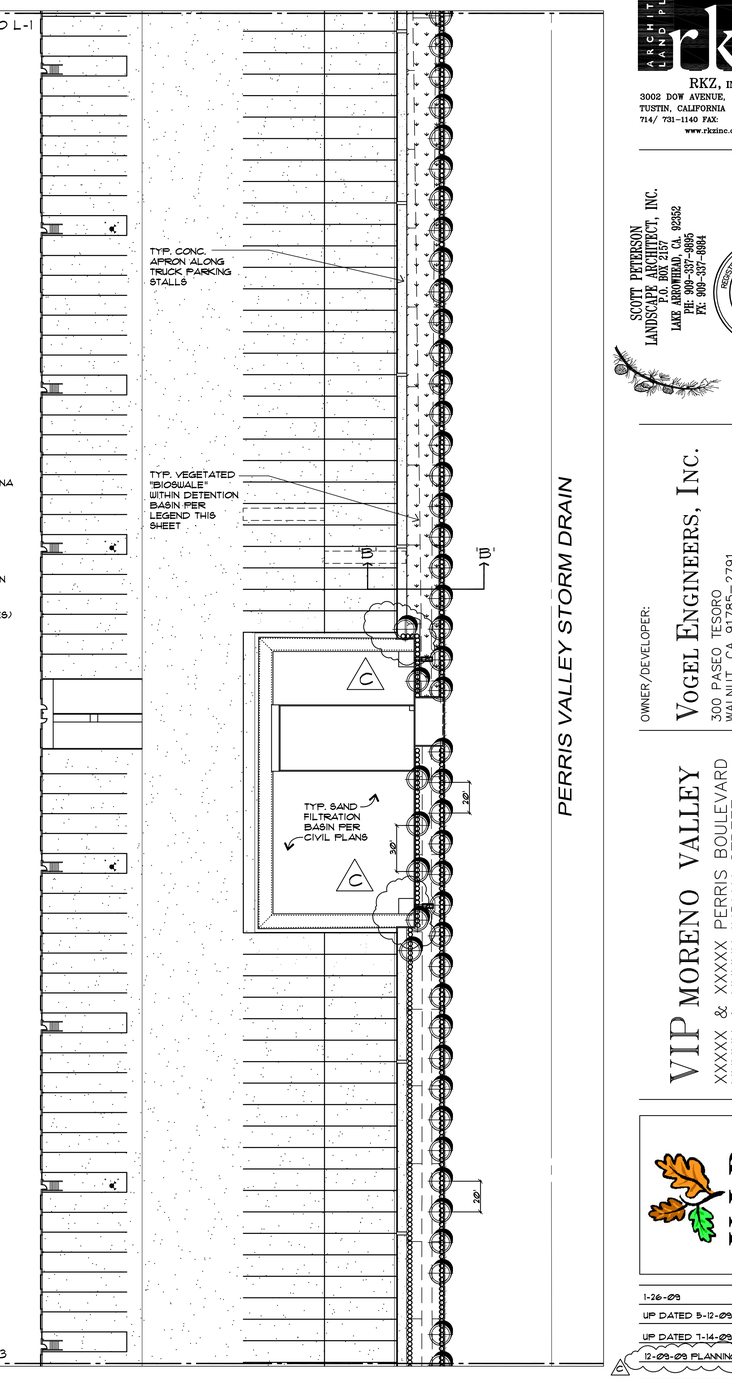
- (a) SANTOLINA ROSMARINIFOLIA, SANTOLINA VIRENS 1 GAL SIZE @ 24" O.C.
- (b) PHORMIUM TENAX 'TINY TIM', NEW ZEALAND FLAX 1 GAL SIZE @ 24" O.C.
- (c) PEROVSKIA 'BLUE SPIRE', RUSSIAN SAGE 1 GAL SIZE @ 24" O.C.
- (d) KNIPHOFIA UVARIA, RED HOT POKER 1 GAL SIZE @ 24" O.C.



SECTION 'B-B'
SCALE: 1/4" = 1'-Ø"



BUILDING

MATCH LINE TO L-3

MATCH LINE TO L-3

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NORTH

0' 40' 80' 120' 160'

SCALE: 1"=40'-Ø"

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REGISTERED LANDSCAPE ARCHITECT
SCOTT PETERSON
NO. 2076
SIGNATURE
DATE
EXP. 11-30-10
STATE OF CALIFORNIA

OWNER/DEVELOPER:
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300 PASEO TESORO
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VIP MORENO VALLEY
XXXXX & XXXXX PERRIS BOULEVARD
XXXXX & XXXXX INDIAN STREET
MORENO VALLEY CALIFORNIA 92551

VIP
VOGEL INDUSTRIAL PARK
MORENO VALLEY CA

1-26-09
UP DATED 5-12-09
UP DATED 7-14-09
12-09-09 PLANNING DEPT.
C

REVISIONS
CONSTR.
BID
PLAN CHECK
DRAWN 12-01-08 LR
JOB NO. 06-28
SHEET NAME

CONCEPTUAL LANDSCAPE PLAN

SHEET NO.
L-2
OF SHEETS

PROJECT # P07-050

MATCH LINE TO L-2

MATCH LINE TO L-2

PLANTING LEGEND

TREES

- LARGE MULTI TRUNK SPECIMEN TREE — QUERCUS AGRIFOLIA, COAST LIVE OAK, 36" BOX SIZE MULTI TRUNK
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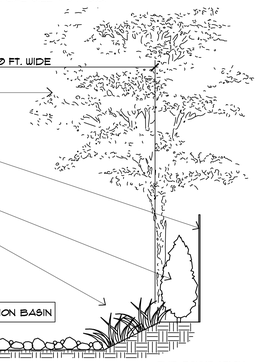
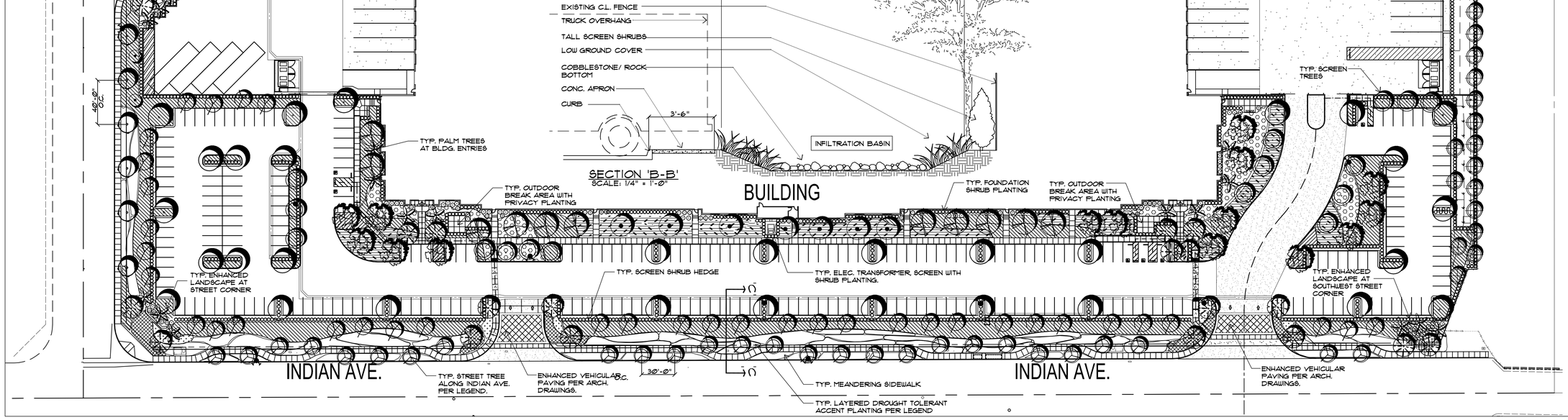


SECTION 'B-B'
SCALE: 1/4" = 1'-0"



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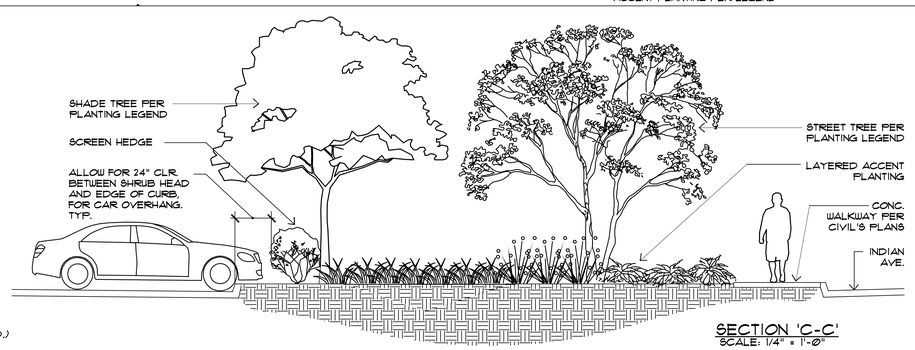

SECTION 'C-C'
SCALE: 1/4" = 1'-0"

NORTH

0' 40' 80' 120' 160'
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DIG ALERT
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ARCHITECTURE LAND PLANNING rkz
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VIP VOGEL INDUSTRIAL PARK MORENO VALLEY CA

1-26-09
UP DATED 5-12-09
UP DATED 6-02-09
12-09-09 PLANNING DEPT.

REVISIONS
CONSTR.
BID
PLAN CHECK
DRAWN 12-01-08 LR
JOB NO. 06-28
SHEET NAME
CONCEPTUAL LANDSCAPE PLAN
SHEET NO. L-3
OF SHEETS
PROJECT # P07-050

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TENTATIVE
PARCEL MAP NO. 36162

IN THE CITY OF MORENO VALLEY, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

SECTION 31, TOWNSHIP 3 SOUTH, RANGE 3 WEST, SAN BERNARDINO MERIDIAN

BEING A SUBDIVISION OF LOTS 25, 26, 31 AND 32 OF BLOCK 1 OF RIVERSIDE ALFALFA ACRES AS PER MAP RECORDED IN BOOK 8, PAGE 21 OF MAPS, RECORDS OF RIVERSIDE COUNTY, STATE OF CALIFORNIA.

ACCESSOR'S PARCEL NUMBERS 316-210-071, 073, 075 & 076

TPM 36162

DATE OF PREPARATION:
MAY, 2009

NUMBER OF PARCELS:
1 PARCEL

AREA:
80.80 ACRES GROSS
71.11 ACRES NET
(NET ACRES EXCLUDES PROPOSED OFFERS OF DEDICATION FOR STREET RIGHT-OF-WAY)

ZONING :

THE PROJECT SITE IS LOCATED WITHIN THE MORENO VALLEY INDUSTRIAL AREA PLAN (SP #208). THE MAJORITY OF THE PROJECT SITE IS ZONED INDUSTRIAL (I) WITH THE NORTHEAST AND SOUTHEAST CORNERS OF THE SITE BEING ZONED INDUSTRIAL SUPPORT AREAS (ISA). DEVELOPMENT OF THE PROPOSED WAREHOUSE DISTRIBUTION FACILITY IS PERMITTED WITHIN BOTH THE I AND ISA ZONES.
(EXISTING AND PROPOSED)

EXISTING USE:
VACANT

PROPOSED USE:
WAREHOUSE/DISTRIBUTION FACILITY

OWNER AND APPLICANT :

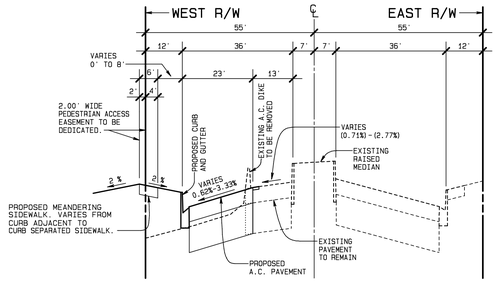
VOGEL ENGINEERS, INC., A CALIFORNIA CORPORATION
ATTENTION: WILLIAM D. VOGEL
300 PASEO TESORO
WALNUT, CA. 91789
(909) 598-7065

MAP PREPARED BY :

ROBERT A. BEBENSEE, R.C.E.
R.C.E. NO. 22877
453 NORTH CENTRAL AVENUE
UPLAND, CA. 91786
(909) 946-1122

FLOOD ZONE:

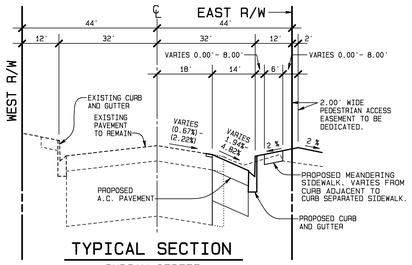
THE PROPERTY INDICATED HEREON LIES WITHIN FLOOD ZONE 'X' (SHADED) AS STATED BY FLOOD INSURANCE RATE MAP, MAP NO. 06065C1430G, PANEL 1430 OF 3805, EFFECTIVE DATE AUGUST 28, 2008, PREPARED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY, NATIONAL FLOOD INSURANCE PROGRAM, WHICH RECITES ZONE 'X' (SHADED) AS AREAS OF 0.2% ANNUAL CHANCE FLOOD; AREAS OF 1% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; AND AREAS PROTECTED BY LEVEES FROM 1% ANNUAL CHANCE FLOOD.



TYPICAL SECTION

PERRIS BOULEVARD

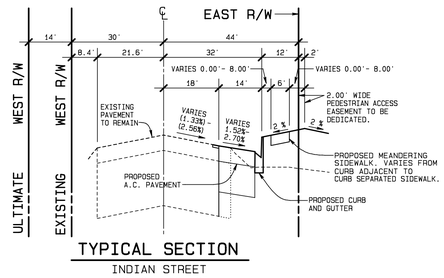
SCALES :
HORIZONTAL : 1" = 20'
VERTICAL : 1" = 2'



TYPICAL SECTION

INDIAN STREET
LOT 31 FRONTAGE

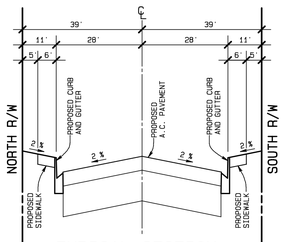
SCALES :
HORIZONTAL : 1" = 20'
VERTICAL : 1" = 2'



TYPICAL SECTION

INDIAN STREET
LOT 26 FRONTAGE

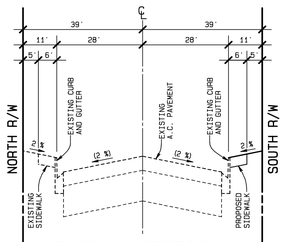
SCALES :
HORIZONTAL : 1" = 20'
VERTICAL : 1" = 2'



TYPICAL SECTION

GROVE VIEW ROAD
LOT 25 FRONTAGE
CURRENTLY UNDER CONSTRUCTION

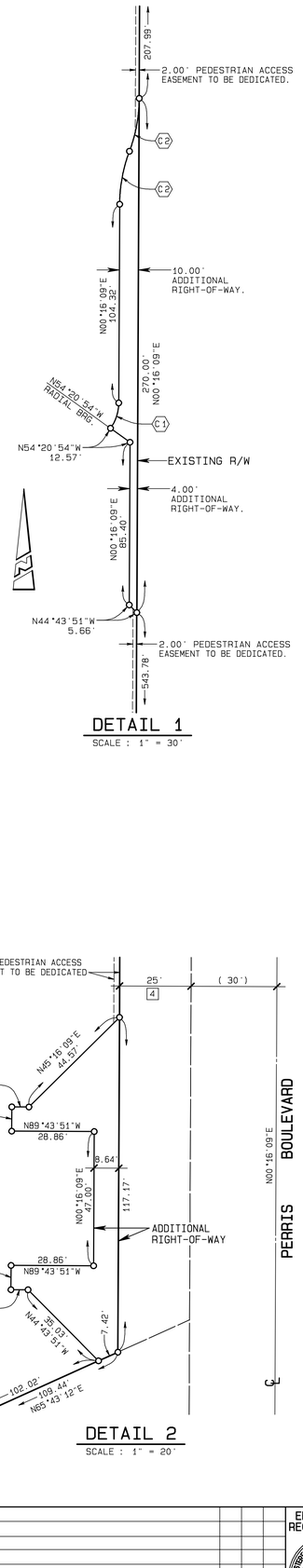
SCALES :
HORIZONTAL : 1" = 20'
VERTICAL : 1" = 2'



TYPICAL SECTION

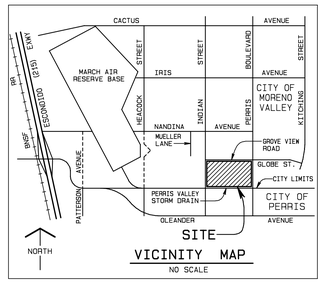
GROVE VIEW ROAD
LOT 25 FRONTAGE

SCALES :
HORIZONTAL : 1" = 20'
VERTICAL : 1" = 2'



DETAIL 1

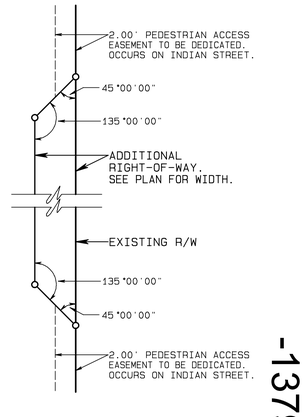
SCALE : 1" = 30'



VICINITY MAP

NO SCALE

UTILITY COMPANIES	EMERGENCY NUMBERS
THE GAS COMPANY	1-800-427-2200
SO. CALIF. EDISON	1-800-684-8123
MORENO VALLEY ELECTRIC UTILITY	1-877-811-8700
VERIZON TELEPHONE (COMMERCIAL)	1-800-483-5000
TIME WARNER CABLE	(888) 892-2253
CITY OF MORENO VALLEY	(951) 413-3110
EASTERN MUNICIPAL WATER DIST.	(951) 928-3777
WASTE MANAGEMENT OF THE INLAND VALLEY	(800) 423-9986



GENERAL DETAIL

NO SCALE

BASIS OF BEARING AND NOTES

THE CENTERLINE OF GROVE VIEW ROAD WAS TAKEN AS HAVING A BEARING OF N89°30'47"W PER PARCEL MAP NO. 32961, RECORDED IN BOOK 217 OF PARCEL MAPS, PAGES 98 AND 99, RECORDS OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA.

●	INDICATES MONUMENT FOUND AS NOTED.
○	INDICATES MONUMENT TO BE SET.
( )	INDICATES RECORD INFORMATION PER M.B. 8/21.
< >	INDICATES RECORD INFORMATION PER INST. NO. 2006-059278O, O.R.
[ ]	INDICATES RECORD INFORMATION PER P.M.B. 217/98-99.
{ }	INDICATES RECORD INFORMATION PER P.M.B. 226/54-57.
R.C.F.C.& W.C.D.	INDICATES RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT.
8"S	INDICATES EXISTING SEWER LINE
24" SD	INDICATES EXISTING STORM DRAIN LINE
10" W	INDICATES EXISTING WATER LINE
1463	INDICATES EXISTING CONTOUR ELEVATION

EASEMENTS

1 — INDICATES 30' WIDE EASEMENT FOR CONSTRUCTION AND MAINTAINING A TEMPORARY DRAINAGE FACILITY PURPOSES GRANTED TO MORENO VALLEY DISPOSAL, INC. IN DOCUMENT ENTITLED "GRANT OF EASEMENT AND MAINTENANCE AGREEMENT", RECORDED JUNE 19, 1989 AS INSTRUMENT NO. 1989-201780, O.R.

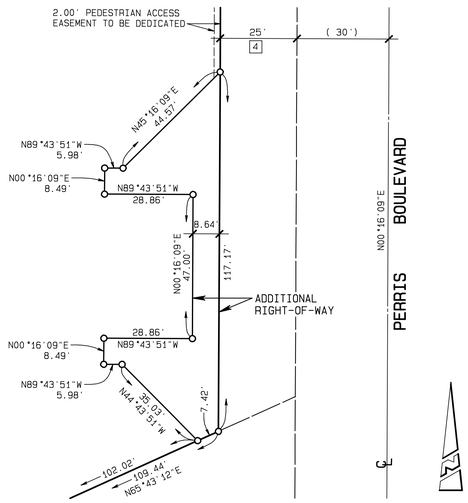
2 — INDICATES CENTERLINE OF EASEMENT, WIDTH UNDISCLOSED, FOR POLE LINES, CONDUITS, UNDERGROUND FACILITIES AND INCIDENTAL PURPOSES GRANTED TO CALIFORNIA ELECTRIC POWER COMPANY IN DOCUMENT RECORDED APRIL 7, 1955 IN BOOK 1719, PAGE 200, O.R.

3 — INDICATES 25' WIDE PERPETUAL EASEMENT AND RIGHT OF WAY FOR PUBLIC HIGHWAY PURPOSES, INCLUDING PUBLIC UTILITY AND PUBLIC SERVICE FACILITIES GRANTED TO THE CITY OF MORENO VALLEY IN DOCUMENT ENTITLED "EASEMENT DEED" RECORDED NOVEMBER 22, 2005 AS INSTRUMENT NO. 2005-0969613, O.R.

4 — INDICATES 25' WIDE PERPETUAL EASEMENT AND RIGHT OF WAY FOR PUBLIC HIGHWAY PURPOSES, INCLUDING PUBLIC UTILITY AND PUBLIC SERVICE FACILITIES GRANTED TO THE CITY OF MORENO VALLEY IN DOCUMENT ENTITLED "EASEMENT DEED" RECORDED NOVEMBER 22, 2005 AS INSTRUMENT NO. 2005-0969614, O.R.

5 — INDICATES 14' WIDE PERPETUAL EASEMENT AND RIGHT OF WAY FOR HIGHWAY PURPOSES, UTILITIES AND PUBLIC SERVICE FACILITIES GRANTED TO THE CITY OF MORENO VALLEY IN DOCUMENT ENTITLED "OFFER OF DEDICATION" RECORDED JANUARY 24, 2006 AS INSTRUMENT NO. 2006-0052906, O.R.

6 — INDICATES PERPETUAL EASEMENT AND RIGHT OF WAY FOR HIGHWAY PURPOSES, UTILITIES AND PUBLIC SERVICE FACILITIES GRANTED TO THE CITY OF MORENO VALLEY IN DOCUMENT ENTITLED "GRANT OF EASEMENT" RECORDED AUGUST 11, 2006 AS INSTRUMENT NO. 2006-0592780, O.R.



DETAIL 2

SCALE : 1" = 20'

ATTACHMENT 11

REVIEW BY CITY STAFF		
OFFICE	INITIAL	DATE
PRINCIPAL ENGINEER		
ENTERPRISE SERVICES		
PLANNING		
TRANSPORTATION		
PARKS AND RECREATION		
LAND DEVELOPMENT		

BENCH MARK

RIVERSIDE COUNTY FLOOD CONTROL BENCH MARK NO. M-31
3-1/4" ALUMINUM DISK STAMPED RIV. CO. SURVEYOR M-31 RESET APRIL 1996, FLUSH AT S.W. COR. OF BRIDGE ON TOP OF SIDEWALK NEAR FACE OF CURB LOCATED AT THE CROSSING OF PERRIS BLVD. AND RIV. CO. FLOOD CONTROL CHANNEL (PERRIS LATERAL "A") 43 FT. WEST OF THE CENTERLINE OF PERRIS BLVD. AND 4.5 FT. EAST OF CONCRETE BRIDGE BARRIER.
ELEVATION: 1474.674

MARK	DATE	INITIAL	DESCRIPTION	REC.	APPR	DATE
		E.O.R.	REVISION			

ENGINEER OF RECORD'S SEAL

REGISTERED PROFESSIONAL ENGINEER ROBERT A. BEBENSEE No. 22877 EXP 12-31-09 CIVIL STATE OF CALIFORNIA

PREPARED BY:
ROBERT A. BEBENSEE, R.C.E.
453 North Central Avenue
Upland, CA 91786
(909) 946-1122

ROBERT A. BEBENSEE
R.C.E. #22877 (EXP: 12/31/2009)
DATE

SHEET 1 NO. 2

PLOT DATE 05-07-09 JOB NO. 061606

-1379-

TENTATIVE
PARCEL MAP NO. 36162

IN THE CITY OF MORENO VALLEY, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

SECTION 31, TOWNSHIP 3 SOUTH, RANGE 3 WEST, SAN BERNARDINO MERIDIAN

BEING A SUBDIVISION OF LOTS 25, 26, 31 AND 32 OF BLOCK 1 OF RIVERSIDE ALFALFA ACRES AS PER MAP RECORDED IN BOOK 8, PAGE 21 OF MAPS, RECORDS OF RIVERSIDE COUNTY, STATE OF CALIFORNIA.

ACCESSOR'S PARCEL NUMBERS 316-210-071, 073, 075 & 076

TPM 36162

DEMOLITION NOTE:

EXISTING ON-SITE STRUCTURES/FEATURES, TREES, EXCLUSIVE OF PROPERTY LINE FENCING AND GROVE VIEW ROAD ELECTRICAL STRUCTURES AND CONDUITS TO BE REMOVED FROM THE SITE TO AN AUTHORIZED DISPOSAL AREA.

EASEMENTS	RECORDATION INFORMATION
1	INST. NO. 1989-201780, O.R.
2	BOOK 1719, PAGE 200, O.R.
3	INST. NO. 2005-0969613, O.R.
4	INST. NO. 2005-0969614, O.R.
5	INST. NO. 2006-0052906, O.R.
6	INST. NO. 2006-0592780, O.R.

SEE SHEET 1 OF 2 FOR PLOTTED EASEMENT DESCRIPTIONS.

LINE DATA

LINE	BEARING	DISTANCE	DESCRIPTION
L1	N89°31'12"W	124.55'	RECORD PER INST. NO. 2004-0139651, O.R.
	N89°31'09"W	124.55'	FIELD CALCULATED
L2	N65°43'11"E	136.93'	RECORD PER INST. NO. 2004-0139651, O.R.
	N65°43'12"E	136.93'	FIELD CALCULATED
L3	S00°16'05"W	57.35'	RECORD PER INST. NO. 2004-0139651, O.R.
	S00°19'09"W	57.35'	FIELD CALCULATED
L4	N00°17'54"E	43.02'	RECORD PER INST. NO. 2004-0196585, O.R.
	N00°17'48"E	43.02'	FIELD CALCULATED
L5	S69°05'05"E	99.10'	RECORD PER INST. NO. 2004-0196585, O.R.
	S69°05'00"E	99.10'	FIELD CALCULATED
L6	S00°28'47"W	8.42'	RECORD PER INST. NO. 2004-0196585, O.R.
	S00°28'51"W	8.42'	FIELD CALCULATED
L7	N89°31'12"W	92.72'	RECORD PER INST. NO. 2004-0196585, O.R.
	N89°31'09"W	92.72'	FIELD CALCULATED
L8	S00°16'30"W	213.41'	RECORD PER INST. NO. 2006-0592780, O.R.
	S00°16'09"W	213.41'	FIELD CALCULATED
L9	N89°43'30"W	25.00'	RECORD PER INST. NO. 2006-0592780, O.R.
	N89°43'51"W	25.00'	FIELD CALCULATED

LINE DATA

LINE	BEARING	DISTANCE	DESCRIPTION
L10	N00°16'30"E	135.64'	RECORD PER INST. NO. 2006-0592780, O.R.
	N00°16'09"E	135.65'	FIELD CALCULATED
L11	N43°52'20"W	54.35'	RECORD PER INST. NO. 2006-0592780, O.R.
	N43°52'30"W	54.35'	FIELD CALCULATED
L12	S44°38'49"W	34.41'	RECORD PER INST. NO. 2006-0592780, O.R.
	S44°38'14"W	34.41'	FIELD CALCULATED
L13	N00°17'23"E	63.69'	RECORD PER INST. NO. 2006-0592780, O.R.
	N00°17'48"E	63.69'	FIELD CALCULATED
L14	N45°16'09"E	44.57'	
L15	N89°43'51"W	5.98'	
L16	N00°16'09"E	8.49'	
L17	N89°43'51"W	5.98'	
L18	N44°43'51"W	35.03'	
L19	N65°43'12"E	7.42'	
L20	N65°43'12"E	102.02'	
L21	N89°43'51"W	28.86'	
L22	N00°16'09"E	47.00'	
L23	N89°43'51"W	28.86'	
L24	N00°16'09"E	8.49'	

CURVE DATA

◯	Δ	R	L	T	DESCRIPTION
C1	35°22'57"	23.00'	14.20'	7.34'	FIELD CALCULATED
C2	20°21'51"	80.00'	28.43'	14.37'	FIELD CALCULATED

SCALE : 1" = 80'

GRAPHIC SCALE 1" = 80'

80 40 0 80 150 240

REVIEW BY CITY STAFF	INITIAL	DATE
OFFICE		
PRINCIPAL ENGINEER		
ENTERPRISE SERVICES		
PLANNING		
TRANSPORTATION		
PARKS AND RECREATION		
LAND DEVELOPMENT		

BENCH MARK

RIVERSIDE COUNTY FLOOD CONTROL BENCH MARK NO. M-31 3-1/4" ALUMINUM DISK STAMPED RIV. CO. SURVEYOR M-31 RESET APRIL 1996. FLUSH AT S.W. COR. OF BRIDGE ON TOP OF SIDEWALK NEAR FACE OF CURB LOCATED AT THE CROSSING OF PERRIS BLVD. AND RIV. CO. FLOOD CONTROL CHANNEL (PERRIS LATERAL "A") 43 FT. WEST OF THE CENTERLINE OF PERRIS BLVD. AND 4.5 FT. EAST OF CONCRETE BRIDGE BARRIER. ELEVATION: 1474.674

MARK	DATE	INITIAL	DESCRIPTION	REC.	APPR	DATE
		E.O.R.	REVISION			

ENGINEER OF RECORD'S SEAL

REGISTERED PROFESSIONAL ENGINEER ROBERT A. BEBENSEE No. 22877 EXP 12-31-09 CIVIL STATE OF CALIFORNIA

PREPARED BY:
ROBERT A.BEBENSEE, R.C.E.
453 North Central Avenue
Upland, CA 91786
(909) 946-1122

ROBERT A. BEBENSEE R.C.E. #22877 (EXP. 12/31/2009) DATE

SHEET 2 NO. 2

PLOT DATE 05-07-09 JOB NO. 061606

-1380-

DATE OF PREPARATION:
DECEMBER, 2009

LEGAL DESCRIPTION:
LOTS 25, 26, 31 AND 32 OF BLOCK 1 OF RIVERSIDE ALFALFA ACRES AS PER MAP RECORDED IN BOOK 8, PAGE 21 OF MAPS, RECORDS OF RIVERSIDE COUNTY, STATE OF CALIFORNIA.

ACCESSOR'S PARCEL NUMBERS:
316-210-071, 073, 075 & 076

AREA:
80.80 ACRES GROSS
71.11 ACRES NET
(NET ACRES EXCLUDES PROPOSED OFFERS OF DEDICATION FOR STREET RIGHT-OF-WAY)

ZONING :
THE PROJECT SITE IS LOCATED WITHIN THE MORENO VALLEY INDUSTRIAL AREA PLAN (SP #208). THE MAJORITY OF THE PROJECT SITE IS ZONED INDUSTRIAL (I) WITH THE NORTHEAST AND SOUTHEAST CORNERS OF THE SITE BEING ZONED INDUSTRIAL SUPPORT AREAS (ISA). DEVELOPMENT OF THE PROPOSED WAREHOUSE DISTRIBUTION FACILITY IS PERMITTED WITHIN BOTH THE I AND ISA ZONES.
(EXISTING AND PROPOSED)

EXISTING USE:
VACANT

PROPOSED USE:
WAREHOUSE/DISTRIBUTION FACILITY

OWNER AND APPLICANT :
VOGEL ENGINEERS, INC., A CALIFORNIA CORPORATION
ATTENTION: WILLIAM D. VOGEL
300 PASEO TESORO
WALNUT, CA. 91789
(909) 598-7065

MAP PREPARED BY :
ROBERT A. BEBENSEE, R.C.E.
R.C.E. NO. 22877, EXP. 12-31-11
453 NORTH CENTRAL AVENUE
UPLAND, CA. 91786
(909) 946-1122

FLOOD ZONE:
THE PROPERTY INDICATED HEREON LIES WITHIN FLOOD ZONE 'X' (SHADED) AS STATED BY FLOOD INSURANCE RATE MAP, MAP NO. 06065C1430G, PANEL 1430 OF 3805, EFFECTIVE DATE AUGUST 28, 2008, PREPARED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY, NATIONAL FLOOD INSURANCE PROGRAM, WHICH RECITES ZONE 'X' (SHADED) AS AREAS OF 0.2% ANNUAL CHANCE FLOOD; AREAS OF 1% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; AND AREAS PROTECTED BY LEVEES FROM 1% ANNUAL CHANCE FLOOD.

AUTOMOBILE PARKING NOTES:
1. AUTOMOBILE PARKING STALLS TO BE 9 FEET WIDE AND 16 FEET MINIMUM LONG, PAVED.
2. 12" WIDE CONCRETE STEP TO BE CONSTRUCTED AT PARKING STALLS PARALLEL AND ADJACENT TO LANDSCAPE AREAS.

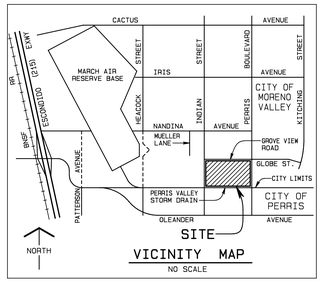
TRAILER PARKING NOTES:
1. TRAILER PARKING STALLS TO BE 14 FEET WIDE AND 53 FEET LONG.
2. SECONDARY TRAILER PARKING STALLS TO HAVE 6 FEET OVERHANG.

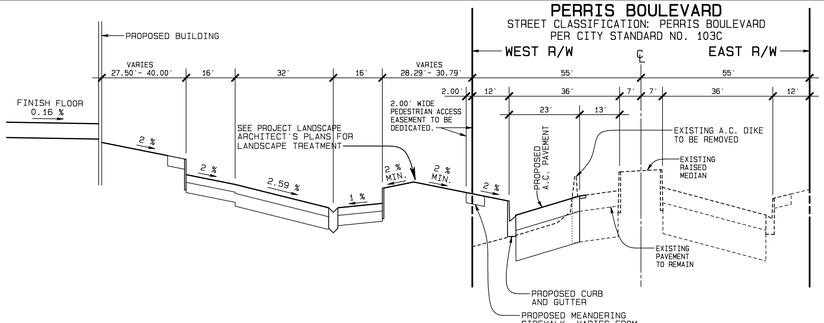
SURFACE STORAGE/SAND FILTER FACILITY NOTE:
SURFACE STORAGE/SAND FILTER FACILITIES SIZED TO HOLD AND PROCESS BMP VOLUMES.

BENCH MARK:
RIVERSIDE COUNTY FLOOD CONTROL
BENCH MARK NO. M-31
3-1/4" ALUMINUM DISK STAMPED RIV. CO. SURVEYOR M-31 RESET APRIL 1996, FLUSH AT S.W. COR. OF BRIDGE ON TOP OF SIDEWALK NEAR FACE OF CURB LOCATED AT THE CROSSING OF PERRIS BLVD. AND RIV. CO. FLOOD CONTROL CHANNEL (PERRIS LATERAL 'A') 43 FEET WEST OF THE CENTERLINE OF PERRIS BOULEVARD AND 4.5 FEET EAST OF CONCRETE BRIDGE BARRIER.
ELEVATION : 1474.674

LEGEND

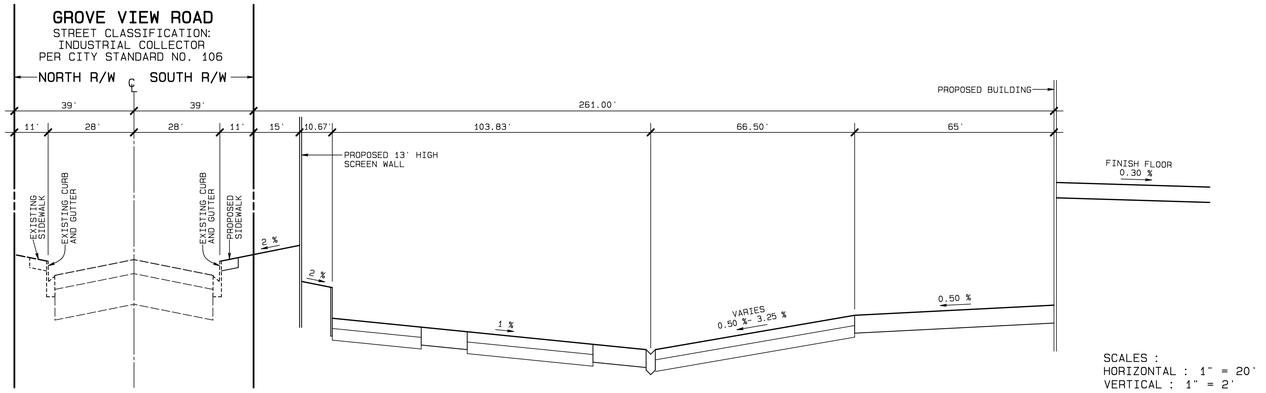
A.C.	ASPHALT CONCRETE
B.R.	BOTTOM OF RISER
B.V.C.	BEGIN VERTICAL CURVE
C.F.	CURB FACE
CML/CMC	CEMENT MORTAR LINED/ CEMENT MORTAR COATED
D.S.	DOWN SPOUT
E.G.	EXISTING GRADE
EMWD	EASTERN MUNICIPAL WATER DISTRICT
E.V.C.	END VERTICAL CURVE
F.D.C.	FIRE DEPARTMENT CONNECTION
F.F.	FINISH FLOOR
F.G.	FINISH GRADE
F.H.	FIRE HYDRANT
FL.	FLOW LINE
F.S.	FINISH SURFACE
F.W.	Indicates ON-SITE FIRE WATER LINE.
G.B.	GRADE BREAK
H.G.L.	HYDRAULIC GRADE LINE
H.P.	HIGH POINT
I.C.B.	IRRIGATION CONTROL BOX
I.C.V.	IRRIGATION CONTROL VALVE
INV.	INVERT
LAT.	LATERAL
MVU	MORENO VALLEY ELECTRIC UTILITY
N.P.A.A.T.	NO PARKING AT ANY TIME SIGN
P.A.	PLANTER AREA
P.C.C.	PORTLAND CONCRETE CEMENT
P.I.	POINT OF INTERSECTION
P.I.V.	POST INDICATOR VALVE
PL	PROPERTY LINE
P.L.L.	PARKING LOT LIGHT
R.D.	ROOF DRAIN
RCB	REINFORCED CONCRETE BOX
R.C.F.C. & W.C.D.	RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
R/W	RIGHT OF WAY
S.C.O.	SEWER CLEANOUT
SD	STORM DRAIN
S.D. MH.	STORM DRAIN MANHOLE
S.L.P.B.	STREET LIGHT PULL BOX
S. MH.	SANITARY SEWER MANHOLE
T.B.M.	TEMPORARY BENCH MARK
T.C.	TOP OF CURB
T.C.B.	TOP CATCH BASIN
T.CO.	TOP OF CLEANOUT
T.D.	TOP OF A.C. DIKE
T.G.	TOP OF GRATE
T.L.	TOP OF LANDING
T.HW.	TOP OF HEADWALL
T.M.H.	TOP OF MANHOLE
T.R.	TOP OF RISER
TRANS.	Indicates TRANSFORMER PAD LOCATION PER ARCHITECTURAL PLANS
T.S.	TOP OF STEP
T.W.	TOP OF WALL
W.M.	WATER METER
W.V.	WATER VALVE
	EXISTING DECIDUOUS TREE
	EXISTING EVERGREEN TREE
	EXISTING PALM TREE
	EXISTING STREET LIGHT
	PROPOSED STREET LIGHT
1460	Indicates EXISTING CONTOUR ELEVATION
1460	Indicates PROPOSED CONTOUR ELEVATION
F	Indicates CUT/FILL DAYLIGHT LINE
(XX.XX)	Indicates EXISTING ELEVATION
6" G	Indicates EXISTING GAS MAIN
18" S	Indicates EXISTING SEWER MAIN
24" SD	Indicates EXISTING STORM DRAIN LINE
4" T	Indicates EXISTING TELEPHONE LINE
39" W	Indicates EXISTING WATER MAIN





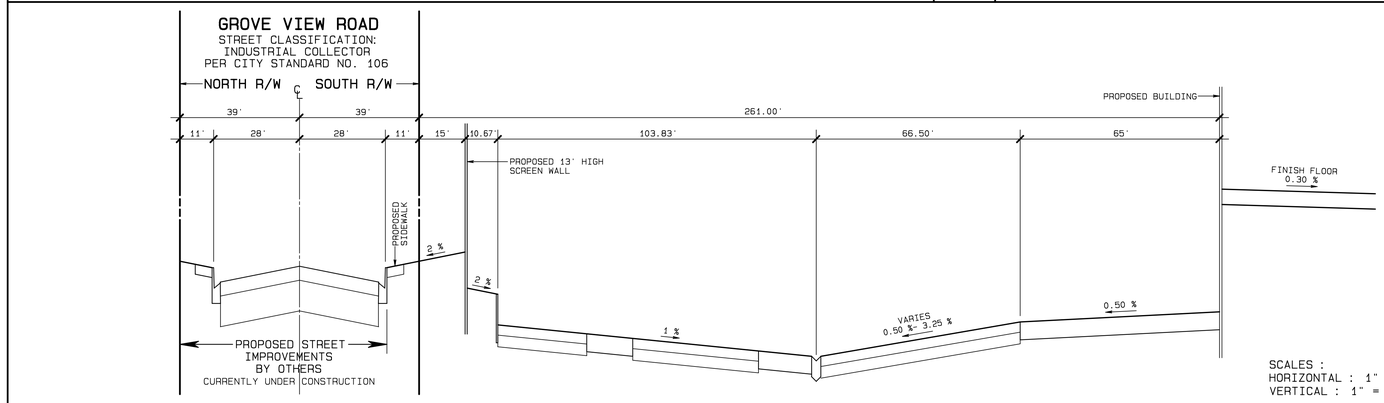
SCALES :
HORIZONTAL : 1" = 20'
VERTICAL : 1" = 2'

SECTION A



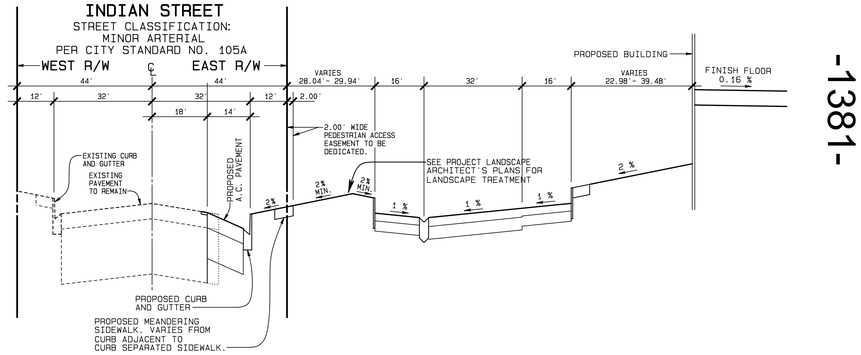
SCALES :
HORIZONTAL : 1" = 20'
VERTICAL : 1" = 2'

SECTION B



SCALES :
HORIZONTAL : 1" = 20'
VERTICAL : 1" = 2'

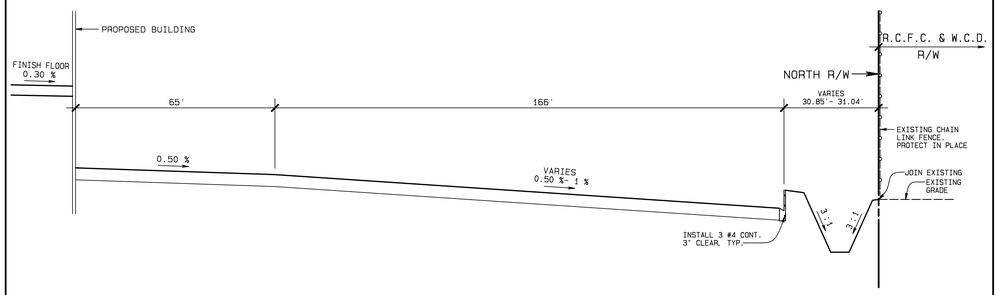
SECTION C



SCALES :
HORIZONTAL : 1" = 20'
VERTICAL : 1" = 2'

SECTION D

-1381-



SCALES :
HORIZONTAL : 1" = 20'
VERTICAL : 1" = 3'

SECTION E

DEMOLITION NOTE:
EXISTING ON-SITE STRUCTURES/FEATURES, TREES, EXCLUSIVE OF PROPERTY LINE FENCING AND GROVE VIEW ROAD ELECTRICAL STRUCTURES AND CONDUITS TO BE REMOVED FROM THE SITE TO AN AUTHORIZED DISPOSAL AREA. FIELD LOCATED ELECTRICAL VAULTS, ADJACENT TO PERRIS BOULEVARD AND INDIAN STREET, TO REMAIN AND BE PROTECTED DURING CONSTRUCTION.

MINIMUM GRAIDIENTS:
A.C. PAVEMENT: 1%
P.C.C.: 0.50%

EARTHWORK QUANTITY ESTIMATE:
CUT- 45,951 CU. YDS. FILL- 342,615 CU. YDS.

THE ABOVE QUANTITIES DO NOT REFLECT ANY SHRINKAGE, SWELLING, SUBSIDENCE, OVER EXCAVATION OR ANY SPECIAL CONDITIONS THAT MAY BE SPECIFIED IN THE PRELIMINARY SOILS REPORT AND ARE FOR REFERENCE AND FEE PURPOSES ONLY. SINCE THE ENGINEER CANNOT CONTROL THAT EXACT METHOD OR MEANS USED BY THE CONTRACTOR DURING GRADING OPERATIONS, NOR CAN THE ENGINEER GUARANTEE THE EXACT SOIL CONDITION OVER THE ENTIRE SITE, THE ENGINEER ASSUMES NO RESPONSIBILITY FOR FINAL EARTHWORK QUANTITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING HIS OWN EARTHWORK QUANTITIES FOR BIDDING, CONTRACT, AND CONSTRUCTION PURPOSES. IF IT APPEARS THERE WILL BE AN EXCESS OR SHORTAGE OF MATERIAL, THE CONTRACTOR MAY NOTIFY THE ENGINEER TO DETERMINE IF POSSIBLE GRADE ADJUSTMENTS CAN BE MADE TO ALLEVIATE SAID MATERIAL EXCESS OR SHORTAGE.

UTILITY COMPANIES	EMERGENCY NUMBERS
THE GAS COMPANY	1-800-427-2200
SO. CALIF. EDISON	1-800-684-8123
MORENO VALLEY ELECTRIC UTILITY	1-877-811-8700
VERIZON TELEPHONE (COMMERCIAL)	1-800-483-5000
TIME WARNER CABLE	(888) 892-2253
CITY OF MORENO VALLEY	(951) 413-3110
EASTERN MUNICIPAL WATER DIST.	(951) 928-3777
WASTE MANAGEMENT OF THE INLAND VALLEY	(800) 423-9986

SHEET INDEX

ATTACHMENT 12

REGISTERED PROFESSIONAL ENGINEER ROBERT A. BEBENSEE No. 22877 EXP 12-31-11 CIVIL STATE OF CALIFORNIA

MARK	DESCRIPTION	INITIAL	DATE	INITIAL	DATE
	NOT FOR CONSTRUCTION FOR PLAN REVIEW ONLY 12/22/09		REVISED		APPROVED

CITY OF MORENO VALLEY

CONCEPTUAL GRADING PLAN

LOTS 25, 26, 31 & 32, BLOCK 1
M.B. 8/21
PA09-0004

DESIGN: R.A.B.	ROBERT A.BEBENSEE, R.C.E. 453 North Central Avenue Upland, CA 91786 (909) 946-1122	PLOT DATE: 12-22-09
DRAWN: R.P.B.		JOB NO.: 061606
CHECKED:	R.C.E. 22877 Robert A. Bebensee Exp. 12-31-11	SHEET: 1 OF 5
	DATE FILE NO.	

R.C.F.C. & W.C.D. R/W
PERRIS VALLEY STORM DRAIN LATERAL B
(IMPROVED UNPAVED DRAINAGE CHANNEL)

SEE SHEET 3 MATCH LINE

INDICATES CENTERLINE OF EASEMENT, WIDTH UNDISCLOSED, FOR POLE LINES, CONDUITS, UNDERGROUND FACILITIES AND INCIDENTAL PURPOSES GRANTED TO CALIFORNIA ELECTRIC POWER COMPANY IN DOCUMENT RECORDED APRIL 7, 1955 IN BOOK 1719, PAGE 200, O.R.

7" CONCRETE SLAB PER ARCHITECTURAL PLANS.

EXISTING LOT LINE TO BE ELIMINATED

APN 316-210-71

APN 316-210-75

PERRIS BOULEVARD

GLOBE STREET

GROVE VIEW ROAD

PERRIS VALLEY ADP LATERAL B-1.3

PERRIS VALLEY ADP LATERAL B-1

A

GRAPHIC SCALE 1" = 40'

INDEX MAP
SCALE : 1" = 300'

PERRIS VALLEY STORM DRAIN LATERAL B

NORTH

-1382-

MARK	DESCRIPTION	INITIAL	DATE	INITIAL	DATE
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CITY OF MORENO VALLEY

CONCEPTUAL GRADING PLAN

LOTS 25, 26, 31 & 32, BLOCK 1 M.B. 8/21

PA09-0004

REGISTERED PROFESSIONAL ENGINEER ROBERT A. BEBENSEE No. 22877 EXP 12-31-11 CIVIL STATE OF CALIFORNIA

DESIGN R.A.B.	ROBERT A. BEBENSEE, R.C.E. 453 North Central Avenue Upland, CA 91786 (909) 946-1122	PLOT DATE 12-22-09
DRAWN R.P.B.	R.C.E. 22877 Exp. 12-31-11	JOB NO. 061606
CHECKED	Robert A. Bebensee DATE FILE NO.	SHEET 2 OF 5

SEE SHEET 4 FOR MATCH LINE

MATCH LINE SEE SHEET 2

R.C.F.C. & W.C.D. R/W
PERRIS VALLEY STORM DRAIN LATERAL B
(IMPROVED UNPAVED DRAINAGE CHANNEL)

N89°31'09"W 2,373.83'

N89°30'47"W 2,479.62'

GROVE VIEW ROAD

R/W

JOIN EXISTING (61.42)E.G.
59.13 T.G.
CATCH BASIN
STORM DRAIN PIPE
70'

EXISTING R.C.P. RIP-RAP

JOIN EXISTING (61.39)E.G.

SURFACE STORAGE/AUSTIN SAND FILTER FACILITY. SEE NOTE ON SHEET 1.

62.49 T.C.
61.49 FL.

63.03 F.S.
62.45 F.S.

67.36 F.F.
66.78 PAD

EXISTING LOT LINE TO BE ELIMINATED

PROPOSED F.H.

CURB OPENINGS, 112' O.C., 6 PLACES.

APN 316-210-71

APN 316-210-75

7" CONCRETE SLAB PER ARCHITECTURAL PLANS.

INDICATES CENTERLINE OF EASEMENT, WIDTH UNDISCLOSED, FOR POLE LINES, CONDUITS, UNDERGROUND FACILITIES AND INCIDENTAL PURPOSES GRANTED TO CALIFORNIA ELECTRIC POWER COMPANY IN DOCUMENT RECORDED APRIL 7, 1955 IN BOOK 1719, PAGE 200, O.R.

60.36 T/C.
59.86 FL.

60.69 F.S.

61.79 F.S.

62.12 F.S.

66.42 F.F.
65.54 PAD

PROPOSED TRASH ENCLOSURE WITH SOLID ROOF COVER PER ARCHITECTURAL PLANS.

60.01 T.C.
59.51 FL.

61.04 T.C.
60.04 FL.

JOIN EXISTING (60.72)E.G.

BRIDGE OPENING

63.25 FL.
2.66 %

36" DIA. STORM DRAIN PIPE
CATCH BASIN
62.93 FL.

PROPRIETARY DEVICE
65.42 T.C.
64.42 F.S.

JUNCTION STRUCTURE

48" DIA. STORM DRAIN PIPE

64.16 FL.

66.36 T.C.
65.36 F.S.

64.76 F.S.

JOIN EXISTING (66.45)T.C.
65.80)FL.

JOIN EXISTING (67.01)T.C.
(66.36)FL.

0' C.F.
67.49 F.S.

0' C.F.
67.05 F.S.

STA. 24+40.73
CL. DRIVEWAY
W = 50.00' MIN.

44.00' ADDITIONAL RIGHT-OF-WAY

EXISTING 1-1/2" DIA. PVC RISER & (2) 1" DIA. PVC RISERS
EXISTING 1-1/2" DIA. PVC RISER
EXISTING 1-1/2" DIA. PVC RISER
EXISTING TELEPHONE VAULT
EXISTING ELECTRICAL VAULT
EXISTING ELECTRICAL VAULT & M.H.
PROPOSED F.H.
EXISTING DRIVEWAY
EXISTING STREET LIGHT
EXISTING TELEPHONE VAULT
EXISTING CATCH BASIN
EXISTING CURB AND GUTTER
EXISTING CURB AND GUTTER
EXISTING STREET LIGHT
EXISTING TELEPHONE VAULT
PROPOSED F.H.
EXISTING STREET LIGHT
EXISTING CATCH BASIN
EXISTING CATCH BASIN
PERRIS VALLEY ADP LATERAL B-1.3
EXISTING STREET LIGHT

MANHOLE WITH SUMP PUMP

SURFACE STORAGE/AUSTIN SAND FILTER FACILITY. SEE NOTE ON SHEET 1.

61.81 FL.
2.97 %

63.99 T.C.
62.99 F.S.

64.19 F.S.

48" DIA. STORM DRAIN PIPE
CATCH BASIN
61.55 FL.

PROPRIETARY DEVICE

68.22 F.F.
67.64 PAD

64.22 F.S.

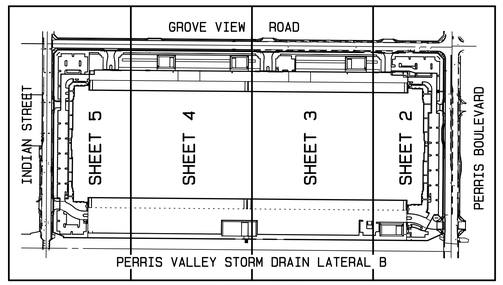
63.88 F.S.

GRAPHIC SCALE 1" = 40'
40 20 0 40 80 120

EASEMENTS

A — INDICATES 30' WIDE EASEMENT FOR CONSTRUCTION AND MAINTAINING A TEMPORARY DRAINAGE FACILITY PURPOSES GRANTED TO MORENO VALLEY DISPOSAL, INC. IN DOCUMENT ENTITLED "GRANT OF EASEMENT AND MAINTENANCE AGREEMENT". RECORDED JUNE 19, 1989 AS INSTRUMENT NO. 1989-201780, O.R.

THE EASEMENT GRANTED HEREUNDER SHALL CONTINUE IN EFFECT UNTIL SUCH TIME AS GRANTEE SHALL BE ABLE TO DISCHARGE STORM WATER FROM GRANTEE'S PROPERTY INTO A STORM DRAIN THAT IS PART OF THE PUBLIC STORM DRAIN SYSTEM CONSTRUCTED TO SERVE THE AREA IN WHICH GRANTEE'S PROPERTY IS LOCATED. AT SUCH TIME AND UPON REQUEST OF GRANTOR, THIS EASEMENT SHALL AUTOMATICALLY TERMINATE, AND GRANTEE COVENANTS AND AGREES TO REMOVE THE FACILITY AND ALL OTHER IMPROVEMENTS PLACED BY GRANTEE IN THE EASEMENT AREA AND TO REPAIR AND RESTORE THE EASEMENT AREA, AS FAR AS PRACTICABLE, TO ITS CONDITION EXISTING AS OF THE DATE OF THIS AGREEMENT, AND TO QUITCLAIM ITS RIGHTS UNDER THIS AGREEMENT.



INDEX MAP
SCALE : 1" = 300'

MARK	DESCRIPTION	INITIAL	DATE	INITIAL	DATE
	NOT FOR CONSTRUCTION FOR PLAN REVIEW ONLY 12/22/09				
		REVISED		APPROVED	

CITY OF MORENO VALLEY

CONCEPTUAL GRADING PLAN

LOTS 25, 26, 31 & 32, BLOCK 1
M.B. 8/21
PA09-0004

DESIGN R.A.B.	ROBERT A. BEBENSEE, R.C.E. 453 North Central Avenue Upland, CA 91786 (909) 946-1122	PLOT DATE 12-22-09
DRAWN R.P.B.		JOB NO. 061606
CHECKED	R.C.E. 22877 Robert A. Bebensee Exp. 12-31-11	SHEET 3 OF 5
	DATE FILE NO.	

REGISTERED PROFESSIONAL ENGINEER ROBERT A. BEBENSEE No. 22877 EXP 12-31-11 CIVIL STATE OF CALIFORNIA

-1383-

R.C.F.C. & W.C.D. R/W
PERRIS VALLEY STORM DRAIN LATERAL B
(IMPROVED UNPAVED DRAINAGE CHANNEL)

SEE SHEET 5
MATCH LINE

JOIN EXISTING (62.61)E.G.
64.11 T.C.
63.11 FL.
R/W
PROPOSED F.H.
G.B. 64.20 F.S.
64.53 F.S.
68.53 F.F.
67.99 PAD
70.63 F.F.
70.05 PAD
66.63 F.S.
64.43 FL.
66.30 F.S.
66.61 T.C.
65.61 F.S.
66.81 F.S.
CATCH BASIN
64.08 FL.
PROPRIETARY DEVICE
SURFACE STORAGE/AUSTIN SAND FILTER FACILITY. SEE NOTE ON SHEET 1.
36" DIA. STORM DRAIN PIPE
MANHOLE WITH SUMP PUMP
65.31 FL.
ROAD
GROVE VIEW
PROPOSED F.H.
EXISTING 2" DIA. PVC RISER PROTECT IN PLACE
EXISTING 6" DIA. PVC RISER PROTECT IN PLACE
EXISTING 2" DIA. PVC RISERS (2) & 3" DIA. PVC RISER & 4" DIA. PVC RISER PROTECT IN PLACE
EXISTING MVU ELECTRICAL VAULT AND WOOD BARRICADE PROTECT IN PLACE
EXISTING 3" DIA. PVC RISERS (2) & 4" DIA. PVC RISER PROTECT IN PLACE
EXISTING 1-1/2" DIA. PVC RISER & (2) 1" DIA. PVC RISERS
EXISTING 1-1/2" DIA. PVC RISER
EXISTING 1-1/2" DIA. PVC RISER
PROPOSED CURB AND GUTTER CURRENTLY UNDER CONSTRUCTION
PROPOSED CATCH BASIN CURRENTLY UNDER CONSTRUCTION
PROPOSED STORM DRAIN LINE CURRENTLY UNDER CONSTRUCTION
EXISTING TELEPHONE VAULT
EXISTING ELECTRICAL VAULT
EXISTING ELECTRICAL VAULT & M.H.
EXISTING PVC TELEPHONE RISER
JOIN EXISTING (67.01)T.C. (66.35)FL.
N89°30'47"W 2,479.62'
N89°31'09"W 2,373.83'
CURB OPENINGS. 112' O.C., 8 PLACES.
APN 316-210-73
APN 316-210-76
EXISTING LOT LINE TO BE ELIMINATED
7" CONCRETE SLAB PER ARCHITECTURAL PLANS.
STORM DRAIN PIPE
CATCH BASIN
59.33 T.G.
62.90 T.C.
61.90 FL.
EXISTING 36" DIA. CMP, 4 TYP.
EXISTING CONCRETE HEADWALL
JOIN EXISTING (61.39)E.G.
EXISTING RIP-RAP
JOIN EXISTING (61.42)E.G.
59.13 T.G.
62.49 T.C.
61.49 FL.
70'
261.89'
63.03 F.S.
62.46 F.S.
87.36 F.F.
66.78 PAD
69.46 F.F.
68.88 PAD
63.25 FL.
2.66 %
261.00'
65.42 T.C.
64.62 F.S.
62.93 FL.
EXISTING S.D. MH.
MATCH LINE
SEE SHEET 3
EXISTING LOT LINE TO BE ELIMINATED
EXISTING LOT LINE TO BE ELIMINATED
SURFACE STORAGE/AUSTIN SAND FILTER FACILITY. SEE NOTE ON SHEET 1.
0.30 %
0.16 %
0.50 %
7.12 %
1 %
3 %
6.8
0.80 %

GRAPHIC SCALE 1" = 40'
40 20 0 40 80 120

EASEMENTS

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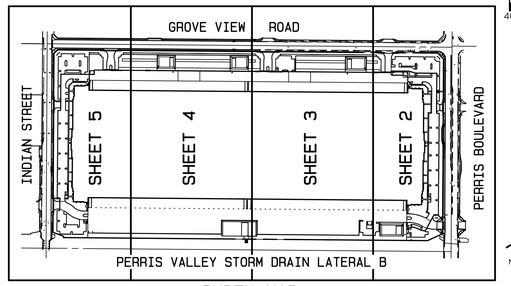

INDEX MAP
SCALE : 1" = 300'

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CITY OF MORENO VALLEY

CONCEPTUAL GRADING PLAN

LOTS 25, 26, 31 & 32, BLOCK 1
M.B. 8/21
PA09-0004

REGISTERED PROFESSIONAL ENGINEER ROBERT A. BEBENSEE No. 22877 EXP 12-31-11 CIVIL STATE OF CALIFORNIA

DESIGN R.A.B.	ROBERT A.BEBENSEE, R.C.E. 453 North Central Avenue Upland, CA 91786 (909) 946-1122	PLOT DATE 12-22-09
DRAWN R.P.B.		JOB NO. 061606
CHECKED	R.C.E. 22877 Robert A. Bebensee Exp. 12-31-11	SHEET 4 OF 5
DATE	FILE NO.	

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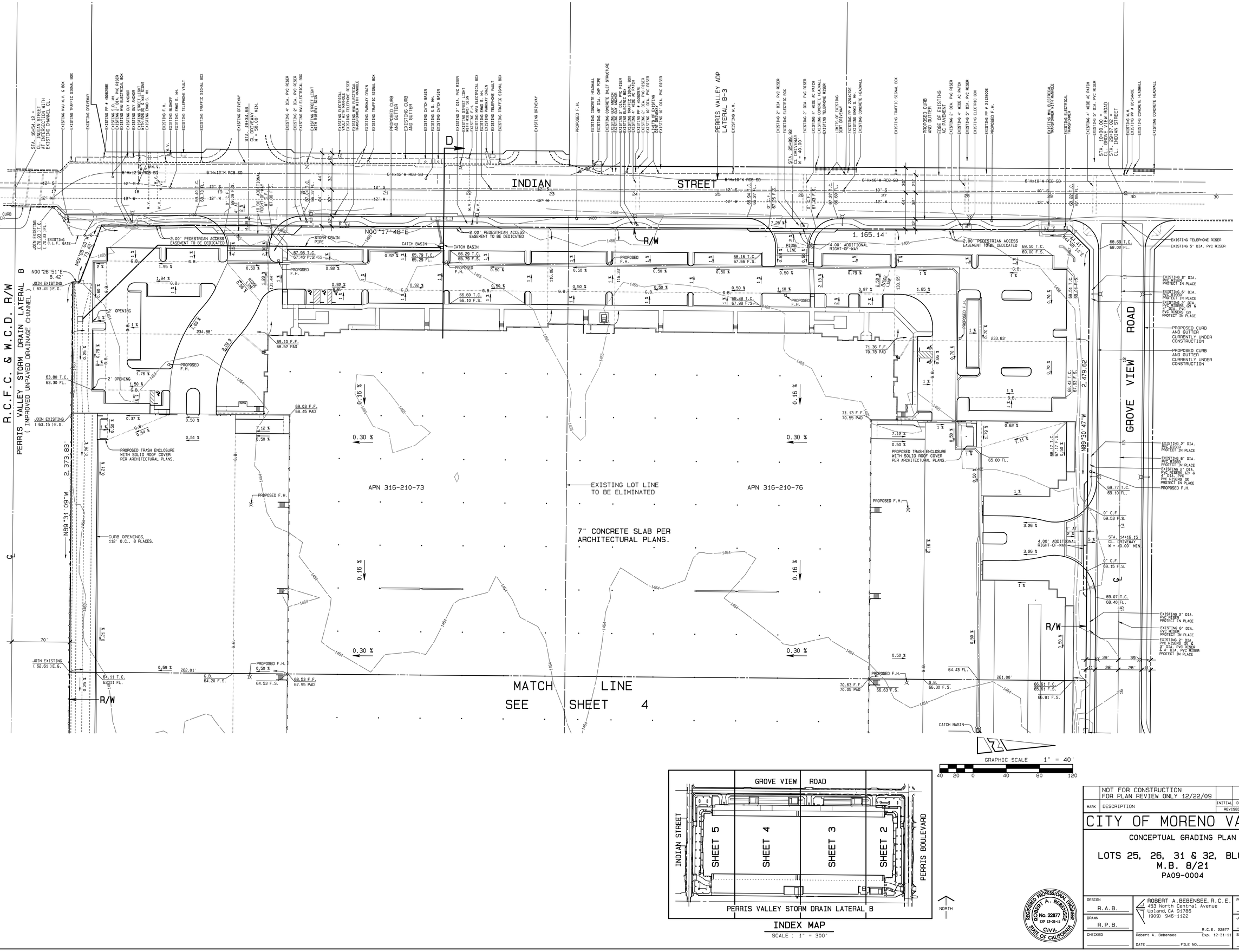

-1385-

MARK	DESCRIPTION	INITIAL	DATE	INITIAL	DATE
	NOT FOR CONSTRUCTION FOR PLAN REVIEW ONLY 12/22/09				
		REVISED		APPROVED	

CITY OF MORENO VALLEY

CONCEPTUAL GRADING PLAN

LOTS 25, 26, 31 & 32, BLOCK 1 M.B. 8/21

PA09-0004

REGISTERED PROFESSIONAL ENGINEER ROBERT A. BEBENSEE No. 22877 EXP 12-31-11 CIVIL STATE OF CALIFORNIA

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	DATE FILE NO.	

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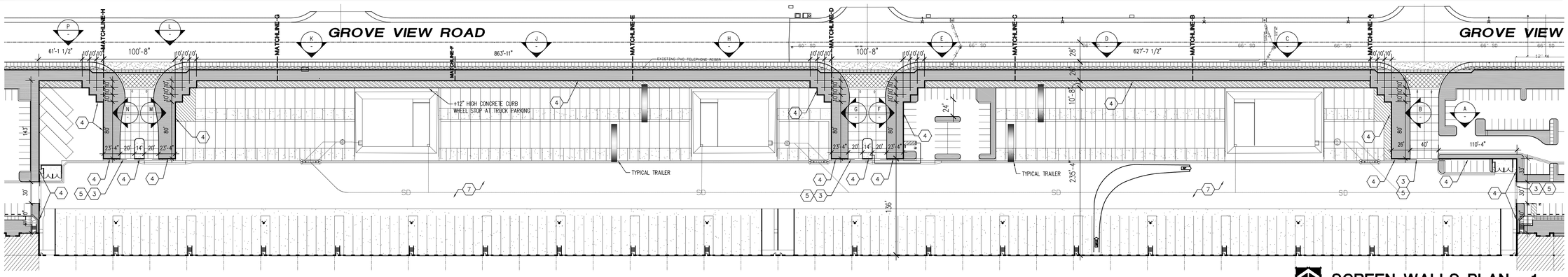
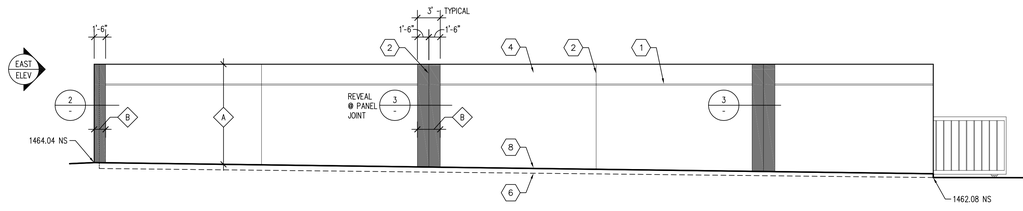
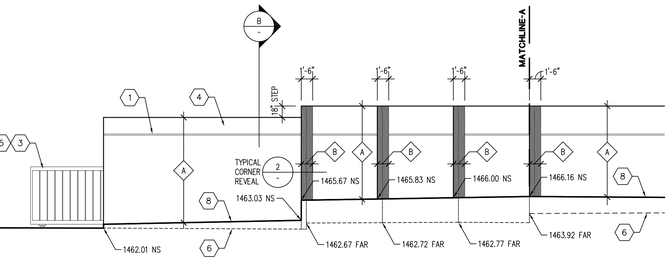


SCREEN WALLS PLAN - 1

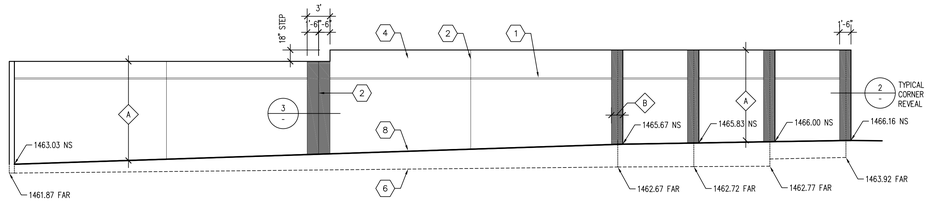
SCALE: 1" = 60'-0"





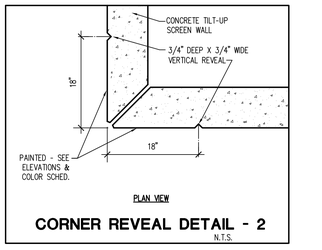
ELEVATION - A

SCALE : 1/8" = 1'-0"



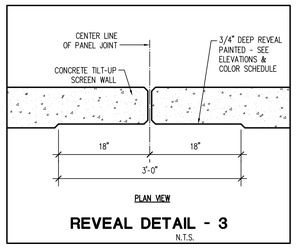
ELEVATION - B

SCALE : 1/8" = 1'-0"



CORNER REVEAL DETAIL - 2

N.T.S.



REVEAL DETAIL - 3

N.T.S.

KEYNOTES:

1. 2 IN. WIDE X 3/4 IN. DEEP REVEAL, PAINTED. TYPICAL
2. PANEL JOINT
3. TUBULAR STEEL ROLLING GATES – SEE SEE NOTE BELOW
4. CONCRETE TILT UP SCREEN WALL, HEIGHTS VARY DUE TO GRADES – REFER TO CIVIL PLANS
5. GATE IN OPEN POSITION
6. FAR-SIDE (FAR) GRADE OR FINISH SURFACE – SEE CE-PLANS
7. A.C. PAVING – SEE CE- PLANS
8. NEAR-SIDE (NS) GRADE OR FINISH SURFACE – SEE CE-PLANS

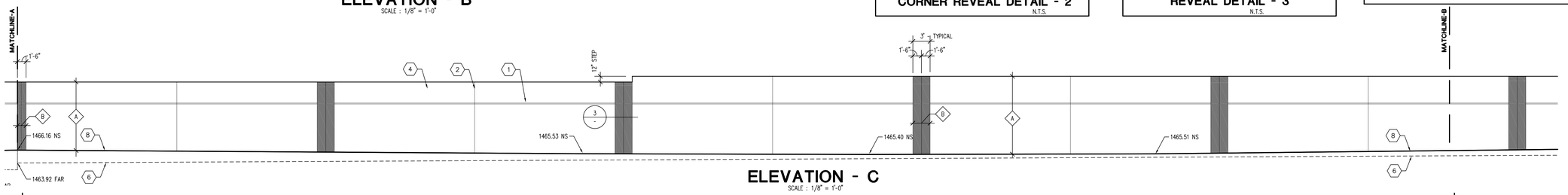
EXTERIOR COLORS:

A. DUNN EDWARDS #DE6143 "ALMOND LATTE".....(FIELD)

B. DUNN EDWARDS #DE6145 "ROCKY RIDGE" (BASE / CAP)

GATES AND FENCES NOTES:

- 8-FOOT HIGH MINIMUM STEEL ROLLING GATES AND ITS HARDWARE, MANUALLY OR ELECTRICALLY OPERATED SHALL BE DESIGNED TO WITHSTAND 90 MPH WIND LOADS IN THE OPEN AND CLOSED POSITION.
- THE STEEL ROLLING GATES CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND STRUCTURAL CALCULATIONS SIGNED BY A LICENSED CALIFORNIA STRUCTURAL ENGINEER FOR THE ENTIRE GATE OPERATION, TO THE APPROVAL OF THE BUILDING, FIRE AND PLANNING DEPARTMENTS AND OBTAIN THE REQUIRED PERMIT PRIOR TO START ANY WORK IN THE FIELD.
- PROVIDE FIRE DEPT. APPROVED "KNOX-LOCKS" AS REQUIRED.
- THESE SAME NOTES APPLY TO THE TUBULAR STEEL AND CHAIN-LINK FENCES.
- ROLLING GATES TO BE ELECTRICALLY OPERATED AT LOCATIONS WHERE THE CITY REQUIRES THEM TO BE SELF CLOSING.
- RKZ INC. IS NOT RESPONSIBLE IN ANY WAY FOR THE GATES, AND FENCES DESIGN AND CONSTRUCTION AND OPERATION. INFORMATION FOUND TO THAT EFFECT ON THESE CONSTRUCTION DOCUMENTS SHALL BE CONSIDERED CONCEPTUAL ONLY.



ELEVATION - C

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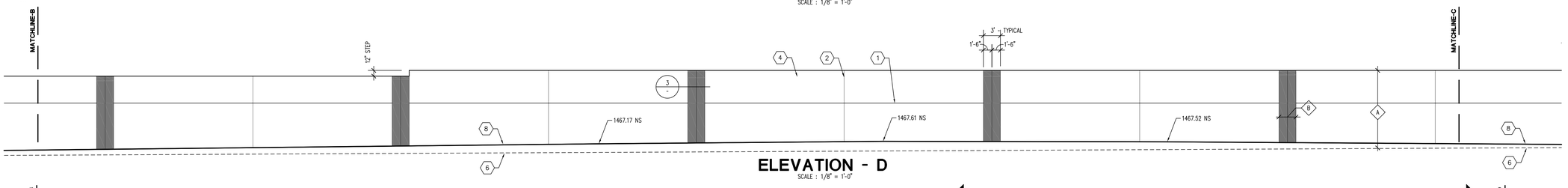

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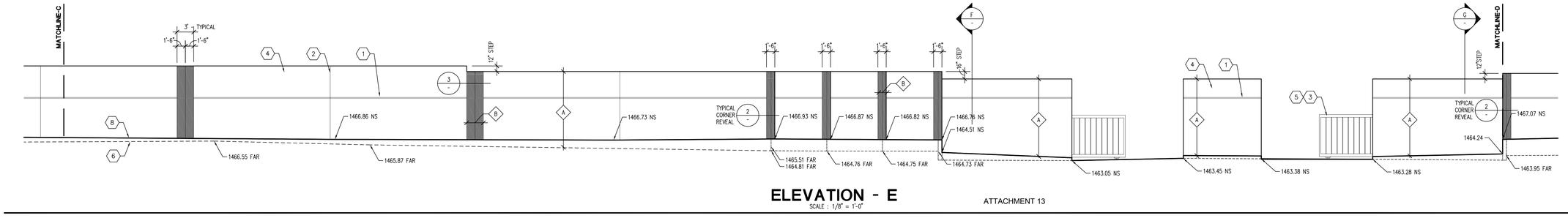

ELEVATION - E

SCALE : 1/8" = 1'-0"

ATTACHMENT 13

-1387-

rkz architects, inc.
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www.rkzinc.com

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300 PASEO TESORO
WALNUT, CA 91765-2791
PHONE: 909 598-7065
FAX: 909 598-2917

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17777 PERRIS BOULEVARD
17700 INDIAN STREET
MORENO VALLEY CALIFORNIA 92551

VIP
VOGEL INDUSTRIAL PARK
MORENO VALLEY CA

REVISIONS
CONSTR.
BID
PLAN CHECK
DRAWN 10-16-08
JOB NO. 06-28
SHEET NAME
SCREEN WALL PLANS AND ELEVATIONS
SHEET NO.
A-5
OF SHEETS

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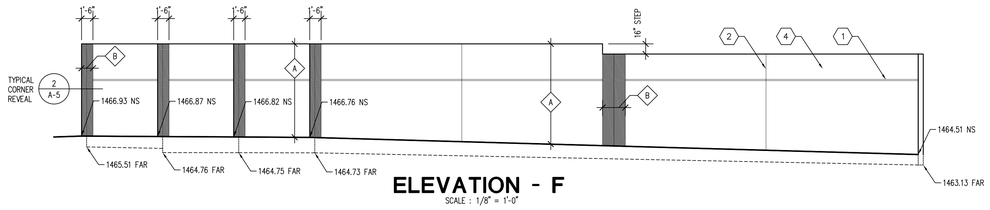
PROJECT #PA09-0004 & PA09-0012



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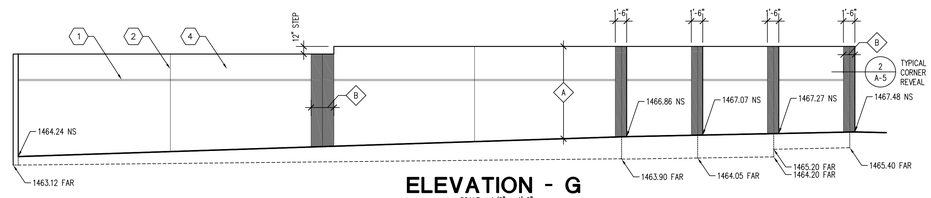

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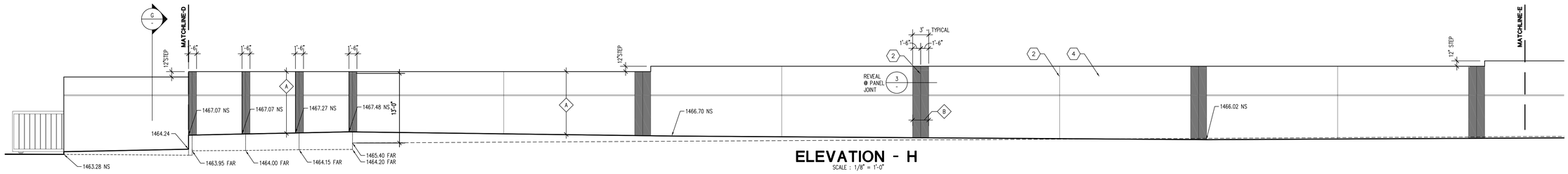

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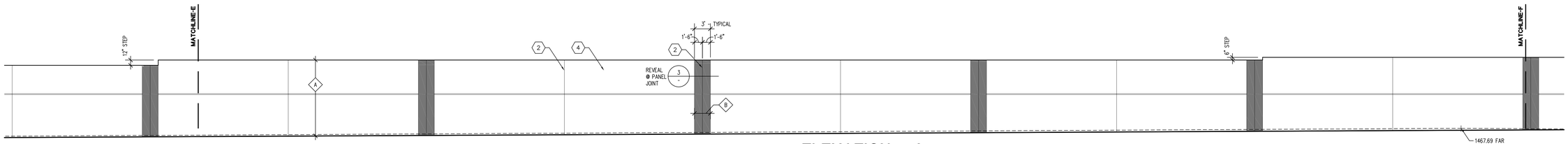

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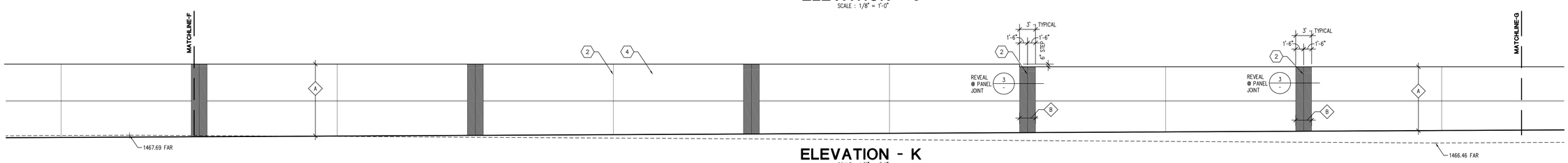

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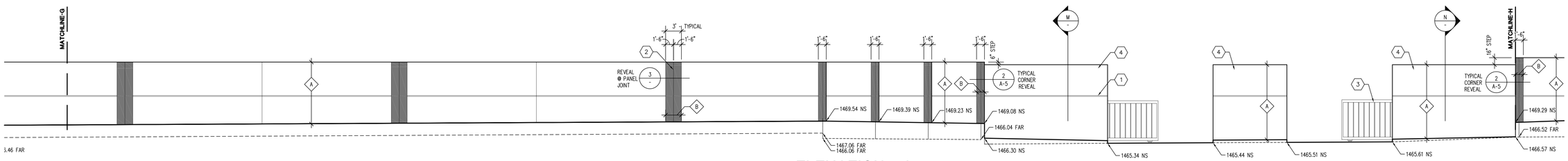

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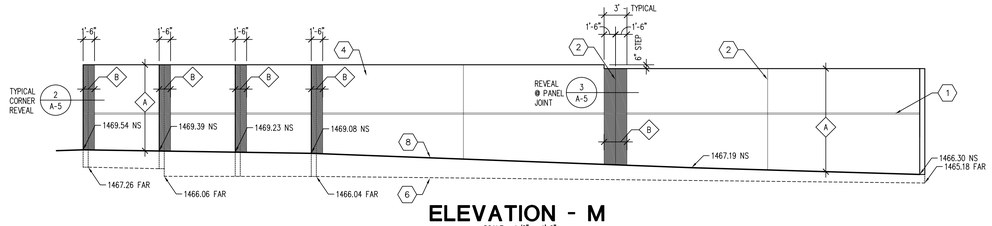

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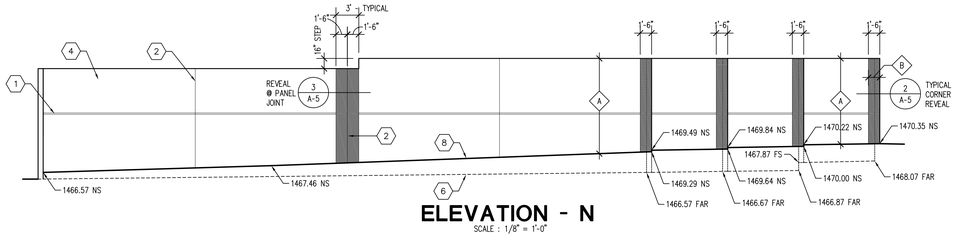

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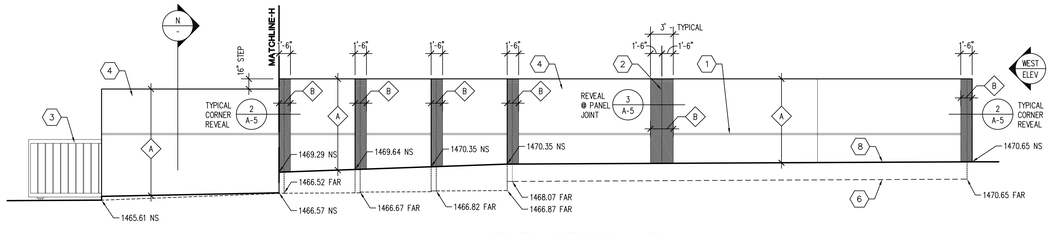

ELEVATION - P
SCALE : 1/8" = 1'-0"

EXTERIOR COLORS:

- A — DUNN EDWARDS #DE6143 "ALMOND LATTE" (FIELD)
- B — DUNN EDWARDS #DE6145 "ROCKY RIDGE" (BASE / CAP)

KEYNOTES:

1. 2 IN. WIDE X 3/4 IN. DEEP REVEAL, PAINTED. TYPICAL
2. PANEL JOINT
3. TUBULAR STEEL ROLLING GATES
4. CONCRETE TILT UP SCREEN WALL, HEIGHTS VARY DUE TO GRADES
5. GATE IN OPEN POSITION
6. FAR-SIDE GRADE OR FINISH SURFACE - SEE CE-PLANS
7. A.C. PAVING - SEE CE- PLANS
8. NEAR-SIDE GRADE OR FINISH SURFACE - SEE CE-PLANS

-1388-

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SCREEN WALL PLANS AND ELEVATIONS
SHEET NO.
A-6
OF SHEETS

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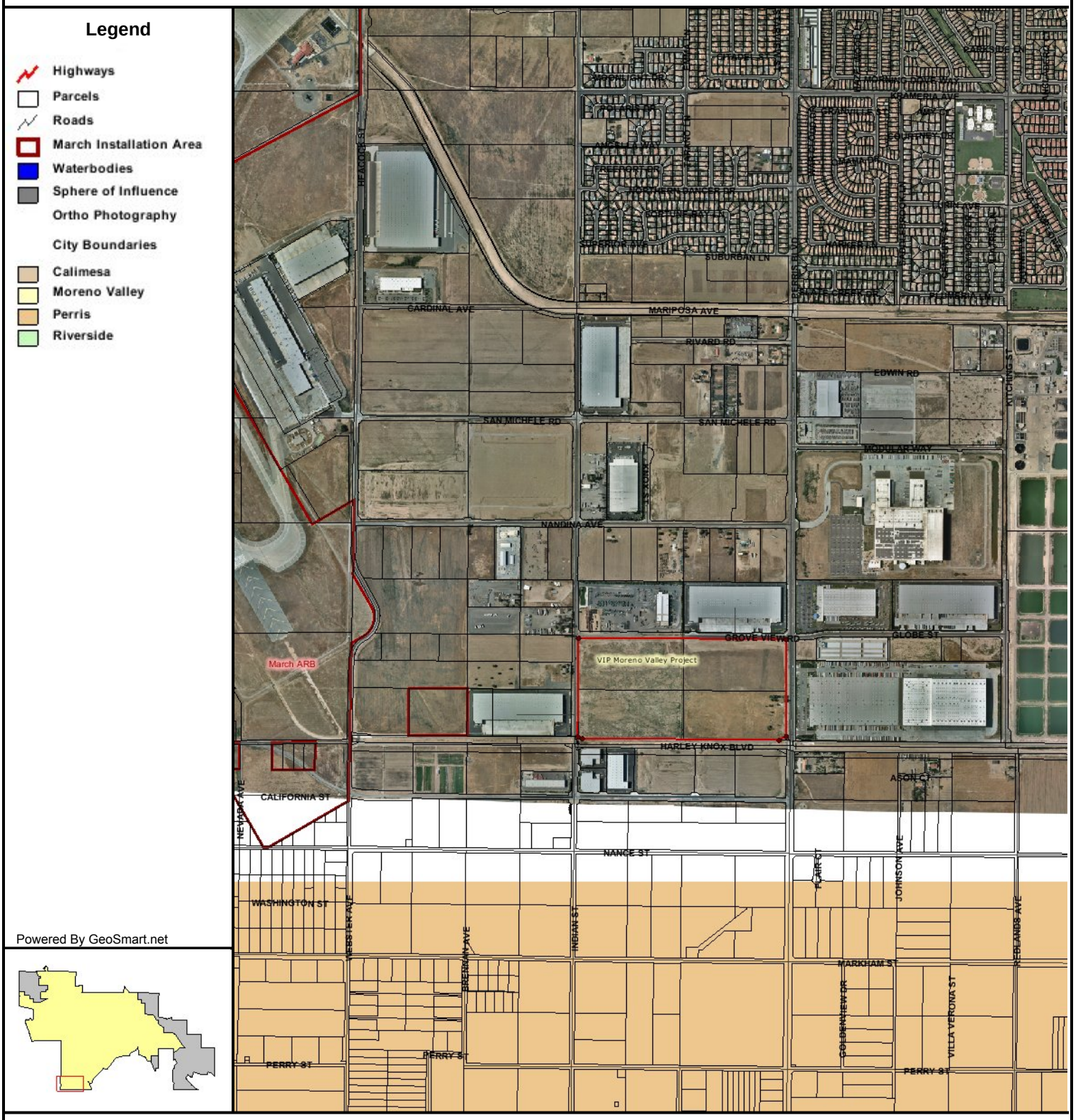
PROJECT #PA09-0004 & PA09-0012

VIP Moreno Valley Project



City of Moreno Valley
14177 Frederick St
Moreno Valley, CA 92553

DISCLAIMER: The information shown on this map was compiled from the Riverside County GIS and the City of Moreno Valley GIS. The land base and facility information on this map is for display purposes only and should not be relied upon without independent verification as to its accuracy. Riverside County and City of Moreno Valley will not be held responsible for any claims, losses, or damages resulting from the use of this map.

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MORENO VALLEY
WHERE DREAMS SOAR

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PLANNING COMMISSION STAFF REPORT

Case:	PA11-0013
Date:	July 12, 2012
Applicant:	City of Moreno Valley
Representative:	N/A
Location:	Citywide
Proposal:	Modify Title 9 of the Municipal Code for energy efficiency measures equal to and above current 2011 California Green Building Code standards necessary to adopt Reach Codes, including the modification of Section 9.05.040, "Industrial Site Development Standards", Section 9.17.030 "Landscape and Irrigation Design", Section 9.11.040 "Off Street Parking Requirements", Section 9.03.040 "Residential Site Development Standards, Section 8.80.020 "Waste Diversion Requirements" and 8.80.030 Waste Management Plan".
Recommendation:	Recommend approval to City Council

SUMMARY

City Staff is proposing to modify specific sections of Title 9 of the Municipal Code to achieve energy savings in excess of current State Building Code requirements ("Reach Codes") in accord with the Southern California Edison Company (SCE) Grant. The specific proposals include orientation of residential buildings, landscape design, carpool/ vanpool parking, solar energy and other items associated with energy efficiency at and above current codes and ordinances citywide.

BACKGROUND

A Long Term Strategic Plan was adopted in 2008 by the California Public Utilities Commission (CPUC), the California Air Resources Board, and the state's utilities. Various Public Resources Code sections establish a process which allows local adoption of energy conservation measures that are more stringent than the statewide standards. As a part of the Plan, the statement of work calls for the development of reach codes.

A Reach Code must achieve a higher level of energy efficiency than would otherwise result from complying with Title 24, including the mandatory requirements of 2011 California Green Building Code. Various efforts of achieving the "reach" beyond the 2011 Code include consideration of adopting performance measures based on a percentage reduction in energy usage beyond what is currently required by Title 24, and the consideration of adopting other prescriptive or individual local mandatory measures that are identified primarily as CALGreen Tier I or II measures. Measures would either involve amendments to the Uniform Electrical, Plumbing and Energy Codes or warrant amendments to current planning and zoning provisions within the Municipal Code.

There are a number of reasons why the City is proposing to adopt Reach Codes at this time. Additional energy efficiency through Reach Codes will assist in achieving the minimum 15% savings by the year 2020 related to mandates or requirements in the California Long Term Energy Efficiency Strategic Plan and AB 32. The additional energy efficiency above Title 24 would also assist to implement a policy of the proposed City Climate Action Strategy/Greenhouse Gas Analysis to facilitate the implementation of energy efficiency design of structures 10% beyond current Title 24 standards and the overall California goal of reaching zero net energy for residential structures by 2020.

In order to better ensure the cost-effectiveness of this task, City staff reviewed and assessed reach codes and related resources of municipalities and organizations throughout Southern California. Staff reviewed a large number of "reach" ordinances and narrowed down the list to focus on those that are most relevant to Moreno Valley's economic and climatic conditions. The following criteria were considered in the review process:

- Consideration of local municipalities with similar climate zones, and/or demographics.

- A thorough evaluation of mandatory requirements of CALGreen as well as Tier 1 and Tier 2 measures will be needed to determine the approach to reach codes that would be most appropriate for the City of Moreno Valley.

- Comparison of various approaches to implementing CALGreen and green ordinances among the identified sample of cities.

- Justification for adopting a percentage of energy savings over Title 24 when other surrounding cities have not yet adopted such codes.

After reviewing the ordinances of several cities in California that have developed Reach Codes, staff chose the cities of Simi Valley, Chula Vista, and West Sacramento for focused study. All or a portion of each city has similar climatic conditions being located several miles inland from the coast such as the City of Moreno Valley, with justification for the cost effectiveness of the established "Reach Codes" made through the Climate Zone 10 which also includes Moreno Valley.

Reach Codes, or those codes proposed for greater energy efficiency, will ultimately include modified language for both Municipal Codes and other building related codes. Staff is presenting the Title 9 or Municipal Code items for Planning Commission's review and recommendation to City Council. Various electrical, plumbing and energy related codes are under the direct purview of the City Council and do not require Planning Commission review. For the Planning Commission's information, the Building related measures include the following items:

Residential Local Mandatory Measures – Electrical, Plumbing and Energy Code items

- Provide a minimum of one-inch conduit from electrical service equipment for the future installation of a photovoltaic (PV) system.

- Kitchen faucets to limit water consumption to 1.5 gallons per minute.

- Space on roof surface and penetrations through roof surface are provided for future solar installation.

- A radiant roof barrier to be installed, with roofing materials to include a 3 year old solar reflectance or thermal emittance.

Non-residential Local Mandatory Measures – Electrical, Plumbing and Energy Code items

- Conduit to be installed from the building roof or eave to a location within the building identified as suitable for future installation of a charge controller (regulator) and inverter for future solar.

- Use of cool roofing materials having solar reflectance and thermal emittance with specific Solar Reflectance Index values.

Incentives will be available for some of the local mandatory measure proposed. According to Moreno Valley Utilities staff, an updated Solar Rebate program was approved by City Council on June 12th. The program will include rebates for residential and small commercial and performance standards for large commercial solar. The solar rebate program will be adjusted every year, to coincide with other Municipal Utility rebate programs, and available budget constraints. Plans are also underway to start an appliance rebate program, which will allow rebates for energy star appliances. Incentives for cool roofing materials are also being considered. The Building Division has also indicated that a building fee incentive may be available for allowing for future installation of solar on a building.

Staff originally proposed performance standards for consideration, where the builder or developer would be required to include building energy efficiency measures to achieve 10% energy efficiency above current Title 24 requirements for new residential projects, 15% percent energy efficiency above current Title 24 standards for new non-residential projects, and 5% energy efficiency above current Title 24 standards for residential and non residential building additions and retrofits. These or greater percentages were included in the city ordinances reviewed by staff. Based on subsequent outreach conducted with the development community, including residential, industrial and commercial developers conducting business in Moreno Valley and the Building Industry Association of Southern California - Riverside County Chapter representing area residential developers, staff has modified the original direction and intensity of Reach Codes. Based upon the concerns of the building community and the current fragile state of the local economy that has curtailed development, staff has decided to drop all references to performance standards and mandatory percentages to provide additional energy efficiency above current Title 24 Building Code standards.

PROJECT DESCRIPTION

Project

The following are various Reach Code items staff is proposing to be incorporated into the Municipal Code to ensure energy efficiency at and in most cases beyond standards included in the current 2011 Green Building Code:

Residential Local Mandatory Measures – Title 9 Items

- In all residential districts allowing single-family homes, new tracts containing five (5) or more lots shall require fifty (50) percent of the structures to orient buildings to optimize the use of solar energy with the long side of the house oriented within thirty (30) degrees south. Landscape design to include turf limit of 25%, utilizing 75% native California or drought tolerant plantings, providing hydrozones and restoring native vegetation to areas disrupted by construction where appropriate.

- Construction waste generated at the site shall be diverted to recycle or salvage in compliance with at least a 75% reduction.

- Each appliance provided by the builder meets Energy Star requirements if an Energy Star designation is applicable for the appliance.

- Space on roof surface and penetrations through roof surface are provided for future solar installation.

The first bullet-point above provides for future energy efficiency measures to be included in single-family residential structures. Placement of structures on lots with the long side of the house oriented within thirty (30) degrees south will allow for maximum afternoon sunlight for greater feasibility of future solar systems and in turn will allow for a reduction of energy consumption. This provides a more specific standard to implement the existing State requirement to maximize solar orientation of new residential tracts.

The second bullet-point item above takes the recently approved drought tolerant landscape ordinance one step further to require the remaining 75% of the non-sod areas to include either drought tolerant or California native landscape, while reducing the need for water consumption. The current landscape ordinance already limits turf areas to 25%.

The third bullet-point item and the 75% reduction of construction wastes, is consistent with AB341, a bill passed last year that created a State wide policy goal to divert 75% of construction waste by the year 2020.

Although the fourth bullet-point item appears to be building related, the Building Code would not regulate Energy Star equipment. The item is proposed to be included in the Municipal Code with the limitation that only kitchen related appliances would be required to meet Energy Star standards.

The fifth bullet-point item will be addressed in two codes, the Municipal Code for providing the space necessary on the roof for future installation of solar and the Energy Code for the penetrations necessary through the roof surface for future solar.

Non-Residential Local Mandatory Measures – Title 9 Items

- Eight (8) percent of all required parking shall be designated for any combination of low-emitting, fuel efficient and carpool/vanpool vehicles.

- Landscape design to include turf limit of 25%, utilizing 75% native California or drought tolerant landscape.

- Construction waste generated at the site is diverted to recycle or salvage in compliance with at least a 75% reduction.

- For all new industrial and warehouse structures at or above 300,000 square feet in floor area, the project shall install a photovoltaic array (solar panels) or other source of renewable generation on-site or otherwise acquire energy from the local utility that has been generated by renewable resources, to meet the project's office electricity needs.

The first bullet-point item under Non-Residential Measures for carpool and vanpool vehicle parking is a mandatory measure within the current 2011 California Green Building Code Standards. As the item is not included within Title 9 of the Municipal Code at this time, it must be adopted through this code amendment to ensure consistency with the 2011 green building code standards currently in place.

The second and third bullet-point items above are consistent with residential measures suggested and allow for reduction of construction wastes and water consumption.

The fourth bullet-point item is the only measure recommended that is not included in the 2011 Green Building standards. The standard however is consistent with measures included for some of the recently approved large high cube industrial warehouse uses in the City including the Skechers warehouse facility within Highland Fairview Corporate Park and the Ridge Property Trust project located in the eastern section of the City. Alternative energy credits or systems providing a similar reduction in grid energy use would be considered to meet this requirement. The ultimate goal of the measure is to reduce energy consumption and corresponding environmental impact of industrial uses.

Staff originally included a provision under the local mandatory measures where Gutter and downspout systems were proposed to be installed to route water at least five (5) feet away from the foundation or connect to landscape drains which discharge to a dry well, sump, bioswale, rainwater capture system or other approved on-site location. As this item was not considered an energy efficiency measure to reduce energy consumption, it was removed from the proposal by staff.

A majority of the items utilized above were included in the Climate Zone 10 Energy Cost-Effectiveness Study and are the most cost effective measures available from the 2011 California Green Building Code.

REVIEW PROCESS

Internal staff subcommittee meetings were conducted on a monthly basis at the outset of the Reach Code effort to determine which local mandatory measures would be most productive and recommended to Planning Commission and City Council. A total of six (6) in-house meetings were conducted with the subcommittee that included representatives from the Planning Division, Building Division and Moreno Valley Utilities. Other additional meetings with individual divisions were included as needed. Some of the items discussed in the meetings included which prescriptive measures and percentages within performance measures to consider for residential and non-residential development and if incentives would be provided by Moreno Valley Utilities for any of the prescriptive measures proposed.

On April 3, 2012, the Planning Division provided the item for discussion purposes at the City Council Study Session meeting. The meeting included a joint discussion of the item with City Council members and Planning Commissioners. At the meeting, the subject was reviewed somewhat favorably by the City Council and Planning Commission, however it was agreed that public outreach was to be provided to the development community to gauge possible concerns with the proposed approach.

Outreach was conducted with the Building Industry both in a meeting session and with individual developers and the Local Building Industry Association representing the residential building community. On May 10, 2012, staff attended the Economic Development Subcommittee Developer Workshop to provide a presentation on Reach Codes. On hand at the meeting were developers from the industrial, commercial and residential community. Additional outreach was conducted at the Environmental and Cultural Preservation Board on May 14, 2012, at a public forum meeting on June 7, 2012, and at an additional Planning Commission Study Session on June 28, 2012. From the outreach meetings and correspondence conducted with the development community, staff has significantly modified the original direction of the Reach Code effort. As referenced in an earlier section of the report, due to specific concerns from the development community and the continued fragile state of the economy, staff has reduced the intensity of Reach Codes to include only a reduced set of local mandatory measures for consideration. As recommended by the development community, all references to Performance standards and specific percentages of energy efficiency above current Title 24 standards have been dropped and are no longer being considered. This includes the elimination of performance standards related to new residential and non-residential developments as well as to additions and retrofits to residential and non-residential buildings.

The Planning Commission will have the opportunity to recommend approval or denial of the proposed Reach Code effort to the City Council. If Planning Commission chooses not to recommend approval, the one mandatory item in the 2011 Green Building Code referencing parking for carpool and vanpool vehicles would still need to be forwarded to the City Council to ensure consistency with the adopted currently adopted green building code standards.

ENVIRONMENTAL

The proposed Municipal Code amendments for Reach Codes are exempt from the California Environmental Quality Act (CEQA) pursuant to Section 15061 of the CEQA Guidelines in that there is no possibility that the proposed activity may have the potential for a significant negative impact upon the environment.

NOTIFICATION

Public notice for this public hearing was published in the local newspaper as a 1/8 page ad. In addition, staff sent notices of the meeting to representatives of the building industry who attended a previous Developer's Workshop meeting regarding Reach Codes. This included notification of the meeting and hearing to the local Building Industry Association (BIA) representing Riverside County and a

representative of the Sierra Club who attended a previous City Council/Planning Commission workshop.

REVIEW AGENCY COMMENTS

As the amendment of the Municipal Code items for Reach Codes are citywide and do not include a building project, the item was not transmitted for review.

STAFF RECOMMENDATION

That the Planning Commission **APPROVE** Resolution No. 2012-13 and thereby **RECOMMEND** that the City Council:

1. **RECOGNIZE** that the proposed Municipal Code Amendments are exempt from the California Environmental Quality Act (CEQA) Guidelines pursuant to Sections 15061 of the CEQA Guidelines; and,

2. **APPROVE** PA11-0013 to amend the Municipal Code to include various Municipal Code modifications and additions to allow for the adoption of Reach Codes (Attachment 2).

Prepared by:	Approved by:
Mark Gross, AICP Senior Planner	John C. Terell, AICP Planning Official

ATTACHMENTS:

1. Public Hearing Notice
2. Climate Zone 10 Energy Cost-Effectiveness Study
3. Planning Commission Resolution No. 2012-13.
4. Strikeout/Underline version of the proposed Municipal Code Amendment

NOTICE
OF
PLANNING COMMISSION
PUBLIC HEARING

THE PLANNING COMMISSION WILL CONSIDER AN AMENDMENT (PA11-0013) TO THE CITY OF MORENO VALLEY MUNICIPAL CODE TITLE 9 TO ADD ENERGY EFFICIENCY MEASURES EQUAL TO AND ABOVE THE CURRENT 2011 CALIFORNIA GREEN BUILDING CODE STANDARDS ("REACH CODES"), INCLUDING MODIFICATION OF SECTION 9.05.040 "INDUSTRIAL SITE DEVELOPMENT STANDARDS, SECTION 9.17.030, "LANDSCAPE AND IRRIGATION DESIGN, SECTION 9.11.040 "OFF STREET PARKING REQUIRMENTS", SECTION 9.03.040 "RESIDENTIAL SITE DEVELOPMENT STANDARDS", SECTION 8.80.020 "WASTE DIVERSION REQUIRMENTS, AND SECTION 8.80.030, "WASTE MANAGEMENT PLAN"

The amendment would modify current Municipal Code Title 9 provisions for orientation of residential tract buildings, landscape design, carpool/ vanpool parking, solar energy and items associated with energy efficiency and Reach Codes citywide.

The Planning Commission may consider any appropriate modifications or alternatives to the amendment or environmental determination. The amendment is exempt under California Environmental Quality Act Guidelines Section 15061 in that there is no possibility that the proposed activity may have potential for a significant impact upon the environment.

Any person interested in the proposed project may contact Mark Gross at (951) 413-3215 or at the Community and Economic Development Department at 14177 Frederick Street, Moreno Valley, California, during normal business hours (7:30 a.m. to 5:30 p.m., Monday – Thursday).

If you challenge any of these items in court, you may be limited to raising only those issues you or someone else raised at the Public Hearing described in this notice, or in written correspondence delivered to the Planning Commission on or before the following meeting date:

Thursday, July 12, 2012
7:00 P.M.
City Council Chamber
14177 Frederick Street.
Moreno Valley, CA 92552-0805

ATTACHMENT 1

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CA Statewide Codes and Standards Program
Title 24 Local Energy Efficiency Ordinances

Title:
Climate Zone 10
Energy Cost-Effectiveness Study

Prepared for:
Ron Gorman
Program Manager
EE Codes and Standards
The Sempra Utilities
213.244.5366
Email ragorman@semprautilities.com

Prepared by:
Michael Gabel
Gabel Associates, LLC
510.428.0803
Email: mike@gabelenergy.com

Last Modified: November 1, 2010

LEGAL NOTICE

This report was prepared by The Sempra Utilities and funded by the California utility customers under the auspices of the California Public Utilities Commission.

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Table of Contents

1.0 Executive Summary

Public Resources Code Section 25402.1(h)2 and Section 10-106 of the Building Energy Efficiency Standards (Standards) establish a process which allows local adoption of energy standards that are more stringent than the statewide Standards. This process allows local governments to adopt and enforce energy standards before the statewide Standards effective date, require additional energy conservation measures, and/or set more stringent energy budgets. Because these energy standards "reach" beyond the minimum requirements of Title 24, Part 6 of the California Building Code, they are commonly referred to as Reach Codes when adopted as a collective set by a local jurisdiction.

The process for adopting a Reach Code requires that local governments apply to the California Energy Commission (CEC) for approval. The applicant jurisdiction must document the supporting analysis for determining that the proposed Reach Code Standards will save more energy than the current statewide Standards. The applicant jurisdiction must also prepare a **Cost Effectiveness Study** that provides the basis of the local government's determination that the proposed Reach Code Standards are cost-effective. Once the CEC staff has verified that the local Reach Code Standards will require buildings to use no more energy than the current statewide Standards and that the documentation requirements in Section 10-106 are met, the application is brought before the full California Energy Commission for approval.

This Cost Effectiveness Study was prepared for Climate Zone 10 which encompasses many cities and towns such as Alpine, Chino Hills, Corona, Cucamonga, El Cajon, Escondido, Hemet, Loma Linda, Ontario, Riverside, San Bernardino, San Jacinto, San Marcos, Temecula and Upland (see Appendix "A" for list of local jurisdictions). The 2008 Building Energy Efficiency Standards, effective January 1, 2010, have been used as the baseline used in calculating the energy performance of efficiency measures summarized in this study.

2.0 Methodology and Assumptions

The energy performance impacts of exceeding the performance requirements of the 2008 Title 24 Building Energy Efficiency Standards have been evaluated in Climate Zone 10 using the following residential and nonresidential prototypical building types:

Small Single Family House 2-story 2,025 sf	**Large Single Family House** 2-story 4,500 sf
Low-rise Multi-family Apartments 8 dwelling units/2-story 8,442 sf	**High-rise Multi-family Apartments** 40 dwelling units/4-story 36,800 sf
Low-rise Office Building 1-story 10,580 sf	**High-rise Office Building** 5-story 52,900 sf

Methodology

The methodology used in the case studies is based on a design process for each of the proposed prototypical building types that first meets the minimum requirements and then exceeds the 2008 Standards by 15%. The process includes the following major stages:

Stage 1: Minimum Compliance with 2008 Standards:

Each prototype building design is tested for minimum compliance with the 2008 Standards, and the mix of energy measures are adjusted using common construction options so the building first just meets the Standards. The set of energy measures chosen represent a reasonable combination which reflects how designers, builders and developers are likely to achieve a specified level of performance using a relatively low first incremental (additional) cost.

Stage 2: Incremental Cost for Exceeding 2008 Standards by 15%:

Starting with that set of measures which is minimally compliant with the 2008 Standards, various energy measures are upgraded so that the building just exceeds the 2008 Standards by 15%. The design choices by the consultant authoring this study are based on many years of experience with architects, builders, mechanical engineers; and general knowledge of the relative acceptance and preferences of many measures, as well as their incremental costs. This approach tends to reflect how building energy performance is typically evaluated for code compliance and how it's used to select design energy efficiency measures. Note that lowest simple payback with respect to building site energy is not the primary focus of selecting measures; but rather the requisite reduction of Title 24 Time Dependent Valuation (TDV) energy at a reasonable incremental cost consistent with other non-monetary but important design considerations. A minimum and

maximum range of incremental costs of added energy efficiency measures is established by a variety of research means. A construction cost estimator, Building Advisory LLC, was contracted to conduct research to obtain current measure cost information for several energy measures; and Gabel Associates performed its own additional research to establish first cost data.

Stage 3 Cost Effectiveness Determination:

Energy savings in kWh and therms is calculated from the Title 24 simulation results to establish the annual energy cost savings and CO2-equivalent reductions in greenhouse gases. A simple payback analysis in years is calculated by dividing the incremental cost for exceeding the 2008 Standards by the estimated annual energy cost savings.

Assumptions

Annual Energy Cost Savings

1. Annual site electricity (kWh) and natural gas (therms) saved for low-rise residential buildings are calculated using the state- approved energy compliance software for the 2008 Building Energy Efficiency Standards, Micropas 8; and for high-rise residential and nonresidential buildings using the state-approved 2008 energy compliance software EnergyPro v5.0.

2. Average residential utility rates of $0.159/kWh for electricity and $0.94/therm for natural gas in current constant dollars; nonresidential rates are time-of-use rate schedules modeled explicitly in the DOE-2.1E computer simulation: Southern California Edison GS-1 schedule for electricity and Southern California Gas GN-10 schedule for natural gas.

3. No change (i.e., no inflation or deflation) of utility rates in constant dollars

4. No increase in summer temperatures from global climate change

Simple Payback Analysis

1. No external cost of global climate change -- and corresponding value of additional investment in energy efficiency and CO_2 reduction – is included.

2. The cost of money (e.g., opportunity cost) invested in the incremental cost of energy efficiency measures is not included.

3.0 Minimum Compliance with 2008 Standards

The following energy design descriptions of t he following building prototypes just meet the 2008 Standards in Climate Zone 10.

Small Single Family House

- 2,025 square feet
- 2-story
- 20.2% glazing/floor area ratio

Energy Efficiency Measures
R-30 Roof w/ Radiant Barrier
R-13 Walls
R-19 Raised Floor over Garage/Open at 2nd Floor
R-0 Slab on Grade
Low E2 Vinyl Windows, U=0.36, SHGC=0.30
Furnace: 80% AFUE
Air Conditioner: 13 SEER, 11 EER (HERS)
Air Conditioner: Refrigerant Charge (HERS)
R-6 Attic Ducts
50 Gallon Gas Water Heater: EF=0.60

Large Single Family House

- 4,500 square feet
- 2-story
- 22.0% glazing/floor area ratio

Energy Efficiency Measures
R-38 Roof w/ Radiant Barrier
R-13 Walls
R-19 Raised Floor
Low E2 Vinyl Windows, U=0.36, SHGC=0.30
(2) Furnaces: 80% AFUE
(2) Air Conditioners: 13 SEER, 11 EER (HERS)
(2) Air Conditioners: Refrigerant Charge (HERS)
R-6 Attic Ducts
Reduced Duct Leakage/Testing (HERS)
(2) 50 Gallon Gas Water Heaters: EF=0.61

Low-rise Multi-family Apartments

- 8,442 square feet
- 8 units/2-story
- 12.5% glazing/floor area ratio

Energy Efficiency Measures
R-38 Roof w/ Radiant Barrier
R-13 Walls
R-0 Slab on Grade
Low E2 Vinyl Windows, U=0.36, SHGC=0.30
(8) Furnaces: 80% AFUE
(8) Air Conditioner: 13 SEER, 11 EER (HERS)
(8) Air Conditioners: Refrigerant Charge (HERS)
R-8 Attic Ducts
(8) 40 Gallon Gas Water Heaters: EF=0.63

High-rise Multifamily Apartments

- 36,800 sf,
- 40 units
- 4-story
- Window to Wall Ratio = 35.2%

Energy Efficiency Measures to Meet Title 24
R-19 under Metal Deck + R-4 (1" rigid); with Cool Roof, Aged Reflectance = 0.55, Thermal Emmittance = 0.75
R-19 in Metal Frame Walls
R-4 (1.25" K-13 spray-on) Raised Slab over parking garage
Dual Metal Windows: default U-factor=0.79, SHGC=0.79
4-pipe fan coil, 84% AFUE boiler, 80-ton scroll air cooled chiller 0.79 KW/ton
Central DHW boiler: 84% AFUE and recirculating system w/ timer-temperature controls

Low-rise Office Building

- Single Story
- 10,580 sf,
- Window to Wall Ratio = 37.1%

Energy Efficiency Measures to Meet Title 24
R-19 under Metal Deck + R-5 (1" rigid); with Cool Roof, Aged Reflectance = 0.55, Emmittance = 0.75
R-19 in Metal Frame Walls
R-0 (un-insulated) slab-on-grade 1st floor
Metal windows: Glazing COG=0.30, COG SHGC=0.38
Lighting = 0.858 w/sf: Open Office Areas: (60) 2-lamp T8 fixtures @58w each; (24) 18w recessed CFLs no lighting controls. Small Offices: (48) 2-lamp T8 fixtures; (40) 18w recessed CFLs, on/off lighting controls. Support Areas: (32) 18w recessed CFLs; (48) 13w CFL wall sconces; no controls.
(3) 10-ton DX units EER=11.0; 80% AFUE furnaces; standard efficiency fan motors; fixed temp. integrated air economizers
R-6 duct insulation w/ ducts on roof, HERS verified duct leakage
(1) Tank Gas Water Heaters EF=0.575

High-rise Office Building

- 5-story
- 52,900 sf,
- Window to Wall Ratio = 39.4%

Energy Efficiency Measures to Meet Title 24
R-19 under Metal Deck + R-5 (1" rigid); with Cool Roof Reflectance = 0.55, Emmittance = 0.75
R-19 in Metal Frame Walls
R-0 (un-insulated) slab-on-grade 1st floor
Metal windows: COG U=0.30, COG SHGC=0.38
Lighting = 0.858 w/sf: Open Office Areas: (300) 2-lamp T8 fixtures @58w each; no lighting controls; (120) 18w recessed CFLs no lighting controls. Small Offices: (280) 2-lamp T8 fixtures on/off lighting controls; (200) 18w recessed CFLs no on/off lighting controls. Support Areas: (160) 18w recessed CFLs no lighting controls; (240) 13w CFL wall sconces; no lighting controls.
(5) 35-ton Packaged VAV EER=10.0; 81% TE furnaces; standard efficiency variable speed fan motors; Fixed temp. air economizers; 20% VAV boxes, reheat on perimeter zones with hot water using 90% AFUE boiler
R-6 duct insulation w/ ducts in conditioned
Boiler 90% AFUE

3.0 Incremental Cost to Exceed 2008 Standards by 15%

The following tables list the energy features and/or equipment included in the 2008 Standards base design, the efficient measure options, and an estimate of the incremental cost for each measure included **to improve the building performance to use 15% less TDV energy than the corresponding Title 24 base case design**.

Small Single Family House

- 2,025 square feet
- 2-story
- 20.2% glazing/floor area ratio

Incremental Cost Estimate to Exceed Title 24 by 15%

Single Family Prototype: 2,025 SF, Option 1 **2025 sf** **Climate Zone 10**

Energy Efficiency Measures	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 Roof w/ Radiant Barrier (from R-30 w/Radiant Barrier): 1,443 sf @ 0.25 to 0.35/sf	Downgrade	$ (505)	$ (361)	$ (433)
R-19 Walls (from R-13): 2,550 sf @$0.31 to $0.54/sf	Upgrade	$ 791	$ 1,377	$ 1,084
R-19 Raised Floor over Garage/Open at 2nd Floor	-	$ -	$ -	$ -
R-0 Slab on Grade	-	$ -	$ -	$ -
Low E2 Vinyl Windows, U=0.36, SHGC=0.30	-	$ -	$ -	$ -
Furnace: 80% AFUE	-	$ -	$ -	$ -
Air Conditioner: 13 SEER, 11 EER (HERS)	-	$ -	$ -	$ -
Air Conditioner: Refrig. Charge (HERS)	-	$ -	$ -	$ -
R-4.2 Attic Ducts (from R-6)	Downgrade	$ (325)	$ (225)	$ (275)
Reduced Duct Leakage/Testing (HERS)	Upgrade	$ 300	$ 600	$ 450
50 Gallon Gas Water Heater: EF=0.59 (from EF=0.60)	Downgrade	$ (100)	$ (50)	$ (75)
Total Incremental Cost of Energy Efficiency Measures:		**$ 160**	**$ 1,341**	**$ 751**
Total Incremental Cost per Square Foot:		**$ 0.08**	**$ 0.66**	**$ 0.37**

Incremental Cost Estimate to Exceed Title 24 by 15%

Single Family Prototype: 2,025 SF, Option 2 **2025 sf** **Climate Zone 10**

Energy Efficiency Measures	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-38 Roof w/ Radiant Barrier (from R-30 w/Radiant Barrier): 1,443 sf @ 0.15 to 0.20/sf	Upgrade	$ 216	$ 289	$ 253
R-21 Walls (from R-13): 2,550 sf @ $0.45 to $0.70/sf	Upgrade	$ 1,148	$ 1,785	$ 1,466
R-19 Raised Floor over Garage/Open at 2nd Floor	-	$ -	$ -	$ -
R-0 Slab on Grade	-	$ -	$ -	$ -
Low E2 Vinyl Windows, U=0.36, SHGC=0.30	-	$ -	$ -	$ -
Furnace: 80% AFUE	-	$ -	$ -	$ -
Air Conditioner: 13 SEER, 11 EER (HERS)	-	$ -	$ -	$ -
Air Conditioner: Refrig. Charge (HERS)	-	$ -	$ -	$ -
R-6 Attic Ducts	-	$ -	$ -	$ -
50 Gallon Gas Water Heater: EF=0.59 (from EF=0.60)	Downgrade	$ (100)	$ (50)	$ (75)
Total Incremental Cost of Energy Efficiency Measures:		**$ 1,264**	**$ 2,024**	**$ 1,644**
Total Incremental Cost per Square Foot:		**$ 0.62**	**$ 1.00**	**$ 0.81**

Incremental Cost Estimate to Exceed Title 24 by 15%

Single Family Prototype: 2,025 SF, Option 3 **2025 sf** **Climate Zone 10**

Energy Efficiency Measures	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-38 Roof w/ Radiant Barrier (from R-30 w/Radiant Barrier): 1,443 sf @ 0.15 to 0.20/sf	Upgrade	$ 216	$ 289	$ 253
R-13 Walls		$ -	$ -	$ -
R-19 Raised Floor over Garage/Open at 2nd Floor	-	$ -	$ -	$ -
R-0 Slab on Grade	-	$ -	$ -	$ -
Low E2 Vinyl Windows, U=0.36, SHGC=0.30	-	$ -	$ -	$ -
Furnace: 80% AFUE	-	$ -	$ -	$ -
Air Conditioning: 15 SEER, 12 EER (HERS) (from 13 SEER, 11 EER)	Upgrade	$ 500	$ 1,500	$ 1,000
Air Conditioner: Refrig. Charge (HERS)	-	$ -	$ -	$ -
R-8 Attic Ducts (from R-6)	Upgrade	$ 225	$ 325	$ 275
Reduced Duct Leakage/Testing (HERS)	Upgrade	$ 300	$ 600	$ 450
50 Gallon Gas Water Heater: EF=0.61(from EF=0.60)	Upgrade	$ 50	$ 100	$ 75
Total Incremental Cost of Energy Efficiency Measures:		**$ 1,291**	**$ 2,814**	**$ 2,053**
Total Incremental Cost per Square Foot:		**$ 0.64**	**$ 1.39**	**$ 1.01**

Incremental Cost Estimate to Exceed Title 24 by 15%

Single Family Prototype: 2,025 SF, Option 4 **2025 sf** **Climate Zone 10**

Energy Efficiency Measures	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-38 Roof w/ Radiant Barrier (from R-30 w/Radiant Barrier): 1,443 sf @ 0.15 to 0.20/sf	Upgrade	$ 216	$ 289	$ 253
R-15 Walls (from R-13): 2,550 sf @$0.14 to $0.18/sf	Upgrade	$ 357	$ 459	$ 408
R-30 Raised Floor over Garage/Open at 2nd Floor (from R-19): 448 sf @ $0.25 to $0.35	Upgrade	$ 112	$ 157	$ 134
R-0 Slab on Grade	-	$ -	$ -	$ -
Low E2 Vinyl Windows, U=0.36, SHGC=0.30	-	$ -	$ -	$ -
Furnace: 80% AFUE	-	$ -	$ -	$ -
Air Conditioner: 13 SEER, 11 EER (HERS)	-	$ -	$ -	$ -
Air Conditioner: Refrig. Charge (HERS)	-	$ -	$ -	$ -
R-8 Attic Ducts (from R-6)	Upgrade	$ 225	$ 325	$ 275
Reduced Duct Leakage/Testing (HERS)	Upgrade	$ 300	$ 600	$ 450
50 Gallon Gas Water Heater: EF=0.62 (from EF=0.60)	Upgrade	$ 100	$ 200	$ 150
Total Incremental Cost of Energy Efficiency Measures:		**$ 1,310**	**$ 2,029**	**$ 1,670**
Total Incremental Cost per Square Foot:		**$ 0.65**	**$ 1.00**	**$ 0.82**

Large Single Family House

- 4,500 square feet
- 2-story
- 22.0% glazing/floor area ratio

Incremental Cost Estimate to Exceed Title 24 by 15%

Single Family Prototype: 4,500 SF, Option 1 **4500 sf** **Climate Zone 10**

Energy Efficiency Measures	Change	Incremental Cost Estimate		
R-38 Roof w/ Radiant Barrier	-	$ -	$ -	$ -
R-19 Walls (from R-13): 2,518 sf @ $0.31 to $0.54/sf	Upgrade	$ 781	$ 1,360	$ 1,070
R-19 Raised Floor	-	$ -	$ -	$ -
Low E2 Vinyl Windows, U=0.36, SHGC=0.30	-	$ -	$ -	$ -
(2) Furnaces: 80% AFUE	-	$ -	$ -	$ -
(2) Air Conditioners: 13 SEER, 11 EER (HERS)	-	$ -	$ -	$ -
(2) Air Conditioner: Refrig. Charge (HERS)	-	$ -	$ -	$ -
R-6 Attic Ducts	-	$ -	$ -	$ -
Reduced Duct Leakage/Testing (HERS)	-	$ -	$ -	$ -
(2) Instantaneous Gas Water Heaters: RE=0.80 (from 50 Gal Gas: EF=0.61)	Upgrade	$ 1,900	$ 3,200	$ 2,550
Pipe Insulation	Upgrade	$ 300	$ 400	$ 350
Total Incremental Cost of Energy Efficiency Measures:		**$ 2,981**	**$ 4,960**	**$ 3,970**
Total Incremental Cost per Square Foot:		**$ 0.66**	**$ 1.10**	**$ 0.88**

Incremental Cost Estimate to Exceed Title 24 by 15%

Single Family Prototype: 4,500 SF, Option 2 **4500 sf** **Climate Zone 10**

Energy Efficiency Measures	Change	Incremental Cost Estimate		
R-38 Roof w/ Radiant Barrier	-	$ -	$ -	$ -
R-21 Walls (from R-13): 2,518 sf @ $0.45 to $0.70/sf	Upgrade	$ 1,133	$ 1,763	$ 1,448
R-30 Raised Floor (from R-19): 2,700 sf @ $0.25 to $0.35	Upgrade	$ 675	$ 945	$ 810
Low E2 Vinyl Windows, U=0.36, SHGC=0.30	-	$ -	$ -	$ -
(2) Furnaces: 92% AFUE (from 80% AFUE)	Upgrade	$ 1,000	$ 2,400	$ 1,700
(2) Air Conditioners: 13 SEER, 11 EER (HERS)	-	$ -	$ -	$ -
(2) Air Conditioner: Refrig. Charge (HERS)	-	$ -	$ -	$ -
R-8 Attic Ducts (from R-6)	Upgrade	$ 450	$ 650	$ 550
Reduced Duct Leakage/Testing (HERS)	-	$ -	$ -	$ -
(2) 50 Gallon Gas Water Heaters: EF=0.63 (from EF=0.61)	Upgrade	$ 100	$ 300	$ 200
Total Incremental Cost of Energy Efficiency Measures:		**$ 3,358**	**$ 6,058**	**$ 4,708**
Total Incremental Cost per Square Foot:		**$ 0.75**	**$ 1.35**	**$ 1.05**

Incremental Cost Estimate to Exceed Title 24 by 15%

Single Family Prototype: 4,500 SF, Option 3 **4500 sf** **Climate Zone 10**

Energy Efficiency Measures	Change	Incremental Cost Estimate		
R-38 Roof w/ Radiant Barrier	-	$ -	$ -	$ -
R-19 Walls (from R-13): 2,518 sf @ $0.31 to $0.54/sf	Upgrade	$ 781	$ 1,360	$ 1,070
R-19 Raised Floor	-	$ -	$ -	$ -
Low E2 Vinyl Windows, U=0.36, SHGC=0.30	-	$ -	$ -	$ -
(2) Furnaces: 80% AFUE	-	$ -	$ -	$ -
(2) Air Conditioners: 15 SEER, 12 EER (HERS) (from 13 SEER, 11 EER)	Upgrade	$ 1,000	$ 3,000	$ 2,000
(2) Air Conditioner: Refrig. Charge (HERS)	-	$ -	$ -	$ -
R-8 Attic Ducts (from R-6)	Upgrade	$ 450	$ 650	$ 550
Reduced Duct Leakage/Testing (HERS)	-	$ -	$ -	$ -
(2) 50 Gallon Gas Water Heaters: EF=0.62 (from EF=0.61)	Upgrade	$ 100	$ 200	$ 150
Total Incremental Cost of Energy Efficiency Measures:		**$ 2,331**	**$ 5,210**	**$ 3,770**
Total Incremental Cost per Square Foot:		**$ 0.52**	**$ 1.16**	**$ 0.84**

Low-rise Multi-family Apartments

- 8,442 square feet
- 8 units/2-story
- 12.5% glazing/floor area ratio

Incremental Cost Estimate to Exceed Title 24 by 15%
Multi-Family Prototype: 8,442 SF, Option 1 **8442 sf** **Climate Zone 10**

Energy Efficiency Measures	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-30 Roof w/ Radiant Barrier (from R-38 w/Radiant Barrier): 4,221 sf @ $0.15 to $0.20/sf	Downgrade	$ (844)	$ (633)	$ (739)
R-19 Walls (from R-13): 10,146 sf @ $0.31 to $0.54/sf	Upgrade	$ 3,145	$ 5,479	$ 4,312
R-0 Slab on Grade	-	$ -	$ -	$ -
Low E2 Vinyl, U=0.36, SHGC=0.30	-	$ -	$ -	$ -
(8) Furnaces: 80% AFUE	-	$ -	$ -	$ -
(8) Air Conditioners: 13 SEER, 11 EER (HERS)	-	$ -	$ -	$ -
(8) Air Conditioner: Refrig. Charge (HERS)	-	$ -	$ -	$ -
Reduced Duct Leakage/Testing (HERS)	Upgrade	$ 2,400	$ 4,800	$ 3,600
R-4.2 Attic Ducts (from R-8)	Downgrade	$ (3,000)	$ (2,000)	$ (2,500)
(8) 40 Gallon Gas Water Heaters: EF=0.62 (from EF=0.63)	Downgrade	$ (400)	$ -	$ (200)
Total Incremental Cost of Energy Efficiency Measures:		**$ 1,301**	**$ 7,646**	**$ 4,473**
Total Incremental Cost per Square Foot:		**$ 0.15**	**$ 0.91**	**$ 0.53**

Incremental Cost Estimate to Exceed Title 24 by 15%
Multi-Family Prototype: 8,442 SF, Option 2 **8442 sf** **Climate Zone 10**

Energy Efficiency Measures	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-30 Roof w/ Radiant Barrier (from R-38 w/Radiant Barrier): 4,221 sf @ $0.15 to $0.20/sf	Downgrade	$ (844)	$ (633)	$ (739)
R-21 Walls (from R-13): 10,146 sf @ $0.45 to $0.70/sf	Upgrade	$ 4,566	$ 7,102	$ 5,834
R-0 Slab on Grade	-	$ -	$ -	$ -
Super Low E Vinyl Windows, U=0.36, SHGC=0.23 (from Low E2, U=0.36, SHGC=0.30): 1055 sf @ $1.40 - $1.75 / sf	Upgrade	$ 1,477	$ 1,846	$ 1,662
(8) Furnaces: 80% AFUE	-	$ -	$ -	$ -
(8) Air Conditioners: 13 SEER, 11 EER (HERS)	-	$ -	$ -	$ -
(8) Air Conditioner: Refrig. Charge (HERS)	-	$ -	$ -	$ -
R-6 Attic Ducts (from R-8)	Downgrade	$ (1,600)	$ (1,000)	$ (1,300)
(8) 40 Gallon Gas Water Heaters: EF=0.63	-	$ -	$ -	$ -
Total Incremental Cost of Energy Efficiency Measures:		**$ 3,599**	**$ 7,315**	**$ 5,457**
Total Incremental Cost per Square Foot:		**$ 0.43**	**$ 0.87**	**$ 0.65**

Incremental Cost Estimate to Exceed Title 24 by 15%
Multi-Family Prototype: 8,442 SF, Option 3 **8442 sf** **Climate Zone 10**

Energy Efficiency Measures	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 Roof w/ Radiant Barrier (from R-38 w/Radiant Barrier): 4,221 sf @ 0.30 to 0.45/sf	Downgrade	$ (1,899)	$ (1,266)	$ (1,583)
R-21 Walls (from R-13): 10,146 sf @ $0.45 to $0.70/sf	Upgrade	$ 4,566	$ 7,102	$ 5,834
R-0 Slab on Grade	-	$ -	$ -	$ -
Low E2 Vinyl, U=0.36, SHGC=0.30	-	$ -	$ -	$ -
(8) Furnaces: 80% AFUE	-	$ -	$ -	$ -
(8) Air Conditioners: 13 SEER, 11 EER (HERS)	-	$ -	$ -	$ -
(8) Air Conditioner: Refrig. Charge (HERS)	-	$ -	$ -	$ -
Reduced Duct Leakage/Testing (HERS)	Upgrade	$ 2,400	$ 4,800	$ 3,600
R-4.2 Attic Ducts (from R-8)	Downgrade	$ (3,000)	$ (2,000)	$ (2,500)
(8) 40 Gallon Gas Water Heaters: EF=0.61 (from EF=0.63)	Downgrade	$ (1,200)	$ (400)	$ (800)
Total Incremental Cost of Energy Efficiency Measures:		**$ 866**	**$ 8,236**	**$ 4,551**
Total Incremental Cost per Square Foot:		**$ 0.10**	**$ 0.98**	**$ 0.54**

High-rise Multifamily Apartments

- 36,800 sf,
- 40 units/4-story
- Window to Wall Ratio = 35.2%

Incremental Cost Estimate to Exceed Title 24 by 15%
High-rise Residential Prototype: 36,800 SF, Option 1 **Climate Zone 10**

Energy Efficiency Measures to Exceed Title 24 by 15%	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 under Metal Deck + **R-5** (1" rigid); w/ Cool Roof Aged **Reflectance = 0.81, Emittance = 0.89**; 9,200 sf @ $0.50 to $0.70/sf	Upgrade	$ 4,600	$ 6,440	$ 5,520
R-19 in Metal Frame Walls	-	$ -	$ -	$ -
R-4 (1.25" K-13 spray-on) Raised Slab over parking garage	-	$ -	$ -	$ -
Dual Metal Windows: **COG U-factor=0.3, COG SHGC=0.27;** 6,240 sf @ $2.50 to $4.00/sf	Upgrade	$ 15,600	$ 24,960	$ 20,280
4-pipe fan coil, 84% AFUE boiler, 80-ton scroll air cooled chiller 0.79 KW/ton	-	$ -	$ -	$ -
Central DHW boiler: 84% AFUE and recirculating system w/ timer-temperature controls	-	$ -	$ -	$ -
Total Incremental Cost of Energy Efficiency Measures:		**$ 20,200**	**$ 31,400**	**$ 25,800**
Total Incremental Cost per Square Foot:		**$ 0.55**	**$ 0.85**	**$ 0.70**

Incremental Cost Estimate to Exceed Title 24 by 15%
High-rise Residential Prototype: 36,800 SF, Option 2 **Climate Zone 10**

Energy Efficiency Measures to Exceed Title 24 by 15%	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 under Metal Deck + R-4 (1" rigid); with Cool Roof, Aged Reflectance = 0.55, Emmittance = 0.75	-	$ -	$ -	$ -
R-19 in Metal Frame Walls	-	$ -	$ -	$ -
R-4 (1.25" K-13 spray-on) Raised Slab over parking garage	-	$ -	$ -	$ -
Dual Metal Windows: **COG U-factor=0.3, COG SHGC=0.38;** 6,240 sf @ $2.00 to $3.50/sf	Upgrade	$ 12,480	$ 21,840	$ 17,160
4-pipe fan coil, **90% AFUE boiler,** 80-ton scroll air cooled chiller 0.79 KW/ton	Upgrade	$ 1,250	$ 2,000	$ 1,625
Central DHW boiler: **90% AFUE** and recirculating system w/ timer-temperature controls	Upgrade	$ 1,250	$ 2,000	$ 1,625
Total Incremental Cost of Energy Efficiency Measures:		**$ 14,980**	**$ 25,840**	**$ 20,410**
Total Incremental Cost per Square Foot:		**$ 0.41**	**$ 0.70**	**$ 0.55**

Incremental Cost Estimate to Exceed Title 24 by 15%
High-rise Residential Prototype: 36,800 SF, Option 3 **Climate Zone 10**

Energy Efficiency Measures to Exceed Title 24 by 15%	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 Metal Roof w/ **R-10 (2")** rigid insulation; no Cool Roof; 9,200 sf @ $0.75 - $1.00/sf	Up/Downgrad	$ 6,900	$ 9,200	$ 8,050
R-19 in Metal Frame Walls	-	$ -	$ -	$ -
R-4 (1.25" K-13 spray-on) Raised Slab over parking garage	-	$ -	$ -	$ -
Dual Metal Windows: **COG U-factor=0.3, COG SHGC=0.38;** 6,240 sf @ $2.00 to $3.50/sf	Upgrade	$ 12,480	$ 21,840	$ 17,160
4-pipe fan coil, **94% AFUE boiler,** 80-ton scroll air cooled chiller 0.79 KW/ton	Upgrade	$ 2,000	$ 3,000	$ 2,500
Central DHW boiler: **94% AFUE** and recirculating system w/ timer-temperature controls	Upgrade	$ 2,000	$ 3,000	$ 2,500
Total Incremental Cost of Energy Efficiency Measures:		**$ 23,380**	**$ 37,040**	**$ 30,210**
Total Incremental Cost per Square Foot:		**$ 0.64**	**$ 1.01**	**$ 0.82**

Low-rise Office Building

- Single Story
- 10,580 sf,
- Window to Wall Ratio = 37.1%

Incremental Cost Estimate to Exceed Title 24 by 15%
Nonresidential Prototype: 10,580 SF, Option 1 **Climate Zone 10**

Energy Efficiency Measures to Exceed Title 24 by 15%	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 under Metal Deck + **R-10 (2" rigid)**; Cool Roof **Reflectance=0.81, Emittance=0.89**; 10,580 sf @ $1.10 to $1.50/sf	Upgrade	$ 11,638	$ 15,870	$ 13,754
R-19 in Metal Frame Walls	-	$ -	$ -	$ -
R-0 (un-insulated) slab-on-grade 1st floor	-	$ -	$ -	$ -
Metal windows: COG U=0.30, **COG SHGC=0.31;** 3,200 sf @ $0.50 to $1.00/sf	Upgrade	$ 1,600	$ 3,200	$ 2,400
Lighting = 0.858 w/sf: Open Office Areas: (60) 2-lamp T8 fixtures @58w each; (24) 18w recessed CFLs no lighting controls. Small Offices: (48) 2-lamp T8 fixtures; (40) 18w recessed CFLs, on/off lighting controls. Support Areas: (32) 18w recessed CFLs; (48) 13w CFL wall sconces; no controls.	-	$ -	$ -	$ -
(3) 10-ton DX units EER=11.0; 80% AFUE furnaces; standard efficiency fan motors; fixed temp. integrated air economizers, **Cycle on at night with DDC and DCV**	Upgrade	$ 1,200	$ 3,000	$ 2,100
R-6 duct insulation w/ ducts on roof, HERS verified duct leakage	-	$ -	$ -	$ -
(1) Gas Tank Water Heater EF=0.575	-	$ -	$ -	$ -
Total Incremental Cost of Energy Efficiency Measures:		**$ 14,438**	**$ 22,070**	**$ 18,254**
Total Incremental Cost per Square Foot:		**$ 1.36**	**$ 2.09**	**$ 1.73**

Incremental Cost Estimate to Exceed Title 24 by 15%

Nonresidential Prototype: 10,580 SF, Option 2 **Climate Zone 10**

Energy Efficiency Measures to Exceed Title 24 by 15%	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 under Metal Deck + **R-10 (2" rigid)**; Cool Roof Reflectance =**0.81, Emittance = 0.89**; 10,580 sf @ $1.10 to $1.50/sf	Upgrade	$ 11,638	$ 15,870	$ 13,754
R-19 in Metal Frame Walls	-	$ -	$ -	$ -
R-0 (un-insulated) slab-on-grade 1st floor	-	$ -	$ -	$ -
Metal windows: COG U=0.30, **COG SHGC=0.31;** 3,200 sf @ $0.50 to $1.00/sf	Upgrade	$ 1,600	$ 3,200	$ 2,400
Lighting = 0.783 w/sf: Open Office Areas: (60) 2-lamp T8 fixtures @58w each; no lighting controls; (24) 18w recessed CFLs. Small Offices: (56) 2-lamp T8 fixtures, **(28) multi-level ocupancy sensors on T8s @ $75 to $100 each;**; (40) 18w recessed CFLs Support Areas: (32) 18w recessed CFLs; (48) 13w CFL wall sconces; no controls.	Upgrade	$ 2,100	$ 2,800	$ 2,450
(3) 10-ton DX units EER=11.0; 80% AFUE furnaces; standard efficiency fan motors; fixed temp. integrated air economizers, **Cycle on at night**	Upgrade	$ 300	$ 600	$ 450
R-6 duct insulation w/ ducts on roof, HERS verified duct leakage	-	$ -	$ -	$ -
(1) Gas Tank Water Heater EF=0.575	-	$ -	$ -	$ -
Total Incremental Cost of Energy Efficiency Measures:		**$ 15,638**	**$ 22,470**	**$ 19,054**
Total Incremental Cost per Square Foot:		**$ 1.48**	**$ 2.12**	**$ 1.80**

Incremental Cost Estimate to Exceed Title 24 by 15%

Nonresidential Prototype: 10,580 SF, Option 3 **Climate Zone 10**

Energy Efficiency Measures to Exceed Title 24 by 15%	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 under Metal Deck + **R-10 (2" rigid)**; Cool Roof Reflectance =**0.81, Emittance = 0.89**; 10,580 sf @ $1.10 to $1.50/sf	Upgrade	$ 11,638	$ 15,870	$ 13,754
R-19 in Metal Frame Walls	-	$ -	$ -	$ -
R-0 (un-insulated) slab-on-grade 1st floor	-	$ -	$ -	$ -
Metal windows: COG U=0.30, COG SHGC=0.38;	-	$ -	$ -	$ -
Lighting = 0.694 w/sf: Open Office Areas: **(28) 74w 2-lamp T8 fixtures**; no lighting controls; (24) 18w recessed CFLs. Small Offices: (56) 2-lamp T8 fixtures, **(28) multi-level occupancy sensors on T8s @ $75 to $100 each;**; (40) 18w recessed CFLs on/off lighting controls**.** Support Areas: (32) 18w recessed CFLs; (48) 13w CFL wall sconces: no controls.	Upgrade	$ 948	$ 1,520	$ 1,234
(3) 10-ton DX units EER=11.0; 80% AFUE furnaces; standard efficiency fan motors; fixed temp. integrated air economizers, **Cycle on at night**	Upgrade	$ 300	$ 600	$ 450
R-6 duct insulation w/ ducts on roof, HERS verified duct leakage	-	$ -	$ -	$ -
(1)Tank Gas Water Heaters EF=0.575	-	$ -	$ -	$ -
Total Incremental Cost of Energy Efficiency Measures:		**$ 12,886**	**$ 17,990**	**$ 15,438**
Total Incremental Cost per Square Foot:		**$ 1.22**	**$ 1.70**	**$ 1.46**

High-rise Office Building

- 5-story
- 52,900 sf,
- Window to Wall Ratio = 39.4%

Incremental Cost Estimate to Exceed Title 24 by 15%
Nonresidential Prototype: 52,900 SF, Option 1 **Climate Zone 10**

Energy Efficiency Measures to Exceed Title 24 by 15%	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 under Metal Deck + **R-10 (2" rigid)**; Cool Roof Reflectance =0.55, Emittance = 0.75; 10,580 sf @ $0.75 to $1.00/sf	Upgrade	$ 7,935	$ 10,580	$ 9,258
R-19 in Metal Frame Walls	-	$ -	$ -	$ -
R-0 (un-insulated) slab-on-grade 1st floor	-	$ -	$ -	$ -
Metal windows: COG U=0.30, **COG SHGC=0.31**; 12,000 sf @ $1.00 to $1.50/sf	Upgrade	$ 12,000	$ 18,000	$ 15,000
Lighting = 0.65 w/sf: Open Office Areas: **(160) HO 2-lamp T8 fixtures @74w each**; no lighting controls; (120) 18w recessed CFLs no lighting controls. Small Offices: (280) 2-lamp T8 fixtures **multi-level occupancy sensors on T8s @ $75 to $100 each**; (200) 18w recessed CFLs on/off lighting controls. Support Areas: (160) 18w recessed CFLs no lighting controls; (240) 13w CFL wall sconces; no lighting controls.	Upgrade	$ 4,740	$ 7,600	$ 6,170
(5) 35-ton Packaged VAV EER=10.0; 81% TE furnaces; **Premium** efficiency variable speed fan motors; Fixed temp. air economizers; 20% VAV boxes, reheat on perimeter zones with hot water using **98% AFUE** boiler, **Cycle on at night** (full boiler cost listed below)	Upgrade	$ 3,500	$ 6,500	$ 5,000
R-6 duct insulation w/ ducts in conditioned	-	$ -	$ -	$ -
Boiler **98% AFUE with variable speed pump**	Upgrade	$ 6,500	$ 12,000	$ 9,250
Total Incremental Cost of Energy Efficiency Measures:		**$ 34,675**	**$ 54,680**	**$ 44,678**
Total Incremental Cost per Square Foot:		**$ 0.66**	**$ 1.03**	**$ 0.84**

Incremental Cost Estimate to Exceed Title 24 by 15%
Nonresidential Prototype: 52,900 SF, Option 2 **Climate Zone 10**

Energy Efficiency Measures to Exceed Title 24 by 15%	Change Type	Incremental Cost Estimate		
		Min	Max	Avg
R-19 under Metal Deck + **R-10 (2" rigid)**; Cool Roof Reflectance =0.55, Emittance = 0.75; 10,580 sf @ $0.75 to $1.00/sf	Upgrade	$ 7,935	$ 10,580	$ 9,258
R-19 in Metal Frame Walls	-	$ -	$ -	$ -
R-0 (un-insulated) slab-on-grade 1st floor	-	$ -	$ -	$ -
Metal windows: COG U=0.30, **COG SHGC=0.31**; 12,000 sf @ $1.00 to $1.50/sf	Upgrade	$ 12,000	$ 18,000	$ 15,000
Lighting = 0.65 w/sf: Open Office Areas: **(160) HO 2-lamp T8 fixtures @74w each**; no lighting controls; (120) 18w recessed CFLs no lighting controls. Small Offices: (280) 2-lamp T8 fixtures **multi-level occupancy sensors on T8s @ $75 to $100 each**; (200) 18w recessed CFLs on/off lighting controls. Support Areas: (160) 18w recessed CFLs no lighting controls; (240) 13w CFL wall sconces; no lighting controls.	Upgrade	$ 4,740	$ 7,600	$ 6,170
(5) 35-ton Packaged VAV EER=10.0; 81% TE furnaces; **premium** efficiency variable speed fan motors; Fixed temp. air economizers; **15% VAV boxes**, reheat on perimeter zones with hot water using 90% AFUE boiler, **Cycle on at night**	Upgrade	$ 4,816	$ 7,945	$ 6,381
R-6 duct insulation w/ ducts in conditioned	-	$ -	$ -	$ -
Boiler 90% AFUE **with variable speed pump**	Upgrade	$ 1,500	$ 2,000	$ 1,750
Total Incremental Cost of Energy Efficiency Measures:		**$ 30,991**	**$ 46,125**	**$ 38,558**
Total Incremental Cost per Square Foot:		**$ 0.59**	**$ 0.87**	**$ 0.73**

5.0 Cost Effectiveness Determination

Regardless of the building design, occupancy profile and number of stories, the incremental improvement in overall annual energy performance of buildings in exceeding the 2008 Standards is determined to be cost-effective. However, each building's overall design, occupancy type and specific design choices may allow for a large range of incremental costs for exceeding 2008 Standards , estimated annual energy cost savings, and subsequent payback period.

Small Single Family

Building Description	Total Annual KWh Saving	Total Annual Therms Saving	Incremental First Cost ($)	Annual Energy Cost Savings ($)	Simple Payback (Years)
2,025 sf (Option 1)	501	49	$751	$126	6.0
2,025 sf (Option 2)	514	48	$1,644	$127	13.0
2,025 sf (Option 3)	544	39	$2,053	$123	16.7
2,025 sf (Option 4)	457	56	$1,670	$125	13.3
Averages:	504	48	$1,529	$125	12.2

Annual Reduction in CO2-equivalent: ***786 lb./building-year***
0.39 lb./sq.ft.-year

Large Single Family

Building Description	Total Annual KWh Saving	Total Annual Therms Saving	Incremental First Cost ($)	Annual Energy Cost Savings ($)	Simple Payback (Years)
4,500 sf (Option 1)	440	149	$3,971	$210	18.9
4,500 sf (Option 2)	659	105	$4,708	$203	23.1
4,500 sf (Option 3)	945	50	$3,771	$197	19.1
Averages:	681	101	$4,150	$204	20.4

Annual Reduction in CO2-equivalent: ***1,486 lb./building-year***
0.33 lb./sq.ft.-year

Low-rise Multi-family Apartments

Building Description	Total Annual KWh Saving	Total Annual Therms Saving	Incremental First Cost ($)	Annual Energy Cost Savings ($)	Simple Payback (Years)
8-Unit, 8,442 sf (Option 1)	2153	170	$4,474	$502	8.9
8-Unit, 8,442 sf (Option 2)	2466	126	$5,457	$511	10.7
8-Unit, 8,442 sf (Option 3)	2211	145	$4,551	$488	9.3
Averages:	2277	147	$4,827	$500	9.6

Annual Reduction in CO2-equivalent:2,736 lb./building-year
0.32 lb./sq.ft.-year

High-rise Multi-family Apartments

Building Description	Total Annual KWh Saving	Total Annual Therms Saving	Incremental First Cost ($)	Annual Energy Cost Savings ($)	Simple Payback (Years)
36,800 sf (Option 1)	23041	-840	$25,800	$2,874	9.0
36,800 sf (Option 2)	17637	-59	$20,410	$2,749	7.4
36,800 sf (Option 3)	13528	709	$30,210	$2,816	10.7
Averages:	18069	-63	$25,473	$2,813	9.0

Annual Reduction in CO2-equivalent: ***7,394 lb./building-year***
0.20 lb./sq.ft.-year

Low-rise Office Building

Building Description	Total Annual KWh Saving	Total Annual Therms Saving	Incremental First Cost ($)	Annual Energy Cost Savings ($)	Simple Payback (Years)
10,580 sf (Option 1)	6234	75	$18,254	$1,493	12.2
10,580 sf (Option 2)	8437	-44	$19,054	$1,863	10.2
10,580 sf (Option 3)	8554	-7	$15,438	$1,894	8.2
Averages:	7742	8	$17,582	$1,750	10.2

Annual Reduction in CO2-equivalent:3,577 lb./building-year
0.34 lb./sq.ft.-year

High-rise Office Building

Building Description	Total Annual KWh Saving	Total Annual Therms Saving	Incremental First Cost ($)	Annual Energy Cost Savings ($)	Simple Payback (Years)
52,900 sf (Option 1)	18232	-927	$44,678	$1,653	27.0
52,900 sf (Option 2)	12347	-195	$38,558	$3,266	11.8
Averages:	15290	-561	$41,618	$2,460	19.4

Annual Reduction in CO2-equivalent:350 lb./building-year
0.01 lb./sq.ft.-year

Climate Zone 10 Cities

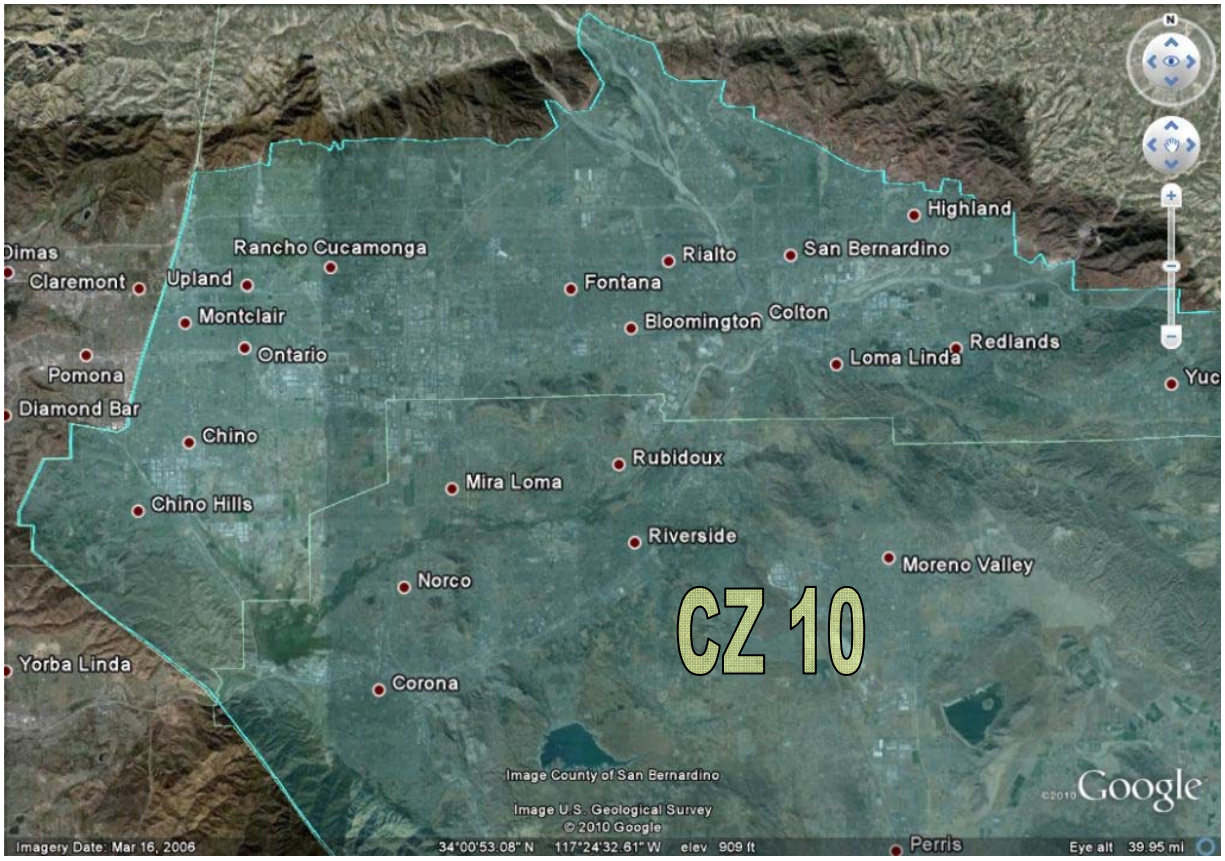
1	Aguanga	41	Hemet
2	Alberhill	42	Henshaw Dam
3	Alpine	43	Highgrove
4	Alta Loma	44	Highland
5	Arlington	45	Home Gardens
6	Barona	46	Homeland
7	Barrett	47	Jamul
8	Barrett	48	Lake Elsinore
9	Beaumont	49	Lake Mathews
10	Bloomington	50	Lake Perris
11	Bonsall	51	Lakeland Village
12	Bostonia	52	Lakeside
13	Calimesa	53	Lakeview
14	Camp Pendleton	54	Loert Otay Reservoir
15	Canyon Lake	55	Loma Linda
16	Casa de Oro, Mount	56	Los Serranos
17	Cherry Valley	57	March A.F.B.
18	Chino	58	Margarita Peak
19	Chino Hills	59	Mentone
20	Colton	60	Mira Loma
21	Corona	61	Montclair
22	Cucamonga	62	Moreno Valley
23	De Luz	63	Murrieta
24	Del Dios	64	Muscoy
25	Devore	65	Norco
26	Dulzura	66	Norton AFB
27	East Hemet	67	Nuevo
28	East Highlands	68	Ontario
29	Edgemont	69	Pala
30	El Cajon	70	Pauma Valley
31	Elsinore	71	Pedley
32	Encanto	72	Perris
33	Escondido	73	Poway Valley
34	Fallbrook	74	Prado Flood Control Basin
35	Fernbrook	75	Quail Valley
36	Fontana	76	Railroad Canyon Reservoir
37	Gillman Hot Springs	77	Rainbow
38	Glen Avon	78	Ramona
39	Grand Terrace	79	Rancho Bernardo
40	Harbinson Canyon	80	Rancho Cucamonga

Only a portion located within Climate Zone 10

Climate Zone 10 Cities (continued)

81 Rancho San Diego
82 Redlands
83 Rialto
84 Riverside
85 Romoland
86 Rubidoux
87 Sage
88 San Bernardino
89 San Diego
90 San Jacinto
91 San Jacinto River
92 San Marcos
93 San Mateo Canyon
94 San Onofre Canyon
95 San Pasqual
96 San Timoteo Canyon
97 San Vicente Reservoir
98 San Ysidro Mountains
99 Santee
100 Spring Valley
101 Sun City
102 Suncrest
103 Sunnymead
104 Sweetwater Reservoir
105 Temecula
106 Temescal Wash
107 Upland
108 Valle Vista
109 Valley Center
110 Wildomar
111 Winchester
112 Woodcrest
113 Yucaipa

Only a portion located within Climate Zone 10


Highland
Rancho Cucamonga
Rialto
San Bernardino
Claremont
Upland
Fontana
Montclair
Bloomington
Colton
Redlands
Ontario
Loma Linda
Pomona
Diamond Bar
Chino
Rubidoux
Mira Loma
Chino Hills
Riverside
Moreno Valley
Norco
CZ 10
Yorba Linda
Corona
Image County of San Bernardino
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34°00'53.08" N 117°24'32.61" W elev 909 ft
Perris
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Moreno Valley
Norco
Corona
Perris
10
San Jacinto
Hemet
Sun City
CZ 10
Lake Elsinore
Rancho Santa Margarita
Wildomar
Murrieta
Image U.S. Geological Survey
Image © 2010 DigitalGlobe
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Temecula
33°43'15.69" N 117°12'25.87" W elev 1492 ft
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Wildomar
Murrieta
Temecula
CZ 10
Fallbrook
Oceanside
Vista
Carlsbad
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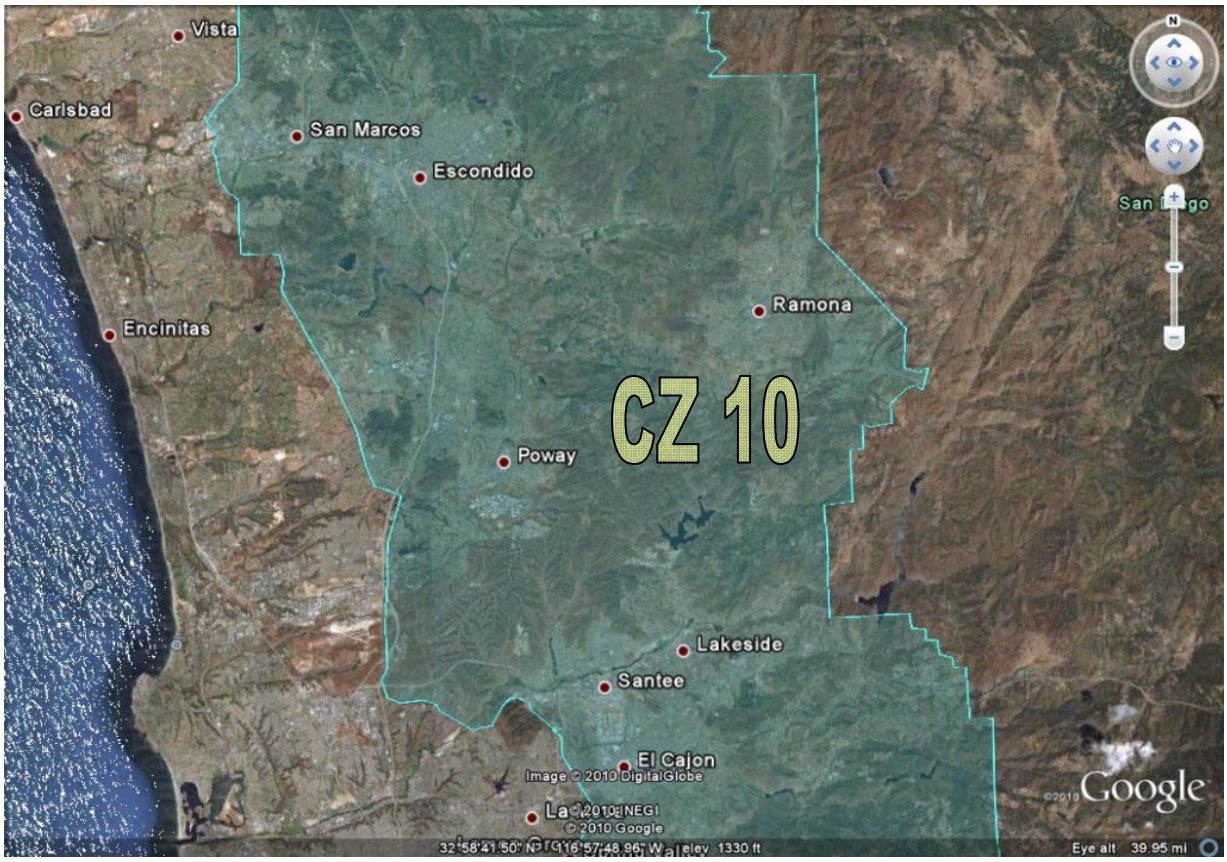
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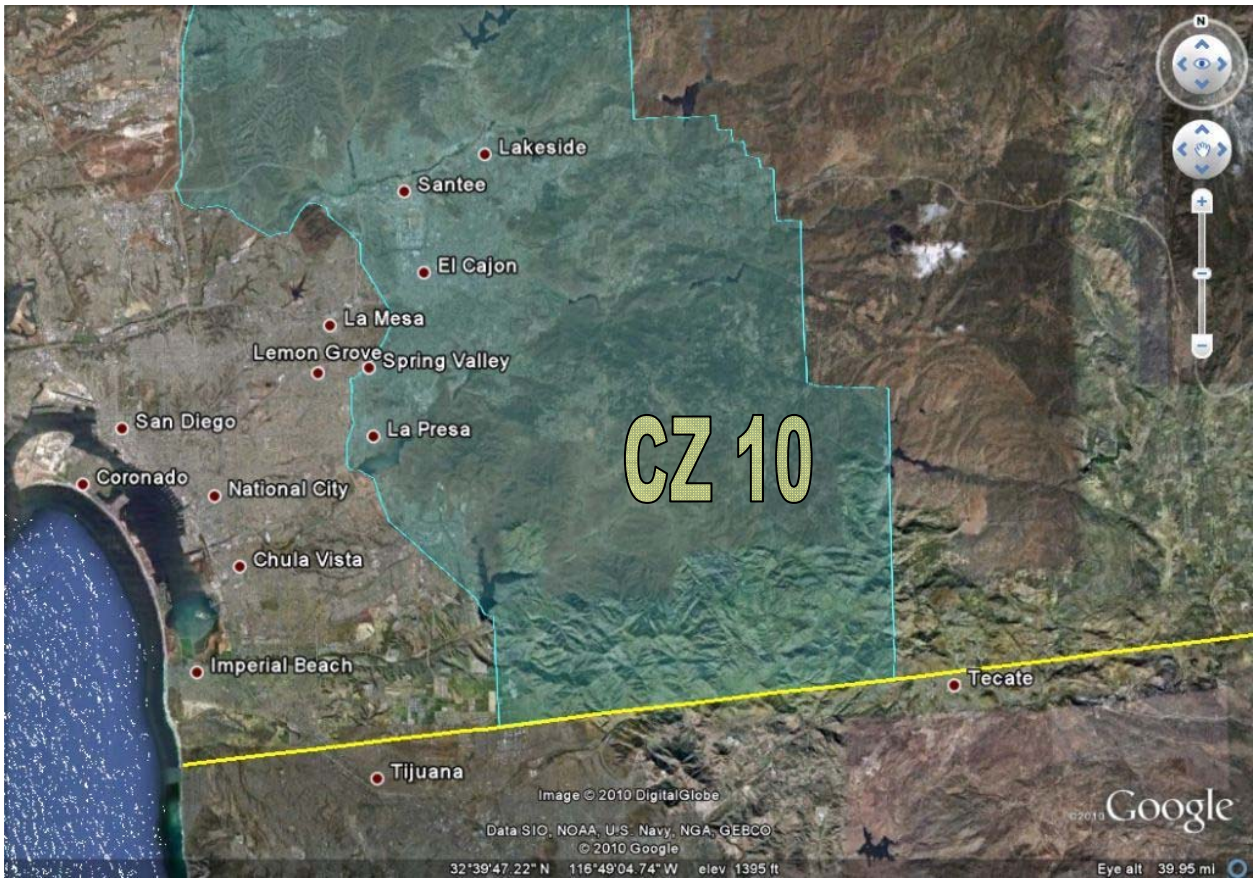
Lakeside
Santee
El Cajon
La Mesa
Lemon Grove
Spring Valley
San Diego
La Presa
CZ 10
Coronado
National City
Chula Vista
Imperial Beach
Tecate
Tijuana
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PLANNING COMMISSION RESOLUTION NO. 2012-13

A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF MORENO VALLEY, CALIFORNIA RECOMMENDING APPROVAL OF PA11-0013 (REACH CODES) TO THE CITY COUNCIL, AMENDING TITLE 9 OF THE MORENO VALLEY MUNICIPAL CODE, TO INCLUDE LOCAL MANDATORY MEASURES TO PROVIDE ENERGY EFFICIENCY EQUAL TO AND ABOVE CURRENT 2011 CALIFORNIA GREEN BUILDING CODE STANDARDS INCLUDING MODIFICATION OF SECTION 9.05.040 "INDUSTRIAL SITE DEVELOPMENT STANDARDS", SECTION 9.17.030, LANDSCAPE AND IRRIGATION DESIGN", SECTION 9.11.040, "OFF STREET PARKING REQUIREMENTS", SECTION 9.03.040, "RESIDENTIAL SITE DEVELOPMENT STANDARDS" SECTION 8.80.020, "DIVERSION REQUIRMENTS", AND SECTION 9.80.030, "WASTE MANAGEMENT PLAN"

WHEREAS, the City of Moreno Valley has filed an application for the approval of PA11-0013, as described in the title of this Resolution.

WHEREAS, on July 12, 2012, the Planning Commission of the City of Moreno Valley held a public hearing to consider the application.

WHEREAS, when an Ordinance is forwarded to the City Council, it will require buildings to consume no more energy than is permitted by Title 24 Part 6.", while Title 24 Part 6 will still be enforced.

WHEREAS, all legal prerequisites to the adoption of this Resolution have occurred.

WHEREAS, there is hereby imposed on the subject development project certain fees, dedications, reservations and other exactions pursuant to state law and City ordinances;

WHEREAS, pursuant to Government Code Section 66020(d)(1), **NOTICE IS HEREBY GIVEN** that this project is subject to certain fees, dedications, reservations and other exactions as provided herein.

NOW, THEREFORE, BE IT RESOLVED, it is hereby found, determined and resolved by the Planning Commission of the City of Moreno Valley as follows:

A. This Planning Commission hereby specifically finds that all of the facts set forth above in this Resolution are true and correct.

ATTACHMENT 3

B. Based upon substantial evidence presented to this Planning Commission during the above-referenced meeting on July 12, 2012, including written and oral staff reports, and the record from the public hearing, this Planning Commission hereby specifically finds as follows:

1. **Conformance with General Plan Policies –** The proposed modifications to the Municipal Code are consistent with the General Plan, and its goals, objectives, policies and programs.

   FACT: The citywide energy efficiency project consists of modifications to existing Municipal Code standards related to Reach Codes, or those codes that reach higher than current standards. The purpose of modifying the codes is to provide local mandatory measures, or those measures that provide energy efficiency above current Title 24 or 2011 Green Building Code standards Numerous sections of the Municipal Code will be modified regarding industrial site development standards, landscape and irrigation design, off street parking requirements, residential site development standards and the addition of performance standards for water capture and construction recycling. All of the proposed modifications included within the Municipal Code amendment are consistent with, and do not conflict with the goals, objectives, policies, and programs established within the General Plan. Specific General Plan goals and objectives within the General Plan in relation to the effort or reducing energy consumption, Goal 2.5 of the General Plan stresses maintenance of systems for water supply, wastewater collection and energy distribution which are capable of meeting present and future needs of all residential, commercial and industrial customers within the City of Moreno Valley and Objective 2.13, Policy 2.13.4, encourages installation of advance technologies and infrastructure including solar energy.

2. **Conformance with Zoning Regulations –** The proposed modifications to the Municipal Code comply with all applicable zoning and other regulations.

   FACT: The primary purpose of modifying current Municipal Code items related to industrial site development standards, landscape and irrigation design, off street parking requirements, residential site development standards and the addition of performance standards for water capture and construction recycling is to obtain future energy efficiency

related to reach codes, which provide energy efficiency above current Title 24 or 2011 Green Building Code standards. The amendments and newly established language within the Municipal Code are consistent with applicable zoning standards, all other regulations within the Code and are internally consistent with the purpose and intent of Title 9. The amendments are also internally compatible with other regulations established within the Moreno Valley Development Code.

3. **Health, Safety and Welfare –** The proposed modifications to the Municipal Code will not be detrimental to the public health, safety or welfare or materially injurious to properties or improvements in the vicinity.

   FACT: The modification and enhancement of existing Municipal Code standards creates a positive environment for the development of Moreno Valley's future by providing energy efficiency in development and design to reduce energy costs and environmental impacts as well as achieving maintenance of systems for water supply, wastewater collection and energy distribution which are capable of meeting present and future needs of all residential, commercial and industrial customers within the City of Moreno Valley. Pursuant to Section 15061 of the CEQA Guidelines, the project meets requirements for project exemption, as there is no possibility that the modification of existing Municipal Codes related to present and future energy efficiency may have a significant effect on the environmental, while the activity in this case would not be subject to CEQA requirements. The proposed amendment also does not have the potential to adversely affect the public health, safety or welfare of the population residing in the City of Moreno Valley or surrounding jurisdictions.

BE IT FURTHER RESOLVED that the Planning Commission **APPROVES** Resolution No. 2012-13, recommending that the City Council recognize that the proposed amendment is exempt from the California Environmental Quality Act (CEQA) Guidelines pursuant to Section 15061 of the CEQA Guidelines and amend Title 9 of the Municipal Code for energy efficiency measures above current 2011 California Green Building Code standards necessary to adopt Reach Codes, including the modification of Section 9.05.040, "Industrial Site Development Standards", Section 9.17.030 "Landscape and Irrigation Design", Section 9.11.040 "Off Street Parking Requirements", Section 9.03.040 "Residential Site Development Standards" and the addition of language for Construction Recycling in Sections 8.80.020 "Diversion Requirements", and 8.80.030 Waste Management Plan".

APPROVED this ____ day of _____, 2012.

_____
Meli Van Natta
Chair, Planning Commission

ATTEST:

_____
John C. Terell, Planning Official
Secretary to the Planning Commission

APPROVED AS TO FORM:

_____
City Attorney

9.17.090 Commercial, industrial, public and quasi-public development.

A. All required setback areas, exclusive of required walkways and driveways shall be landscaped. Landscape areas consist predominately of plant materials, except for necessary walks and fences/walls. Gated and screened storage areas may be exempted from this landscape requirement per approval of the community development director.

B. A landscape buffer shall be provided on a nonresidential site when adjacent to residential uses to provide visual relief to the nonresidential side. Plant materials shall be selected so that at maturity (within ten (10) years), intermittent visual obstruction with no unobstructed openings greater than five feet in horizontal distance remain.

C. In addition to the required street trees, trees shall be planted at the equivalent of one tree per thirty (30) linear feet of building dimension that is visible from the parking lot or public right-of-way. Trees may be massed for pleasing aesthetic effects. The creation of plaza or paseo areas is encouraged, including the use of pervious surface areas that reduce water run off. Such areas should incorporate focal points such as water features or specimen trees and establish a social gathering place with such elements as tables, benches, and seating walls.

D. Additional parking lot trees shall be provided at one tree per thirty (30) linear feet of parking lot adjacent to the interior property.

E. Project entry drives shall incorporate enhanced landscaping (size and variety of vegetation) and pavement.

F. Projects with frontage abutting arterial streets shall be required to construct parkways in conformance with city standard engineering plans unless otherwise approved by the community development director.

G. Turf is limited to gathering areas only. (Ord. 826 § 3.7, 2011; Ord. 786 § 2, 2009)

H. A minimum seventy-five (75) percent of the site shall include drought tolerant landscape species or native California species. The plant palette provided in the County of Riverside Guide to Friendly Landscaping is recommended to identify plants which can be used to establish an aesthetically pleasing and water efficient landscape.

ATTACHMENT 4

A. General Requirements.

1. The following table sets forth minimum property development standards for all land, buildings and structures constructed within the specified industrial districts. All sites shall conform to the dimensions set forth in this section. A development or center may, however, be a combination of many parcels totaling at least the required site size, but its design must be integrated and unified.

2. In addition, projects must comply with the special requirements enumerated in subsection B, the performance standards included in Chapter 9.10 and any other applicable city ordinances, policies and programs.

Table 9.05.040-8

Industrial Site Development

Minimum Standards

Requirement	BP/LI[1]	BPX	I
1. Minimum site area (in acres)	1	1	5
2. Minimum site width (in feet)	200	200	300
3. Minimum site depth (in feet)	200	200	300
4. Minimum front building setback area (in feet)	20	20	20
5. Minimum interior side building setback area (in feet)*	*(see note below)	*(see note below)	—
6. Minimum street side building setback area (in feet)	20	20	20
7. Minimum rear building setback area (in feet)*	*(see note below)	*(see note below)	—

[1] See Special Site Development Standards Section 9.05.040(B)(9) for unique separation requirements for structures greater than 50,000 square feet in building area.
* Structures shall be constructed on the property line or a minimum of three feet from the property line.

B. Special Site Development Standards.

1. When any industrial district abuts a property in any residential district, a minimum building setback equal to the building height, but not less than twenty (20) feet shall be required from such residential district. Further, the ten (10) feet of such setback nearest the district boundary line shall be landscaped.

2. Where off-street parking areas industrial districts are visible from any street, screening in the form of a landscaped earthen berm, shrubs, or decorative wall three feet in height shall be erected between the required landscape area and the parking area.

3. In all industrial districts, required front building setback areas shall be landscaped. The landscaping shall consist predominantly of plant materials except for necessary walks and drives.

4. Except as otherwise permitted, a street side building setback area in any industrial district shall be used only for landscaping, pedestrian walkways, driveways or off-street parking. Where off-street parking in any industrial district is located within building setback areas, a minimum landscaped area ten (10) feet in depth shall be provided between the property line and parking area, with an additional minimum landscaped area ten (10) feet in depth required between the parking area and the building.

5. Except as otherwise permitted, required rear and interior side building setback areas in any industrial district shall be used only for landscaping, pedestrian walkways, driveways, off-street parking or loading, recreational activities or facilities, and similar accessory activities.

6. Parking for each use shall comply with the requirements of Chapter 9.11 and this title.

7. The land uses planned for each development shall be specified on the approved site plans. No use shall be established unless the development where it is located has adequate parking facilities to accommodate such use and any planned uses that share parking facilities with such use.

8. In the BP, LI and I districts, the retail sales of goods produced or warehoused in connection with a manufacturing, assembly or warehouse use may be conducted, provided that no more than fifteen (15) percent of the gross floor area of the space occupied by such use is devoted to retail sales. Any merchandise storage or display areas to which the public has access shall be considered as committed to the percentage of building area used for retail purposes.

9. In the LI district, industrial and warehouse structures greater than fifty thousand (50,000) square feet in building area shall be separated from any Residential district as determined by an air quality and noise impact analysis. The minimum separation distance for such uses shall be two hundred fifty (250) feet between the Residential district and the building, truck court or loading area.

10. The parcelization of a business complex for marketing, financing or other purpose shall not establish separate privileges with respect to the maximum percentage of floor area specified in this section with respect to the BPX district. (Ord. 830 § 3.1, 2011;

Ord. 643 § 2.2, 2003; Ord. 616 § 2.2.5, 2005; Ord. 590 § 2, 2001; Ord. 497 §§ 1.1, 1.2, 1.3, 1996; Ord. 464 §§ 1.2, 1.3, 1995; Ord. 405 §§ 1.1, 1.2, 1993; Ord. 359, 1992)

11. For all new industrial and warehouse structures at or above 300,000 square feet in floor area, the project shall install a photovoltaic array (solar panels) or other source of renewable generation on-site or otherwise acquire energy from the local utility that has been generated by renewable resources, to meet the project's office electricity needs.

9.17.030 Landscape and irrigation design standards.

A. General. The landscape plans shall incorporate low water use plants, turf trees and ground covers adaptable to the area. A list of plants may be found in the county of Riverside's Guide to California Friendly Landscaping that provides a variety of options to meet the drought tolerant needs of the area while ensuring an aesthetically pleasing landscape. Plants not on the list may be used providing the water consumption does not exceed the project's water budget. Consideration should be given to climate, soil types and topographic conditions. Landscapes should group plants using similar watering patterns to eliminate over watering and provide irrigation watering zones of similar use.

The irrigation systems shall be installed using water-conserving equipment including the installation of bubblers, drip systems, low volume sprays and smart irrigation controls. Smart irrigation controls are sensitive to the changing weather patterns and adjust watering cycles automatically to reduce water usage during colder/rainy weather. A water budget shall be completed that meets Eastern Municipal Water District guidelines and submitted with the landscape plans. Based on the landscape design, the water budget will determine the landscape's water demand. Once calculated, the annual maximum allowable water budget (AMAWB) is compared to the estimated annual water use (EAWU) to ensure the design does not exceed the allowed water use.

Projects shall be designed to capture and retain storm water onsite to improve water use efficiency and water quality. The use of reclaimed water is encouraged. Contact Eastern Municipal Water District for availability.

B. Plan Design Standards. The following design standards are required on all landscape plan submittals:

1. Final landscape and irrigation plans shall be based on the approved site plan and/or the final grading plan for the project.

2. Final landscape and irrigation plans for all projects, with more than one thousand (1,000) square feet of landscaped area, except custom homes or projects designed in-house by the public works department or parks and community services department, shall be designed (and wet stamped/certified) by a California state licensed architect, civil engineer or landscape architect. All nonresidential projects with one thousand (1,000) square feet or less of landscaped areas shall provide landscape and irrigation plans certified by a certified irrigation designer.

3. Minimum scale is one inch = twenty (20) feet. A smaller scale may be used with prior approval by the city. Standard sheet size is twenty-four (24) inches by thirty-six (36) inches.

4. Existing vegetation shall be retained on any portion of a development not designated for grading or construction, unless otherwise approved or required by the city.

5. Landscape shall include drought-tolerant plants and water conservation principles.

6. All soil surfaces in landscape areas shall be covered with plant materials, walkways or mulch (organic or inorganic).

7. Ground-mounted equipment (e.g., transformers and back flow preventers) shall be screened with landscaping or screening walls, allowing for adequate access for equipment maintenance.

8. Trash enclosures are screened with at least three feet of landscaping on three sides.

9. Unimproved areas are maintained in a weed-free condition, and may require temporary landscape and irrigation.

10. All nonturf landscape areas are covered with a minimum of three inches of mulch following installation, unless otherwise approved by the city.

11. Native or low-water use plant materials shall be used. The use of invasive plants should be avoided. (See the California Invasive Plant Inventory by the California Invasive Plant Council www.cal-ipc.org.) No invasive plants are permitted adjacent to Multi-Species Habitat Conservation Plan conservation areas.

12. Water budgets that meet Eastern Municipal Water District guidelines shall be attached to plan submittal. Obtain water budget information from Eastern Municipal Water District.

13. Water budgets are subject to approval by Eastern Municipal Water District. The city of Moreno Valley will cooperate with Eastern Municipal Water District in monitoring to the extent practicable.

14. Irrigation systems shall be designed, maintained and managed to meet the current irrigation efficiency standard as determined by the state of California Code of Regulations and Eastern Municipal Water District. Landscape plans submitted shall meet this standard.

15. Water quality basin design shall ensure that the design between the basin and the required landscaping area complement one another.

C. Turf Areas.

1. Turf areas shall have a maximum design slope of twenty (20) percent and a minimum design slope of one percent.

2. Turf areas shall be limited to less than twenty-five (25) percent and only in gathering areas with the exception of parks and similar recreational facilities. Turf shall not be used solely for decorative purposes. Turfless or xeriscape design concepts are preferred.

3. Where turf areas are allowed, drought-tolerant and warm season turf varieties shall be used.

4. Except for single-family residences, concrete mow strips shall be installed between all turf areas and groundcover/shrub areas, vine pockets, walls, structures, or signs.

5. High quality artificial turf is allowed as an element of a project landscape.

6. Native grasses not requiring regular mowing shall be used in lieu of turf in water quality facilities.

D. Ground Cover/Shrub Areas.

1. Shrubs and groundcover shall be installed in shrub/planting areas in amounts and at intervals that will provide eighty (80) percent coverage within twenty-four (24) months.

2. Shrubs shall be located to provide visual interest to the project site, break-up building massing, and help screen unsightly views.

3. Groundcover (low water use plants are preferred) shall be installed in such a manner to ensure eighty (80) percent coverage within twelve (12) months.

4. No plantings shall be located closer than twenty-four (24) inches from any building or structure, unless otherwise approved by the city.

5. All planting areas adjacent to buildings or structures shall slope away from all buildings, structures or walls, or incorporate drains to direct water away from these elements.

6. Large ground cover areas shall have multiple plant types including a variation in height, texture and color.

7. A minimum seventy-five (75) percent of the site shall include drought tolerant landscape species or native California species. The plant palette provided in the Riverside County Landscape Guidelines is recommended to identify plants which can be used to establish a balance of drought tolerant plants.

E. Trees.

1. Trees shall be planted in a manner, which maximizes the shading of paved areas, outdoor seating, and both south- and west-facing windows.

2. Street trees for designated streets shall be used, unless a different street tree has already been established along the street segment in question.

3. Trees shall be planted at sufficient size and manner to ensure successful establishment and protection from breakage.

4. All landscape plans shall indicate mature tree canopy diameters.

5. All mature tree canopies in parking lots shall be pruned and maintained to maximize shade potential and ensure healthy, maximum growth. Topping of trees shall be avoided.

6. The tree palette shall provide a balanced use of evergreen and deciduous trees with attention to summer shade, fall and spring color, winter sunlight, and new growth.

7. Parkway tree planting shall provide a buffer effect that creates partial screening between parking lot areas and street vehicular traffic.

8. Existing mature trees that cannot be preserved in-place, shall be transplanted elsewhere on the site, unless transplantation is infeasible due to the type or condition of the trees.

9. Projects necessitating the removal of existing trees with four-inch or greater trunk diameters (calipers), shall be replaced at a three to one ratio, with minimum twenty-four (24) inch box size trees of the same species, or a minimum thirty-six (36) inch box for a one to one replacement, where approved.

10. Trees shall be planted in a manner and at locations, which minimize the potential for damage to adjacent walkways and paving.

F. Irrigation.

1. All planted landscape areas shall be provided with an approved “smart” automatic irrigation control systems (labeled as evapotranspiration (E.T.) based), with rain sensing and/or soil moisture sensing devices. Watering during the rain shall be avoided.

2. Drip, bubbler-type and rotor sprays or stream roter sprinkler heads or similar efficient sprinklers shall be used whenever possible. These sprinklers should be used exclusively when positioned adjacent to building walls. (Bubblers and spray heads should be pressure compensating, low volume type.)

3. Separate irrigation zones shall be provided for areas with different irrigation requirements, including, but not limited to, trees, turf and nonturf areas.

4. Reduced pressure backflow preventers are required on all irrigation systems.

5. No fixed risers are permitted, unless otherwise approved by the community development director.

6. A pressure vacuum breaker shall be installed at the top of slopes when irrigation is installed on the top of the slope.

7. Irrigation shall be placed in a manner that eliminates overspray, runoff, wicking action and/or damage to adjacent buildings, walls, walks, driveways, streets, and fences.

8. Irrigation of landscapes should occur between nine p.m. and six a.m. except during the establishment period, when temperatures are predicted to fall below zero or when repairing/adjusting the irrigation system.

9. Eastern Municipal Water District will calculate the annual maximum allowable water budget (AMAWB) for customers requesting a new account. The proposed landscape must meet the AMAWB requirements prior to meter release. (Ord. 826 § 3.7, 2011; Ord. 786 § 2, 2009)

9.11.040 Off-street parking requirements.

A. Automobile Parking Requirements. Off-street automobile parking shall be provided in accordance with the requirements of this chapter. The following tables set forth the required off-street parking requirements and certain notations for various residential, commercial, industrial, public and quasi-public uses. Parking provided above required off-street must be constructed with permeable surfaces and/or enhanced landscaped retention and absorption areas:

Table 9.11.040A-12

Off-Street Parking Requirements

Use	Requirement	Covered Parking	Notes
Residential Uses			
Single-family	2/unit	Within an enclosed garage	
Second units	2/unit	Carport or garage	
Duplex	2/unit	Within an enclosed garage	
3 or more units Studio 1 bedroom 2 bedrooms 3+ bedrooms	 1.25/unit 1.5/unit 2.0/unit 2.5/unit	 1 covered/unit 1 covered/unit 1 covered/unit 2 covered/unit	Guest parking is required for all units at 0.25 spaces/unit. Guest parking is included in the minimum required parking standard.
Senior housing			
Studio 1 bedroom	1.0/unit 1.25/unit	1 covered/unit 1 covered/unit	Guest parking is required for all units

2+ bedrooms	1.5/unit	1 covered/unit	at 0.25 spaces/unit. Guest parking is included in the minimum required parking standard. Alternate parking requirements may be permitted subject to approval of a parking study pursuant to Section 9.11.070(A) of this chapter.
Mobile home parks	2.5/unit		Tandem spaces may be used to meet resident parking requirements.
Residential care homes	Parking requirements shall be determined by the community development director subject to an approved parking study.		

Table 9.11.040B-12
Off-Street Parking Requirements

Commercial Uses	Requirement	Notes
General retail (unless specified elsewhere)	1/225 sq. ft. of gross floor area	
Automobile, boat, mobile home, or trailer sales, retail nurseries, or other similar outdoor commercial activities	1/2,000 sq. ft. of display area	1. Display area shall include all office, service and repair, or other related activities and areas that are accessible to the public.
		2. No required off-street parking spaces shall be used for display, sales, service or repair of vehicles.

Automobile service stations, repair and service facilities	2 spaces + 4/service bay for 4 or less bays and 2/service bay for 5 or more bays	Any related retail activities shall be subject to the general retail parking standards (mini-markets, tire sales, and the like).
Automobile washing and waxing establishments:		
Self-serve	2 spaces + 2/washing stall	
Automated	10 + 1 per 2 employees	
Business and professional offices	1/250 sq. ft. of gross floor area	
Banks, savings and loans and medical/dental offices	1/225 sq. ft. of gross floor area	
Day care center	1/employee + 1/500 sq. ft. of gross floor area	Special design requirements shall apply for bus loading or parent drop-off points.
Eating and drinking establishments	1/100 sq. ft. of gross floor area up to 6,000 sq. ft. 1/75 sq. ft. of gross floor area over 6,000 sq. ft.	A minimum of 10 spaces required for stand alone use.
Hotel, motel	1/guest room	
Kennels	2 spaces per 1,000 sq. ft.	2 spaces per 1,000 sq. ft. of indoor animal enclosure.
Mortuaries	1/4 seats + funeral procession queue capacity for 5 cars	
Commercial Uses	**Requirement**	**Notes**
Nail salons	1 space for every 2 work stations	
School, private		
Business and trade	10 spaces + 24/classroom	
College	10 spaces + 30/classroom	
Elementary/junior high	10 spaces + 2/classroom	Special design requirements shall apply for bus loading and parent drop-off points.
Senior high	10 spaces + 10/classroom	
Storage lots and mini-warehouses	1/100 storage spaces and 2/caretaker residence	2 spaces minimum.
Medical and health services:		
Convalescent and nursing homes	1/3 beds	
Homeless shelter	1/4 beds	
Hospitals	1/bed	

Residential care facilities	(See Residential Uses, Section 9.11.040 Table 9.11.040A-12)	
Veterinary hospital and clinic	1/200 sq. ft. of gross floor area	
Recreation:		
Arcades	1/75 sq. ft. of gross floor area	
Bowling and billiards	5/alley + 2/billiard table	
Commercial stables	1/5 horse capacity for boarding on-site	
Golf course	6/hole	
Golf driving range	1/tee	
Golf, miniature	3/hole	
Health club	1/100 sq. ft. of gross floor area	
Parks—Public and private	To be determined by the approval authority based upon an approved parking study	
Skating rink	1/100 sq. ft. of gross floor area	
Tennis, handball and racquetball facilities	3/court	
Theaters	1/3 fixed seats	

Table 9.11.040C-12

Off-Street Parking Requirements

Use	Requirement	Notes
Industrial Uses		
Manufacturing	1/500 sq. ft. of gross floor area	Trailer parking: parking stalls for trailers shall be provided at a ratio of 1 stall per truck loading dock door.
Research and development	1/350 sq. ft. of gross floor area	

Warehouse and distribution	1/1,000 sq. ft. of gross floor area for the first 20,000 sq. ft.; 1/ea. 2,000 sq. ft. of gross floor area for the second 20,000 sq. ft.; 1/ea. 4,000 sq. ft. of gross floor area for areas in excess of the initial 40,000 sq. ft.	This is in addition to the loading parking stall already provided at the dock door.

Table 9.11.040D-12

Off-Street Parking Requirements

Use	Requirement	Notes
Public and Quasi-Public Uses		
Libraries, museums and galleries	1/300 sq. ft. of gross floor area	
Public utility facilities without an office on-site	2/employee on the largest shift + 1/company vehicle	A minimum of 2 spaces shall be required.
Auditorium, places of public assembly and places of worship	1/3 fixed seats or 1/35 sq. ft. of gross floor area of the assembly area or 1 space for every 4.5 lineal feet of benches/pews, whichever is greater	
Government offices	To be determined by a parking study approved by the community development director	

B. Schedule of Accessible Parking Requirements. The following requirements for accessible parking are intended to be consis-tent with the state requirements. Any conflict-

ing provisions or future changes in state or federal requirements shall preempt the standards for provision of accessible parking spaces contained in this title.

1. Accessible parking for residential uses shall be provided at a rate of one space for each dwelling unit that is designed for accessibility and occupancy by the disabled, unless an adjustment is allowed, based on a parking study approved by the community development director.

2. Accessible parking for outpatient units and facilities providing medical care and other services for persons with mobility impairments shall be provided at a rate of ten (10) percent of the total number of parking spaces provided serving such outpatient unit or facility. Accessible parking for units and facilities that specialize in treatment or services for persons with mobility impairments shall be provided at a rate of twenty (20) percent of the total number of parking spaces provided serving each such unit or facility.

3. Accessible parking spaces for other uses shall be provided at the following rates:

No. of Automobile Spaces Provided	**No. of Accessible Spaces Provided**
1—25	1
26—50	2
51—75	3
76—100	4
101—150	5
151—200	6
201—300	7
301—400	8
401—500	9
501—1,000	2 percent of total spaces
1,001 and over	20 plus 1 for each 100 spaces or fraction thereof over 1,001

4. Each accessible parking space shall be fourteen (14) feet wide, striped to provide a nine-foot wide parking area and a five-foot wide loading area (access aisle) and shall be a minimum of eighteen (18) feet in length. If two accessible spaces are located adjacent to each other, they may share the five-foot wide loading area, resulting in a width of twenty-three (23) feet for the two spaces. One in every eight handicapped spaces, but not less than one, shall be van accessible; served by a loading area not less than eight feet wide. If two van accessible parking spaces are located adjacent to each other, they may share a common eight-foot wide loading area.

5. When less than five parking spaces are provided, at least one shall be fourteen (14) feet wide, striped to provide a nine-foot parking area and a five-foot loading area. Such space shall not be required to be reserved or identified exclusively for use by persons with disabilities.

6. Accessible parking spaces serving a particular building shall be located on the shortest accessible route of travel from adjacent parking to an accessible entrance. In parking facilities that do not serve a particular building, accessible parking shall be located on the shortest accessible route of travel to an accessible pedestrian entrance of the parking facility. In buildings with multiple accessible entrances with adjacent parking, accessible parking spaces shall be dispersed and located closest to the accessible entrances.

7. In each parking area, a bumper or curb shall be provided and located to prevent encroachment of cars over the required width of walkways. The space shall be so located that persons with disabilities are not compelled to wheel or walk behind cars other than their own. Pedestrian ways that are accessible to people with disabilities shall be provided from each such parking space to the related facilities, including curb cuts or ramps as needed. Ramps shall not encroach into any parking space, with the exception that ramps located at the front of accessible parking spaces may encroach into the length of such spaces when such encroachment does not limit the capability of a person with a disability to leave or enter their vehicle, thus providing equivalent facilitation. Where the building official determines that compliance with any regulation of this subsection (B)(7) would create an unreasonable hardship, a waiver may be granted when equivalent facilitation is provided.

8. The slope of an accessible parking stall shall be the minimum possible and shall not exceed one-quarter inch per foot (2.083% gradient) in any direction.

9. Notwithstanding the off-street parking requirements of subsection A of this section, the number of parking spaces that are not accessible may be reduced to the extent necessary for modification of an existing facility to comply with the requirements described in this subsection.

10. Where provided, one passenger drop-off and loading zone shall provide an access aisle at least five feet wide and twenty (20) feet long adjacent and parallel to the vehicle pull up space. Such zones shall be located on a surface with a slope not exceeding one vertical in fifty (50) horizontal and shall be located on an accessible route of travel to the entrance of the facility. If there are curbs between the access aisle and the vehicle pull-up space, then a curb ramp shall be provided. Valet parking facilities shall provide a passenger loading zone, as described herein. (Ord. 826 § 3.4, 2011; Ord. 808 § 2.5.2, 2010; Ord. 694 § 1.1 (part), 2005; Ord. 670 § 3.1 (part), 2004; Ord. 557 §§ 2.2, 2.3, 2000; Ord. 520 § 1.14, 1997; Ord. 475 § 1.4 (part), 1995; Ord. 405 §§ 1.8, 1.13, 1993; Ord. 402 §§ 1.1, 1.2, 1993; Ord. 359, 1992)

C. Low Emitting Fuel Efficient Carpool/Vanpool Vehicle Parking

1. Eight (8) percent of all required non-residential parking shall be designated for any combination of low-emitting, fuel efficient and carpool /vanpool vehicles.

9.17.080 Multifamily residential development.

A. A minimum of thirty-five (35) percent of the site area, exclusive of private patio and yard areas, shall be landscaped. Required setback areas and outdoor recreation areas may be counted towards this minimum, but not public rights-of-way. Landscape areas consist predominately of plant materials, except for necessary walks and fences/walls. The use of permeable surfaces is recommended for walks and patios to reduce water run-off.

B. Trees shall be positioned such that trees are planted to shade paved areas and west- and south-facing windows for energy-efficient savings; coniferous or nonwinter deciduous trees are kept away from south-facing windows in order to allow for heat gain during winter months. The larger sized trees should be placed at entries and accent areas.

C. Turf shall be limited and installed in useable gathering areas only with a maximum of twenty-five (25) percent. (Ord. 826 § 3.7, 2011; Ord. 786 § 2, 2009)

D. A minimum seventy-five (75) percent of the site shall include drought tolerant landscape species or native California species. The plant palette provided in the County of Riverside Guide to Friendly Landscaping is recommended to identify plants which can be used to establish an aesthetically pleasing and water efficient landscape.

9.03.040 Residential site development standards.

The following standards shall apply to land and permitted or conditionally permitted buildings and structures located within the herein described residential districts. The standards stated herein are not intended to prevent more restrictive private site development standards contained in the covenants, conditions and restrictions or other private consensual restrictions imposed on any property or dwelling unit. However, in no case shall private deed or other property restrictions be applied or recognized so as to permit a lesser standard than the minimum standards established in this title or to otherwise revise the standards established by this title.

A. Rural Residential Requirements.

1. Slope-Density-Natural Area Relationship. The maximum density (du/ac) and the minimum percent of a site to remain in a natural state shall be determined by a slope analysis applied to the Slope-Density-Natural Area Table, as defined below.

a. Slope-Density-Natural Area Table 9.03.040-4.

Slope Class	Allowable Density (DU/Acre)	Amount of Open Space Required
Greater than 25%	0.05 (1 du/20 ac)	60%
15.1% to 25%	0.10 (1 du/10 ac)	50%
10% to 15%	0.20 (1 du/5 ac)	35%
Less than 10%	0.40 (1 du/2.5 ac)	n/a

b. Slope analysis calculations and mapping shall be provided by the applicant as described under subsection C of this section. The slope analysis shall be certified by a qualified civil engineer or licensed surveyor.

c. The total number of dwelling units permitted within a project area shall be the sum of the allowable dwelling units within each slope class. For example, if ten (10) acres of the project falls within the ten (10) to fifteen (15) percent slope class and five acres falls within the 15.1 percent to twenty-five (25) percent slope class, then the total permitted yield shall be two dwelling units (10 ac x 0.10 du/ac plus 5 ac x 0.20 du/ac).

2. Minimum Lot Size. Minimum lot size shall be one dwelling unit per 2.5 acres within a slope category of ten (10) percent or less unless determined to be reduced by an approved slope analysis. Based on the outcome of a slope analysis, minimum lot size within the rural residential district may be reduced to twenty thousand (20,000) square feet, or the minimum lot size of the adjacent zone, whichever is greater, if clustered on slopes of less than ten (10) percent and the lots are part of a project that preserves the steeper slope classes as natural open space by dedication to an appropriate governmental entity, open space easement, transfer of development rights or other means

approved by the city. The ongoing maintenance of such open space areas shall be ensured through a mechanism approved by the city.

3. Subdivision Design and Future Land Divisions.

a. Subdivisions shall be compatible with the surrounding development pattern. A subdivision shall be considered compatible if the lots created along the outside boundary of the project are no smaller than the average lot size within three hundred (300) feet of the project boundary. Parcels greater than five acres in area shall be excluded from the calculations when determining the average lot size within three hundred (300) feet of the project boundary.

b. Subdivisions shall be designed in such a way as to transfer development density to the lower slope classes and preserve the steeper slopes for very low density and/or open space. Subdivisions created in this way are prohibited from further division so as not to circumvent the density transfer and the purpose of the district. This restriction shall be binding on the subdivider and subsequent land owners. Therefore, this restriction shall be secured by development agreement or other type of recorded deed restriction approved by the city.

4. Building Height. Dwellings and other accessory structures shall not exceed thirty (30) feet in overall height, provided that on slopes of less than ten (10) percent, the overall height shall not exceed thirty-five (35) feet.

5. Setbacks and Other Site Development Criteria. Front, side and rear setbacks and other site development standards not specifically referenced in this section shall be subject to the following standards:

Lot Size	**Standards**
Under 40,000 s.f.	R2 district standards
40,000 s.f. or greater	R1 district standards

6. Grading within the rural residential district shall be performed as described under the hillside residential requirements, subsection (B)(6) of this section.

B. Hillside Residential Requirements.

1. Slope-Density-Natural Area Relationship. The maximum density (du/ac) and the percent of a site to remain in a natural state shall be determined by a slope analysis applied to the Slope-Density-Natural Area Table, as defined below.

a. Slope-Density-Natural Area Table 9.03.040-5.

Slope Class	Allowable Density (DU/Acre)	Minimum Amount of Open Space Required
Greater than 25%	0.10 (1 du/10 ac)	60%
15.1% to 25%	0.25 (1 du/4 ac)	50%
10% to 15%	0.50 (1 du/2 ac)	35%
Less than 10%	1.00 (1 du/ac)	n/a

b. Slope analysis calculations and mapping shall be provided by the applicant as described under subsection C of this section. The community development director may require the slope analysis to be certified by a qualified civil engineer or licensed surveyor.

c. The total number of dwelling units permitted within a project area shall be the sum of the allowable dwelling units within each slope class. For example, if ten (10) acres of the project falls within the 15.1 percent to twenty-five (25) percent slope class and five acres falls within the greater than twenty-five (25) percent slope class, then the total permitted yield shall be three dwelling units (10 ac x 0.25 du/ac plus 5 ac x 0.10 du/ac).

2. Minimum Lot Size. Minimum lot size shall be one acre within a slope category of ten (10) percent or less unless determined to be reduced by an approved slope analysis. Based on the outcome of a slope analysis, the lot size within the hillside residential district may be reduced to ten thousand (10,000) square feet or the minimum lot size of the adjacent zone, whichever is greater, if clustered on slopes of less than ten (10) percent and the lots are part of a project that preserves the steeper slope classes as natural open space by dedication to an appropriate governmental entity, open space easement, transfer of development rights or other means approved by the city. The ongoing maintenance of such open space areas shall be ensured through a mechanism approved by the city.

3. Subdivision Design and Future Land Divisions.

a. Subdivisions shall be compatible with the surrounding development pattern. A subdivision shall be considered compatible if the lots created along the outside boundary of the project are no smaller than the average lot size within three hundred (300) feet of the project boundary. Parcels greater than five acres in area shall be excluded from the calculations when determining the average lot size within three hundred (300) feet of the project boundary.

b. Subdivisions shall be designed in such a way as to transfer development density to the lower slope classes and preserve the steeper slopes for very low density and/or open space. Subdivisions created in this way are prohibited from further division

so as not to circumvent the density transfer and the purpose of the district. This restriction shall be binding on the subdivider and subsequent land owners. Therefore, this restriction shall be secured by development agreement or other type of recorded deed restriction approved by the city.

4. Building Height. Dwellings and other accessory structures shall not exceed thirty (30) feet in overall height, provided that on slopes of less than ten (10) percent, the overall height shall not exceed thirty-five (35) feet.

5. Setbacks and Other Site Development Criteria. Front, side and rear setbacks and other site development standards not specifically referenced in this section shall be subject to the following standards:

Lot Size	**Standards**
Less than 20,000 s.f.	R-3 district standards
20,000 s.f. to 40,000 s.f.	R-2 district standards
40,000 s.f. or greater	R-1 district standards

6. Grading of any site shall be minimized and shall conform to the provisions contained in the city of Moreno Valley design guidelines, Ch. 9.16, under Applications for hillside development, Article IV, Sections 9.16.170 through 9.16.230 of this title, and the following standards:

Slope Class	**Standards**
15.1—25%	Padded building sites may be allowed, but maximum use of custom foundations and split level designs shall be employed to reduce the need for large padded building areas.
Above 25%	Mass grading is not permitted. Special hillside architectural and design techniques are expected in order to conform to the natural landform. Homes constructed on lots within this terrain shall use custom, multiple-level foundations.
For all areas	All graded areas shall be protected from wind and water erosion through acceptable slope stabilization methods such as planting, walls or jute netting.

C. Slope Calculations. For the purposes of this section, the following method will be used to determine slope.

1. “Slope” is defined as the relationship between the change in elevation (rise) of the land and the horizontal distance (run) over which that change in elevation occurs. The percent of any given slope is determined by dividing the rise by the run on the natural slope of land, multiplied by one hundred (100).

2. a. For the purpose of determining the amount and location of land falling into each slope category, the applicant shall submit to the community development department, at the time of application, a base topographic map of the subject site prepared and signed by a registered civil engineer or licensed land surveyor. Such a map shall have a scale of not less than one inch to two hundred (200) feet and a contour interval of not more than ten (10) feet.

b. This base topographic map shall include all adjoining properties within three hundred (300) feet of the site boundaries. Slope bands in the range of less than ten (10) percent, ten (10) to fifteen (15) percent, fifteen (15) to twenty-five (25) percent, and greater than twenty-five (25) percent shall be delineated on the topographic map. The map shall be accompanied by a tabulation of the land area in each slope category specified in acres. The exact method for computing the percent slope and area by percent slope category is to be sufficiently described and presented so that a review can readily be made.

3. Slope Mapping Method.

a. The percent slope of any particular piece of land shall be plotted on the map as described in this subsection.

b. In preparing a slope map, those portions of ravines, ridges and terraces of less

area generally sloping at twenty-five (25) percent slope or greater, shall be regarded as part of the bordering twenty-five (25) percent slope or greater band.

D. General Residential Requirements. The following tables sets forth minimum site development standards for residential development projects in the specified residential districts. In addition, projects must comply with the special development standards enumerated in this section, the performance standards included in Chapter 9.10 and any other applicable city ordinances, policies and standards.

Figure 9.03.040-1
Residential Lot Information

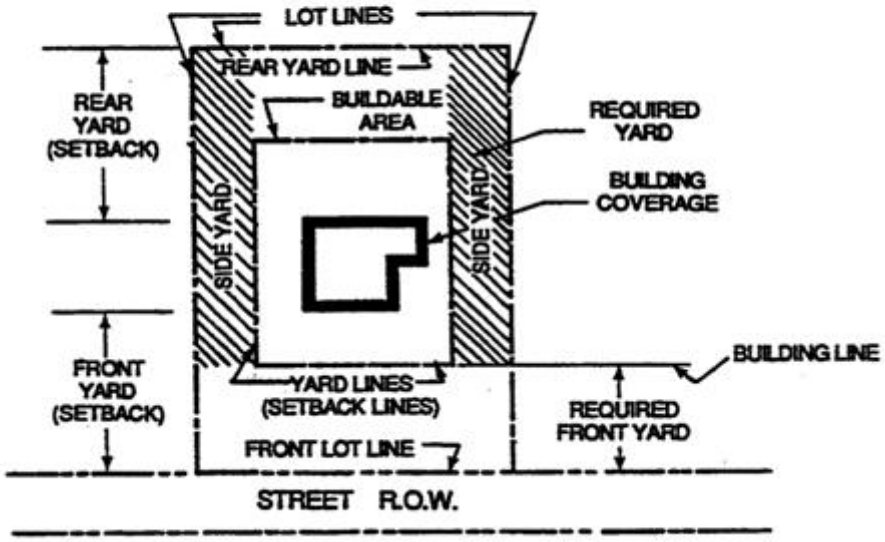

Figure 9.03.040-2
Residential Yard Descriptions

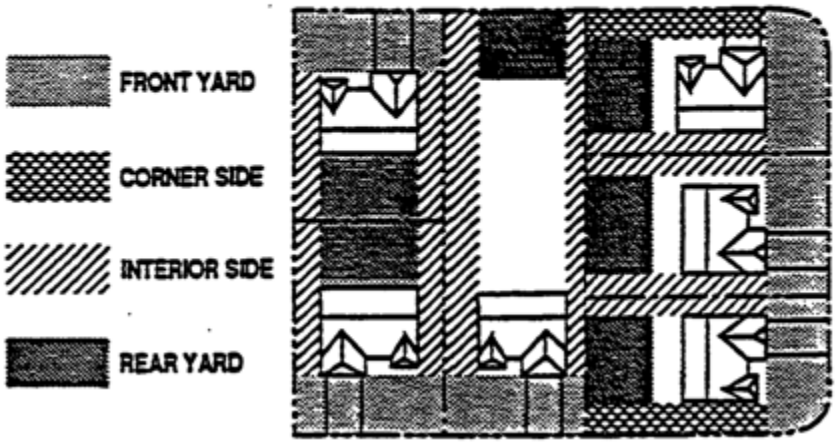

Table 9.03.040-6

Residential Site Development Standards

Single-Family Standards

Requirement	R1	R2	RA2	R3	R5	RS10
1. Maximum density (DUs* per net acre)	1	2	2	3	5	10
2. Minimum lot size (sq. ft. net area)	40K**	20K	20K	10K	7,200	4,500
3. Minimum lot width, in feet	150	100	100	90	70	45
Cul-de-sac/knuckle lot frontage	50	50	50	50	50	45
4. Minimum lot depth, in feet	170	120	120	100	100	85
5. Minimum front yard setback	25	25	25	25	20	20
Front-facing garages	Not applicable					10
Buildings other than front-facing garages						10
6. Minimum side yard setback, in feet***						
a. Interior side yard	See Note 1	See Note 1	See Note 1	See Note 1	See Note 2	See Note 3
b. Street side yard	20	20	20	15	15	10
7. Minimum rear yard setback, in feet***	40	35	35	30	15	50
8. Maximum lot coverage	25%	30%	30%	40%	40%	50%
9. Maximum building and structure height, in feet	Two stories not to exceed 35 feet.					
10. Minimum dwelling size (sq. ft.)	1500	1500	1500	1250	1250	1000
11. Minimum distance between buildings, in feet (including main DUs and accessory structures)	20	15	15	10	10	10
12. Floor area ratio						
a. One-story home	.25	.30	.30	.40	.40	.50
b. Multi-story home	.50	.60	.60	.70	.70	.75

* The term “DUs” means dwelling units.

** The term “K” means thousands.

*** See Section 9.08.030 regarding accessory structures and room additions.

Notes to Residential Site Development Standards Table 9.03.040-6.

1. Combined interior side yard setbacks of twenty (20) feet shall be provided with a minimum of five feet on one side.

2. Combined interior side yard setbacks of fifteen (15) feet shall be provided with a minimum of five feet on one side.

3. In the RS10 district the minimum street side setback shall be ten (10) feet. The interior side setback shall be five feet, except in the case of zero lot line developments with houses placed on an interior side lot line. When a house is placed on an interior side lot line, the other minimum side yard setback shall be ten (10) feet. Where applicable, an easement at least five feet in width shall be provided along the common lot line. The easement shall guarantee the right to use and occupy the easement for a roof overhang(s), stormwater drainage and for building maintenance and repair.

Table 9.03.040-7

Residential Site Development Standards

Multifamily Standards

Requirement	**R10**	**R15**	**R20**	**R30**
1. Maximum density (DUs*/net acre)	10	15	20	30
2. Minimum lot size (net area in sq. ft.)	1 acre	1 acre	1 acre	1 acre
3. Minimum lot width in feet	200	200	200	200
4. Minimum lot depth in feet	175	175	175	175
5. Minimum front yard setback, in feet	20	25	30	30
6. Minimum side yard setback, in feet				
Interior side yard	10	10	10	10 feet plus 2 feet for every 5 feet in height over 30 feet
Street side yard	20	20	20	20
Requirement	**R10**	**R15**	**R20**	**R30**
7. Minimum rear yard setback, in ft.	15	20	25	10 feet plus 2 for every 5 feet in height over 30 feet
8. Maximum lot coverage	40%	45%	50%	50%
9. Maximum building and structure height, in feet	50 feet			
10. Minimum dwelling size (sq. ft.)	See Note 1			
11. Minimum distance between buildings, in feet (including main DUs and accessory structures)	20	20	20	20
12. Floor area ratio	.75	.75	.75	1.0

* The term “DUs” means dwelling units.

Note to Residential Site Development Standards Table 9.03.040-7.

1. Minimum dwelling sizes in multiple-family projects shall be as follows:

a. One bedroom: four hundred fifty (450) square feet;

b. Two bedroom: eight hundred (800) square feet;

c. Three bedroom: one thousand (1,000) square feet.

E. Special Single-Family Residential Development Standards.

1. In any residential district, front yard setbacks in subdivision developments may be reduced by twenty (20) percent provided the mean of all such setbacks in the development is not less than the minimum required for the district.

2. In the R5 districts, developments of five or more dwelling units shall include front and street side yard landscaping and shall consist predominantly of plant materials, except for necessary walks, drives and fences.

3. In the RS10 district, driveways and fire hydrants shall be designed and located to maximize on-street parking opportunities in front of each residence.

4. Within the RS10 district, small lot single-family subdivisions on less than fifteen (15) gross acres shall provide landscaping and decorative walls along the street side of corner lots and at least two of the following amenities throughout the project:

a. Front porches;

b. Automatic garage door openers;

c. Electronic security systems.

5. Within the RS10 district, small lot single-family subdivisions on fifteen (15) gross acres or more shall include usable common open space encompassing a minimum of ten (10) percent of each development. Usable common open space does not include individually owned lots, parking areas, nor vehicular rights-of-way. Usable common open space is open space and/or recreational amenities under joint (common) ownership, including, but not necessarily limited to, landscaped areas, trails, playgrounds,

tennis courts, swimming pools and recreational buildings. A homeowners' association shall be established to provide continual maintenance of the commonly owned facilities.

6. For all developments within the R5 land use district, a buffer of lots held to the development standards of the R3 land use district shall be included for all portions of a subdivision located adjacent to lower density single-family residential land use districts, including the R1, R2, RA-2, and RR zones.

7. In all residential districts, air conditioners, heating, cooling and ventilating equipment and all other mechanical, lighting or electrical devices shall be operated so that noise levels do not exceed sixty (60) dBA (Ldn) at the property line. Additionally, such equipment, including roof-mounted installation, shall be screened from surrounding properties and streets and shall not be located in the required front yard or street side yard. All equipment shall be installed and operated in accordance with other applicable city ordinances.

8. In all residential districts allowing single family homes, kitchen appliances provided by the builder shall meet Energy Star requirements if an Energy Star designation is applicable for the appliance.

9. Space on the roof and penetrations through the roof surface shall be provided for future solar installation .

10. In all residential districts allowing single-family homes, new tracts containing five (5) or more lots shall require fifty (50) percent of the structures to orient buildings to optimize the use of solar energy with the long side of the house oriented within thirty (30) degrees south.

F. Special Multiple-Family Residential Development Standards.

1. In the R10, R15, R20 and R30 districts, buildings exceeding one story in height shall maintain a minimum building setback of fifty (50) feet from any single-family district. Any single-story building within the R10, R15, R20 or R30 district shall maintain a minimum setback of twenty (20) feet from any single-family district.

2. In any residential district, front yard setbacks in subdivision developments may be reduced by twenty (20) percent provided the mean of all such setbacks in the development is not less than the minimum required for the district.

3. In all residential districts, air conditioners, heating, cooling and ventilating equipment and all other mechanical, lighting or electrical devices shall be operated so that noise levels do not exceed sixty (60) dBA (Ldn) at the property line. Additionally, such equipment, including roof-mounted installation, shall be screened from surrounding properties and streets and shall not be located in the required front yard or street side yard. All equipment shall be installed and operated in accordance with other applicable city ordinances.

4. In the RS10, R10, R15, R20 and R30 districts, developments of five or more dwelling units shall include front and street side yard landscaping and shall consist predominantly of plant materials, except for necessary walks, drives and fences.

5. In the RS10, R10, R15, R20 and R30 districts, a minimum of thirty-five (35) percent of the net site area, exclusive of private patio and yard areas, shall be landscaped. Turf shall not exceed fifty (50) percent of this area. Required setback areas and outdoor recreation areas may be counted toward this minimum. Landscaping shall consist predominately of plant materials to include water efficient native plants, except for necessary walks and fences. Landscape areas shall be designed to promote water retention and allow runoff from impervious surfaces. Hardscape areas are recommended to be constructed with pervious surfaces where feasible to reduce run off.

6. Where a multiple-family project abuts property in a single-family district, a decorative masonry wall at least six feet in height and screening landscaping within a planter of at least five-foot interior width shall be erected and maintained between such uses and the single-family district. Decorative walls composed of block, brick, stone, stucco-treated masonry or concrete panels are acceptable. The community development director may approve alternative materials, provided that the materials are decorative and comparable to masonry walls or concrete panels in durability and ability to attenuate light and sound.

7. Parking for each use shall comply with the requirements of Chapter 9.11 of this title.

8. In the R30 District, Landscape Trees. One tree per twenty (20) linear feet of building dimension for the portions of building visible from parking lot or ROW and one tree per twenty (20) linear feet of perimeter planter areas.

9. In the R30 district, for a development of three acres or greater, up to sixty (60) percent of the units may be in buildings with three or four stories, fifty (50) feet maximum height subject to planning commission approval.

Table 9.03.040-8

Designation	Minimum Density*	Maximum Density
R10	8 units/acre	10 units/acre
R15	12 units/acre	15 units/acre
R20	16 units/acre	20 units/acre
R30	24 units/acre	30 units/acre

* Eighty (80) percent of allowable density must be achieved by all multiple-family residential developments.

10. Space on the roof and penetrations through the roof surface shall be provided for future solar installation.

G. General Multiple-Family Guidelines.

1. Opposing garages or carports should be turned to avoid the monotony of alley-like parking corridors.

2. Parking areas should be staggered and landscaped to add visual interest, and opportunities for accent treatments.

3. Parking spaces within multifamily areas shall be located within two hundred fifty (250) feet of the dwellings they serve.

4. Multifamily parking lots shall be limited to two double aisles of cars to help reduce expanses of paving. Parking lots shall provide openings in curbs to convey surface drainage into landscape areas for water quality, retention and absorption.

5. Open parking areas should be clustered and treated as landscaped plazas and courts.

6. Landscaping shall be used around the perimeter of the lot, as well as within the lot, reducing paved area and providing for a more pedestrian oriented site.

7. No more than four units for a two-story structure should be served by one entry.

8. Each multiple-family unit shall have at least one hundred and fifty (150) square feet of private open space per downstairs unit and a minimum of one hundred (100) square feet of private open space per upstairs unit. Private open space may consist of a fenced yard area, patio or balcony. Fenced yards and patios shall have a minimum dimension of at least eight feet. Balconies shall be at least five feet deep.

9. Common open space at a minimum of three hundred (300) square feet per each residential dwelling in the project is required.

10. Individual units should have a porch or porch-like space at the front door.

11. Trash enclosures shall be located to provide a maximum walking distance of two hundred fifty (250) feet from the units they serve.

12. Trash enclosures shall include solid roofs and be designed to be compatible with the project's architecture.

13. Trash enclosures shall not be located on dead end drive aisles, unless adequate turnaround is provided for collection vehicles.

14. There shall be at least one double-bin trash enclosure for every forty-eight (48) residential units.

15. Mail boxes should be located at various places on the site and treated to match the building's architecture, avoiding the institutional and monumental "gang box" appearance, while conforming to post office guidelines.

16. Drive aisles should be curved and should incorporate landscaping and paving treatments to reduce vehicle speed. Landscaping treatments may include pinched planters and a mix of canopy and vertical trees. Paving treatments may include interlocking paver bands or etchings across drives. Speed bumps or Botts' dots are not an acceptable alternative.

17. Freestanding structures, like gazebos or pergolas, should be located to define activity areas at pathway intersections or in secluded landscape areas.

18. Drive aisles shall be at least twenty-four (24) feet wide for two-way traffic and shall be at least twenty (20) feet wide for one-way traffic.

19. Buffer setbacks and landscaping shall be provided along all property lines. Buffers may also be appropriate within the complex, separating recreational areas from units and limiting lines of sight between balconies and into parking areas.

20. Multiple-family projects warrant special design considerations, including:

a. Intimate, shaded outdoor seating areas;

b. A network of pathways, providing interesting walking experiences;

c. Gentle slopes for outdoor pathways and ramps to entry doors and between floors;

d. Convenient and attractive access to transit, including portecocheres, information kiosks, seating areas and water elements;

e. Security;

f. Direct ambulance access (senior housing projects);

g. Parking close to units;

h. Elevators (senior housing projects).

21. Buildings shall provide for a variety of colors and architectural features to break up the massing of buildings and provide visual interest.

22. Multifamily units shall be clustered to minimize grading and to help maintain the natural landscape.

23. Multifamily projects shall be designed for the needs of the intended residents. For example, children's needs would require open space, tot lots, handrails, and enclosed yards on ground floor units. Disabled or elderly needs would require ramps, parking close to units, minimum and gradual elevation changes and elevators.

24. Architectural features should be used to increase privacy from nearby units and common or public spaces.

25. Roof forms should be mixed and combined to vary the perception of building height, to differentiate units and to add interest to building mass. The long, straight roofline of a single gable is not permitted.

26. A diagram of the complex showing the location of the viewer and the building designations shall be positioned at each visitor entrance of a multiple-family development.

27. Buildings shall provide for a variety of colors and architectural features to break up the massing of buildings and provide visual interest. (Ord. 826 § 3.2, 2011; Ord. 808 §§

2.2—2.2.3, 2010; Ord. 797 §§ 2.4, 2.4.2—4, 2009; Ord. 773 § 3, 2008; Ord. 757 §§ 2.7, 2.72, 2008; Ord. 757 §§ 2.7, 2.7.2, 2008; Ord. 726 § 4.3, 2006; Ord. 698 § 3.1(c), 2005; Ord. 694 § 1.1 (part), 2005; Ord. 616 §§ 2.2.1, 2.2.2, 2003; Ord. 604 § 2.3, 2002; Ord. 520 § 1.9, 1997; Ord. 475 § 1.4, (part), 1995; Ord. 468 §§ 1.4, 1.5, 1995; Ord. 461 § 1.1, 1995; Ord. 386 § 1.13, 1993; Ord. 359, 1992)

9.17.070 Single-family residential development.

A. Plans for landscape construction or reconstruction of existing single-family units, custom homes and model home complexes are subject to review by the planning division to ensure:

1. Conformance with prevailing building design guidelines, with pleasing visual aesthetics and water efficient design.

2. Use of xeriscape landscaping.

3. Use of approved landscape materials.

4. Use of approved “smart irrigation” controllers.

5. Irrigation systems minimize overspray onto structures or hard surfaces such as sidewalks, driveways and walls/fences.

6. The front yard area have a maximum of twenty-five (25) percent turf with the remaining yard planted with shrubs, groundcovers and required trees. Turf should be planted in gathering areas only. Pavement and other solid surfaces shall not cover more than half of the required front yard setback. Pervious pavement/surfaces are recommended to reduce water run-off.

7. New and existing single-family front yard setbacks include front and street side yard landscaping consisting predominantly of plant materials including shrubs, groundcovers and required trees, except for necessary walks, drives and fences, not including weeds, as defined in Municipal Code Chapter 6.04, or concrete/hardscape materials.

8. Groundcover should be used to absorb run-off from rain or irrigation.

9. Reduction of hardscape/paving, incorporating permeable surfaces to reduce run-off.

10. A minimum seventy-five (75) percent of the site shall include drought tolerant landscape species or native California species. The plant palette provided in the County of Riverside Guide to Friendly Landscaping is recommended to identify plants which can be used to establish an aesthetically pleasing and water efficient landscape.

B. Model homes are provided by a developer as examples of the housing product for sale within the subject tract. A xeriscape planting concept with a turfless front yard is incorporated for at least one of the models. The concept must be used in at least twenty-five (25) percent of the production units. Promotional information on xeriscape-planting concepts is made available for prospective homebuyers.

C. For parking lot, walls, screening and other landscape requirements, see applicable sections of the title. (Ord. 826 § 3.7, 2011; Ord. 817 § 3.7, 2010; Ord. 786 § 2, 2009)

8.80.020 Diversion requirements.

A. Diversion Requirement.

1. Demolition and Remodeling Debris. It is required that at least ~~fifty (50)~~ seventy-Five (75) percent of waste tonnage from construction, demolition, and remodeling debris shall be diverted from the landfill. Demolition and remodeling projects must submit an acceptable waste management plan (WMP) as outlined in this chapter for approval prior to commencing the project.

2. New Construction (Residential, Commercial, and Industrial). It is required that the franchise hauler be used to assist in the design of a construction site management plan to divert cardboard, wood, pallets, and other recyclable materials from the site. The franchise hauler will be required to present an agreeable plan to the city staff and to report the amount of tonnage by material that has been recycled from each job site.

a. The franchise hauler will make its best effort to divert any and all recyclable materials by at least ~~fifty (50)~~ seventy-five (75) percent of waste tonnage to increase diversion on new residential, commercial, and industrial sites.

b. The franchise hauler will work with city staff to design an economically feasible collection system for the builder that increases diversion from construction sites and conforms to other city development requirements.

B. Diversion Requirement Exemption.

1. Application. If an applicant for a covered project experiences unique circumstances that the applicant believes make it infeasible to comply with the diversion requirements, the applicant may apply for a diversion requirement exemption at the time that he or she submits the WMP required under Section 8.80.030 of this chapter.

2. Meeting with Compliance Official. The compliance official shall review the information supplied by the applicant and may meet with the applicant to discuss possible ways of meeting the diversion requirement. Upon request of the jurisdiction, the compliance official may request that staff from the city of Moreno Valley attend this meeting. Based on the information supplied by the applicant and, if applicable, the city of Moreno Valley, the compliance official shall determine whether it is possible for the applicant to meet the diversion requirement.

3. Granting of Exemption. If the compliance official determines that it is infeasible for the applicant to meet the diversion requirements due to unique circumstances, he or she shall determine the maximum feasible diversion rate for waste materials to be generated and shall indicate the new diversion requirement the applicant shall be required to meet, and will inform the applicant, in writing, of the new requirement. The Applicant shall then have twenty-one (21) days to resubmit another WMP, which is in compliance with the new diversion requirement. If the applicant fails

to resubmit, or if the resubmitted WMP does not comply with Section 8.80.030 of this chapter, the compliance official shall deny the WMP in accordance with Section 8.80.030.

C. Threshold. Every project shall be made available for deconstruction, salvage, and recovery prior to demolition. It shall be the responsibility of the applicant to recover the maximum feasible amount of salvageable designated recyclables and reusable materials prior to demolition. Recovered and salvaged designated recyclable and reusable material from every project shall qualify to be counted in meeting diversion requirements of Section 8.80.020(B) of this chapter. Recovered or salvaged designated recyclables and reusable materials may be given away or sold on the premises, or may be removed to reuse facilities for storage or sale. (Ord. 706 § 3.2 (part), 2006)

8.80.030 Waste management plan.

A. Waste Management Plan Submittal Requirements. Prior to permit issuance, every applicant shall submit a properly completed "waste management plan" (WMP) to the compliance official, in a form prescribed by that official, as a portion of the building or demolition permit process. The completed WMP shall contain the following:

1. The estimated volume or weight of project waste to be generated by material type;

2. The maximum volume or weight of such materials that can be feasibly diverted via reuse and recycling;

3. The vendor(s) that the applicant proposes to use to haul the materials;

4. Facility(s) the materials will be hauled to, and their expected diversion rates;

5. Estimated volume or weight of construction and demolition debris that will be landfilled.

Because actual material weights are not available in this stage, estimates are used. In estimating the volume or weight of materials as identified in the WMP, the applicant shall use the standardized conversion rates approved by the city of Moreno Valley for this purpose. Approval of the WMP as complete and accurate shall be a condition precedent to the issuance of any building or demolition permit. If the maximum volume or weight of such materials that can be feasibly diverted via reuse or recycling, as estimated using city-approved standardized conversion rates, is less than the required diversion requirements, applicant must submit information that supports the lower projected diversion rate, or the WMP shall be deemed incomplete.

B. Waste Management Plan Approval. No building or demolition permit shall be issued for any covered project unless and until the compliance official has approved the WMP. Approval shall not be required, however, where emergency demolition is required to protect public health or safety. The compliance official shall only approve a WMP if he or she determines that all of the following conditions have been met:

1. The WMP provides all of the information set forth in this section.

2. The WMP indicates that at least ~~fifty (50)~~ seventy-five (75) percent of all construction and demolition debris generated by the project shall be diverted (or new diversion goal set in accordance with the applicant's approved diversion exemption request).

C. Waste Management Plan Nonapproval. If the compliance official determines that the WMP is incomplete or fails to indicate that at least ~~fifty (50)~~ seventy-

five percent of all construction and demolition waste material generated by the project will by reused or recycled, he or she shall either:

1. Return the WMP to the applicant marked "Denied," including a statement of reasons, which shall then immediately stop processing the building or demolition permit application, or

2. Return the WMP to the applicant marked "Further Explanation Required."

D. Waste Management Plan Exemptions. A waste management plan shall not be required for the following:

1. If the franchise hauler is used exclusively for debris/recycling removal from the site on a covered project. The franchise hauler shall submit a tonnage report to the city to verify the disposal and/or recycling tonnage collected from the site prior to the project completion;

2. New residential construction projects of one unit only;

3. Residential alterations of one unit only, except as noted in "4" below;

4. Roofing projects that do not include tear-off of existing roof;

5. Work for which only plumbing, electrical, or mechanical permits are required;

6. Seismic tie-down projects;

7. The installation or replacement of shelves;

8. Installation of pre-fabricated patio enclosures and covers where no foundation or other structural building modifications are required;

9. Installation of swimming pools and spas, provided that the exemption shall only apply to the area to be excavated for the installation of the pool or spa and the area for the pad for the pool/spa equipment that does not exceed three thousand (3000) square feet, and shall not apply to any related construction or alterations necessary for any other equipment or accessories, nor to any other portion of the project.

10. Installation of pre-fabricated accessories such as signs or antennas where no structural building modifications are required. (Ord. 706 § 3.2 (part), 2006)