

**Final Environmental Impact Report  
for the Silva Estates Project:  
Responses to Comments**

**State Clearinghouse #2006072118**

*Prepared for:*

City of Manteca  
Community Development Department  
1001 West Center Street  
Manteca, CA 95337  
Contact: Mark Meissner  
209/239-8424

*Prepared by:*

ICF International  
630 K Street, Suite 400  
Sacramento, CA 95814  
Contact: Sally Lyn Zeff, AICP  
916/737-3000

March 2010

ICF International. 2010. *Final Environmental Impact Report for the Silva Estates Project: Responses to Comments*. March. (ICF 06362.06). Sacramento, CA.  
Prepared for City of Manteca Community Development Department, Manteca, CA.

# Contents

|                                                                                                                                 | Page       |
|---------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>Chapter 1 Introduction .....</b>                                                                                             | <b>1-1</b> |
| Purpose of This Document .....                                                                                                  | 1-1        |
| Public Review Process .....                                                                                                     | 1-1        |
| CEQA Requirements .....                                                                                                         | 1-2        |
| Use of This Document .....                                                                                                      | 1-2        |
| <b>Chapter 2 Text Changes to Draft EIR .....</b>                                                                                | <b>2-1</b> |
| Section 3.9—Utilities and Service Systems .....                                                                                 | 2-1        |
| <b>Chapter 3 Comments on Draft EIR and Responses to Comments.....</b>                                                           | <b>3-1</b> |
| Responses to Comment Letter 1—San Joaquin County<br>Department of Public Works, February 23, 2007 .....                         | 3-4        |
| Responses to Comment Letter 2—George Quersma, City<br>of Manteca Fire Chief, January 2007 .....                                 | 3-7        |
| Responses to Comment Letter 3—Manteca Unified School<br>District, February 2, 2007 .....                                        | 3-9        |
| Responses to Comment Letter 4—San Joaquin Council of<br>Governments, January 19, 2007 .....                                     | 3-11       |
| Responses to Comment Letter 5—California Department<br>of Transportation, February 16, 2007 .....                               | 3-14       |
| Responses to Comment Letter 6—Pacific Gas & Electric<br>Company, Land Services, February 13, 2007.....                          | 3-18       |
| Responses to Comment Letter 7—San Joaquin Valley Air<br>Pollution Control District, February 20, 2007 .....                     | 3-21       |
| Responses to Comment Letter 8—California Department<br>of Transportation, December 30, 2009 .....                               | 3-23       |
| <b>Chapter 4 Mitigation Monitoring and Reporting Program.....</b>                                                               | <b>4-1</b> |
| Purpose of and Need for Monitoring .....                                                                                        | 4-1        |
| Mitigation Monitoring and Reporting Program.....                                                                                | 4-2        |
| <br><b>Appendix A Public Draft Partial Recirculation of Draft Environmental Impact<br/>Report for the Silva Estates Project</b> |            |

# Tables

|                                                      | <b>Page</b> |
|------------------------------------------------------|-------------|
| 3-1 Comments Received on Draft EIR.....              | 3-2         |
| 4-1 Mitigation Monitoring and Reporting Program..... | follows 4-3 |

# Acronyms and Abbreviations

|                  |                                                                           |
|------------------|---------------------------------------------------------------------------|
| Caltrans         | California Department of Transportation                                   |
| CEQA             | California Environmental Quality Act                                      |
| CIP              | Capital Improvement Plan                                                  |
| City             | City of Manteca                                                           |
| County           | San Joaquin County                                                        |
| EIR              | environmental impact report                                               |
| IS               | initial study                                                             |
| ISR              | Indirect Source Review                                                    |
| LOS              | level of service                                                          |
| MMRP             | mitigation monitoring and reporting program                               |
| MUSD             | Manteca Unified School District                                           |
| PFIP             | Public Facilities Implementation Plan                                     |
| PG&E             | Pacific Gas & Electric Company                                            |
| proposed project | Silva Estates Project                                                     |
| PSRs             | Project Study Reports                                                     |
| SJCOG            | San Joaquin Council of Governments                                        |
| SJMSCP           | San Joaquin County Multi-Species Habitat Conservation and Open Space Plan |
| SJVAPCD          | San Joaquin Valley Air Pollution Control District                         |
| SR               | State Route                                                               |

## **Purpose of This Document**

This document, together with the draft environmental impact report (EIR) for the Silva Estates Project (proposed project) that was circulated in January 2007, and the partial recirculated Draft EIR that was circulated in December, 2009, constitutes the final EIR for the proposed project. The information presented in this document has been provided in accordance with the requirements of the California Environmental Quality Act (CEQA) Guidelines and includes the following chapters:

- Chapter 1, “Introduction,” discusses the purpose of this document, public review process, requirements under CEQA, and uses of this document.
- Chapter 2, “Text Changes to Draft EIR,” contains changes to the text of the draft EIR made in response to comments received during the public review period for the draft EIR.
- Chapter 3, “Comments on Draft EIR and Responses to Comments,” contains comments received during the public review period for the draft EIR and the responses by the City of Manteca (City) to those comments.
- Chapter 4, “Mitigation Monitoring and Reporting Program,” contains the mitigation monitoring and reporting program (MMRP) for the proposed project.

The partial recirculated draft is found in Appendix A of this document.

## **Public Review Process**

The draft EIR was distributed to various public agencies, citizen groups, and interested individuals for a 45-day public review period, from January 2, 2007 through February 16, 2007. The draft EIR was circulated to state agencies for review through the State Clearinghouse of the Governor’s Office of Planning and Research. Copies of the draft EIR were available for public review during normal business hours at Manteca City Hall. During the review period, written comments were received from members of the public and agencies.

The partial recirculated draft EIR was distributed to various public agencies, citizen groups, and interested individuals for a 45-day public review period, from December 1, 2009 through January 14, 2010. The partial recirculated draft EIR was circulated to state agencies for review through the State Clearinghouse of the Governor's Office of Planning and Research. Copies of the partial recirculated draft EIR were available for public review during normal business hours at Manteca City Hall. During the review period, no additional written comments were received from members of the public and agencies. A letter from Caltrans was received stating that the agency had no additional comments.

## CEQA Requirements

As the lead agency under CEQA, the City must provide each public agency that commented on the draft EIR with a copy of its responses to comments at least 10 days before certifying the final EIR.

## Use of This Document

A final EIR allows the public and public agencies to review revisions to the draft EIR, comments on the draft EIR, responses to comments, and other components of the EIR, such as the MMRP, before approval of the project. This final EIR, including the draft EIR and partial recirculated draft EIR incorporated by reference, will serve as the environmental document used by the City when considering approval of the project.

After completing the final EIR and before approving the project, the lead agency must make the following three certifications (CEQA Guidelines Section 15090):

- The final EIR has been completed in compliance with CEQA.
- The final EIR was presented to the decision-making body of the lead agency, and the decision-making body reviewed and considered the information in the final EIR before approving the project.
- The final EIR reflects the lead agency's independent judgment and analysis.

In addition, if an EIR that has been certified for a project identifies one or more significant environmental impacts, the lead agency must adopt findings of fact (CEQA Guidelines Section 15091[a]) in connection with approval of the project. For each significant impact, the lead agency must make one of the following findings:

- Changes or alterations have been required in or incorporated into the project which avoid or substantially lessen the significant environmental effect as identified in the EIR.
- Such changes or alterations are the responsibility and within the jurisdiction of another public agency, not the agency making the finding. Such changes

have been adopted by such other agency or can and should be adopted by such other agency.

- Specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or project alternatives identified in the final EIR.

Each finding must be accompanied by a brief explanation of the rationale for the finding. In addition, the lead agency must adopt, in conjunction with the findings, a program for reporting or monitoring the changes that it has either required in the project or made a condition of approval to avoid or substantially lessen impacts (CEQA Guidelines Section 15091[d]). These measures must be fully enforceable through permit conditions, agreements, or other measures. This is the program referred to above as the MMRP.

In addition, when a lead agency approves a project that would result in significant and unavoidable impacts that are disclosed in the final EIR, the agency must state in writing its reasons for supporting the approved action (CEQA Guidelines Section 15093[b]). This statement of overriding considerations must be supported by substantial information in the record, including the final EIR. Because the proposed project would result in significant and unavoidable impacts, the City is required to adopt a statement of overriding considerations if it approves the project. The statement of overriding considerations is not a substitute for the findings of fact described above.

The certifications, findings of fact, and statement of overriding considerations are included in a separate findings document that will accompany the City's staff report if and when the City approves the proposed project. The draft EIR and partial recirculated draft EIR (incorporated by reference), final EIR, findings of fact, and statement of overriding considerations are submitted to the City for consideration of the proposed project.



## Chapter 2

# Text Changes to Draft EIR

This chapter contains revisions to the text of the draft EIR. Text changes are intended to clarify or correct information in the draft EIR in response to comments received on the document. Revisions are shown with strikethrough text for deletions (~~strikethrough~~) and underlined text for additions (underline). No text changes were identified for those sections or chapters not listed below. Revisions to the text of the draft EIR that were recirculated for public review are found in Appendix A.

## Section 3.9—Utilities and Service Systems

The following change is made to the first sentence of the last paragraph on page 3.9-2 of the draft EIR:

The MFD goals are to maintain a 5-minute response time for all emergencies and keep all engine and ladder companies staffed with a minimum of ~~four~~ three persons (City of Manteca 2003c).

## Chapter 3

# Comments on Draft EIR and Responses to Comments

As described in Chapter 1, the draft EIR and the partial recirculated draft EIR were circulated for review and comment by the public and other interested parties, by agencies that commented on the initial study (IS) and notice of preparation of the EIR, and by surrounding jurisdictions. Comment letters on the draft EIR were received from individuals and agencies. One comment letter was received on the partial recirculated draft EIR. The letters received are listed in Table 3-1, and copies of the letters, with all individual comments indicated, are provided in this chapter.

As stated in the CEQA Guidelines Sections 15088(a) and 15088(b), comments that raise environmental issues must be provided with responses. This chapter contains the City's responses to comments received on the draft EIR. Reasoned, factual responses have been provided for all comments received, focusing specifically on the environmental issues raised. In general, the responses provide explanation or amplification of information contained in the draft EIR. Comments that are outside the scope of CEQA review will be forwarded to the decision-makers for consideration as part of the project approval process. These comments are answered with a general response.

The comment letters and comments within each letter are numbered consecutively. For example, Letter 1 is the first letter, and Comment 1-1 is the first comment in Letter 1. Revisions made to the draft EIR in response to comments are identified as text to be deleted (~~striketrough~~) and text to be added (underline). All text changes are also indicated in Chapter 2.

**Table 3-1.** Comments Received on Draft EIR

| Letter | Date              | Commenter                                         | Address                                   |
|--------|-------------------|---------------------------------------------------|-------------------------------------------|
| 1      | February 23, 2007 | San Joaquin County Department of Public Works     | P.O. Box 1810<br>Stockton, CA 95201       |
| 2      | January 2007      | George Quersma, City of Manteca Fire Chief        | 1001 West Center St.<br>Manteca, CA 95337 |
| 3      | February 2, 2007  | Manteca Unified School District                   | P.O. Box 32<br>Manteca, CA 95336          |
| 4      | January 19, 2007  | San Joaquin Council of Governments                | 555 East Weber Ave.<br>Stockton, CA 95202 |
| 5      | February 16, 2007 | California Department of Transportation           | P.O. Box 2048<br>Stockton, CA 95201       |
| 6      | February 13, 2007 | Pacific Gas & Electric Company, Land Services     | 4040 West Lane<br>Stockton, CA 95204      |
| 7      | February 20, 2007 | San Joaquin Valley Air Pollution Control District | –                                         |
| 8      | December 30, 2009 | California Department of Transportation           | P.O. Box 2048<br>Stockton, CA 95201       |



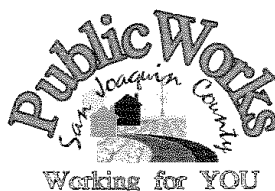
**THOMAS R. FLINN**  
DIRECTOR

**THOMAS M. GAU**  
CHIEF DEPUTY DIRECTOR

**MANUEL SOLORIO**  
DEPUTY DIRECTOR

**STEVEN WINKLER**  
DEPUTY DIRECTOR

**ROGER JANES**  
BUSINESS ADMINISTRATOR



## Letter 1

P. O. BOX 1810 - 1810 E. HAZELTON AVENUE  
STOCKTON, CALIFORNIA 95201  
(209) 468-3000 FAX (209) 468-2999  
[www.sjgov.org/pubworks](http://www.sjgov.org/pubworks)

February 23, 2007

Mr. Mark Meissner  
Senior Planner  
City of Manteca  
1001 West Center Street  
Manteca, California 95337

**SUBJECT: DRAFT ENVIRONMENTAL IMPACT REPORT FOR SILVA ESTATES**

Dear Mr. Meissner:

The San Joaquin County Department of Public Works (County) has reviewed the above mentioned document and has the following comments:

From Transportation Planning:

- |                                                                                                                                                                                                                                                                                                                                             |     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| 1) A County Encroachment Permit is required for any work and/or traffic control in the County's right-of-way. The applicant shall submit an Encroachment Permit application at least 60 days prior to the start of construction. No work or traffic control shall be allowed within the County's right-of-way until the Permit is approved. | 1-1 |
| 2) The project shall be subject to the recently adopted Regional Transportation Impact Fee. The City of Manteca (City) shall collect this fee from the applicants.                                                                                                                                                                          | 1-2 |
| 3) If any project-related improvements will be located within the unincorporated County, the County may request that the City enter into a cooperative agreement with the County. Maintenance of such improvements within the unincorporated County shall be the responsibility of the City and/or the developer(s).                        | 1-3 |
| 4) All impacts to County roadways shall be mitigated to the County's Level of Service standard and the County's requirements.                                                                                                                                                                                                               | 1-4 |
| 5) The County requests that the City of Manteca collect any project fair share costs for impacts to County roads and intersections and advise San Joaquin County Department of Public Works accordingly.                                                                                                                                    | 1-5 |

Thank you for the opportunity to comment, if you have any questions, please contact me at 468-8494, or by e-mail [avallejo@sjgov.org](mailto:avallejo@sjgov.org).

Sincerely,

**ANDREA VALLEJO**  
Associate Planner

AV:rc  
TP-7B062-R1

c: Michael C. Selling, Senior Civil Engineer  
Adam Brucker, Senior Transportation Planner  
Dwayne Sabiniano, Engineering Assistant II

# **Responses to Comment Letter 1—San Joaquin County Department of Public Works, February 23, 2007**

## **Response to Comment 1-1**

The San Joaquin County (County) Department of Public Works notes the process for obtaining a County encroachment permit when required. This process is standard implementation procedure, and no response is necessary in the EIR.

## **Response to Comment 1-2**

The department notes that the City will be responsible for collecting the required Regional Transportation Impact Fee. Based on the adopted fee of \$2,610 for each single-family dwelling unit, the project applicant shall be required to pay a total of \$558,540, or \$2,500 x 214 net new single family dwelling units.

## **Response to Comment 1-3**

The department notes the process for cooperation regarding project-related improvements within the unincorporated county area. This process is standard implementation procedure, and no response is necessary in the EIR.

## **Response to Comment 1-4**

The department comments that it is the County's opinion that mitigation measures for impacts on County roads should be mitigated to the County's level of service (LOS) standards. For a specific discussion of LOS and project impacts and mitigation measures, please see section 3.8, "Transportation and Traffic," of the draft EIR.

## **Response to Comment 1-5**

The department requests that City collect fair share contributions for impacts on County roads and intersections and inform the County. For a specific discussion of LOS and project impacts and mitigation measures, please see section 3.8, "Transportation and Traffic," of the draft EIR. All project-related impacts on roadway segments under Existing Plus Project and Cumulative Plus Project conditions are being mitigated to acceptable LOS conditions with the planned widening of Union Road to meet both County and City LOS standards.



George Quersma

Letter 2

**NOTICE OF COMPLETION  
OF THE DRAFT ENVIRONMENTAL IMPACT REPORT FOR  
THE SILVA ESTATES SUBDIVISION**

**TO:** Responsible and Interested Parties  
**FROM:** City of Manteca  
Community Development Department  
Planning Division  
1001 West Center Street  
Manteca, CA 95337

In accordance with the California Environmental Quality Act (CEQA) and the State CEQA guidelines, the City of Manteca (City) (as lead agency) has prepared a Draft Environmental Impact Report (Draft EIR) to evaluate the environmental effects associated with the proposed Silva Estates Subdivision. In accordance with Section 15087 of the CEQA Guidelines, the City has prepared this Notice of Completion to provide responsible and interested parties with information about the project details regarding the public comment period, document availability, and public meeting.

**Project Title:** SILVA ESTATES SUBDIVISION

**Project Applicants:** Anderson Homes, Craig Barton

**Project Description:**

The proposed project includes the construction of the Silva Estates (formerly Milner Estates) subdivision. The project would subdivide approximately 59.9 acres into 217 single-family lots. The project would include the removal of two of the five existing single-family homes on the site. The project would also involve annexation, rezoning, a development agreement and a tentative map for residential development.

**Project Location:**

The proposed project site is located in San Joaquin County directly south of the Manteca city limits. The site is located at the southeast corner of the Union Road/Woodward Avenue intersection.

**Public Comment Period:**

The public comment period for the Draft EIR begins on January 2, 2007 and closes on February 16, 2007. Please submit comments by 5:00 p.m. on February 16, 2007 to **Mark Meissner, Senior Planner, at the address above or by email at mmeissner@ci.manteca.ca.us**

**Public Comment Meeting:** February 8, 2007 3:00pm at the City of Manteca Council Chambers, 1001 West Center Street, Manteca, CA 95337

**Document Availability:** Copies of the Draft EIR are available for public review at the following locations:

**Manteca City Clerk**  
1001 West Center Street  
Manteca, CA 95337

**City of Manteca Community Development Department**  
1001 West Center Street  
Manteca, CA 95337

**Stockton-San Joaquin County Public Library**

**Manteca Branch Library**  
320 West Center Street  
Manteca, CA 95336

Correction:  
(39-2)  
GMC

2-1

Silva Estates Subdivision  
Notice of Completion

City of Manteca  
January 2007

City of Manteca

Environmental Analysis  
Utilities and Service Systems

## Police

The Manteca Police Department (MPD) serves Manteca, including the project area, with more than 70 sworn officers, 30 civilian staff members, and volunteer workers (City of Manteca 2003c). The MPD provides crime prevention for the residents of Manteca through community policing, neighborhood watch, proactive enforcement, and citizen involvement.

The MPD is located at 1001 West Center Street, Manteca, California, 1.8 miles north of the project site. The MPD has tentative plans for the construction of a new station, which would replace the existing police station, near the intersection of South Main Street and SR 120 within the next 18 months to 5 years.

## Fire and Emergency Services

The Insurance Services Office (ISO) has rated Manteca as a Class 3 on a scale of 10. The ISO classification range is 1 through 10, with 1 being the highest. The Class 3 rating applies to all developed areas of Manteca where a water supply for fire suppression is provided by way of a fire hydrant system. The General Plan 2023 outlines a policy of endeavoring to maintain an overall fire insurance (ISO) rating of 4 or better.

The MFD responds to emergencies and calls for service from three fire stations located within the city limits. MFD stations are located at

- Station 241: 290 South Powers Avenue
- Station 242: 1154 South Union Road
- Station 243: 399 West Louise Avenue

Fire Station 242 is nearest the project site, located approximately 0.7 mile to the south of the project site.

As of 2005, the MFD maintained a staff of nine administrative personnel and 30 fire suppression personnel. The average number of on-duty engine company personnel per day per shift is 9.16 (City of Manteca 2005a).

The MFD is also responsible for providing emergency medical services. In 2005, the MFD responded to 2,403 calls for emergency medical services (City of Manteca 2005a). To maintain a standard level of care, all trained fire personnel carry Emergency Medical Technician-1 (EMT) and EMT-Defibrillation (EMT-D) certification.

The MFD goals are to maintain a 5-minute response time for all emergencies and keep all engine and ladder companies staffed with a minimum of four persons (City of Manteca 2003c). The average response time for the three MFD stations was 4.79 minutes, and effectiveness was 75.1%, meaning that an engine

# **Responses to Comment Letter 2—George Quersma, City of Manteca Fire Chief, January 2007**

## **Response to Comment 2-1**

The Manteca Fire Chief presents a correction to the first sentence of the last paragraph on page 3.9-2 of the draft EIR:

The MFD goals are to maintain a 5-minute response time for all emergencies and keep all engine and ladder companies staffed with a minimum of ~~four~~ three persons (City of Manteca 2003c).





Letter 3

Sandy Dwyer, Director of Facilities Planning

February 2, 2007

Mr. Mark Meissner, Senior Planner  
City of Manteca, Community Development Dept.  
1001 West Center Street  
Manteca, CA 95337

Subject: Draft EIR for the Silva Estates Subdivision

Dear Mr. Meissner,

Manteca Unified School District is in receipt and has reviewed the Draft Environmental Impact Report for the Silva Estates Subdivision. The following provides updated information relative to the Manteca Unified School District:

- The Elementary School site attendance area (K-8) will be Veritas Elementary School until Rustic Elementary is constructed. 3-1
- The High School attendance area (9-12) is Sierra High School, however, currently Sierra High School is over-crowded and the students will be bussed to one of the other three high schools that have capacity for a specific grade level. The South Manteca High School is currently planned and when constructed will accommodate the high school students in the Silva Estates.
- The most recent needs analysis completed by the School District supports justification for increasing developer fees for Level Two fees to \$4.86 per square foot and Level Three fees to \$9.76 per square foot. 3-2
- The estimated number of dwelling units projected for the school District is approximately 5,552 and student generation rates for elementary school is .540 and for high school is .199, a total of .739.
- In the City of Manteca Stella Brockman Elementary School Annex was completed along with a Joint-Use Gym. 3-3
- Woodward Annex (K-3) School in the City of Manteca is also planned for the Northeast Woodward area in the near future.

Manteca Unified is confident the information provided above will assist you in completing the Final Environmental Impact Report for the Silva Estates Subdivision. Should you require additional information I can be contacted at (209) 825-3200, extension 765, or you may contact May Karim, Facilities Planning Supervisor at (209) 825-3200, extension 763.

Sincerely,

*Sandy Dwyer*  
Sandy Dwyer,  
Director of Facilities Planning

RECEIVED

FEB 05 2007

Community Development Department

P.O. Box 32  
Manteca, CA 95336  
2901 East Louise Avenue, Lathrop

Phone (209) 825-3200  
Fax (209) 825-3295  
www.mantecausd.net

## **Responses to Comment Letter 3—Manteca Unified School District, February 2, 2007**

### **Response to Comment 3-1**

The Manteca Unified School District (MUSD) presents updated information on the schools that will serve the project site. This information is hereby incorporated in the EIR. It does not change any of the impacts or mitigation measures presented in the draft EIR.

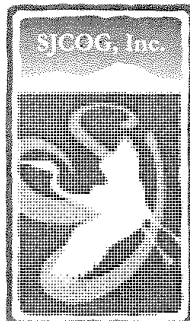
### **Response to Comment 3-2**

The MUSD presents information on the background for future updates to developer fees. As noted in the draft EIR, the City will collect the required developer fees as established at the time such fees are due.

### **Response to Comment 3-3**

The MUSD presents additional updated information on district facilities. This information is hereby incorporated in the EIR. It does not change any of the impacts or mitigation measures presented in the draft EIR.

## Letter 4



## S J C O G, Inc.

555 East Weber Avenue • Stockton, CA 95202 • (209) 468-3913 • FAX (209) 468-1084

*San Joaquin County Multi-Species Habitat Conservation &  
Open Space Plan (SJMSCP)***SJMSCP RESPONSE TO LEAD AGENCY  
ADVISORY AGENCY NOTICE TO SJCOG, Inc.**

**To:** Mark Meissner, City of Manteca Community Development Department  
**From:** Erin Sickler, SJCOG, Inc.  
**Date:** January 19, 2007  
**Re:** **Lead Agency Project Title:** EIR for the Silva Estates Project  
**Lead Agency Project Number:** N/A  
**Assessor Parcel Number(s):** 224-022-01; 02; 03; 04; 05; 06

**Total Acres to be converted from Open Space Use:** approximately 59.9 acres

**Habitat Types to be Disturbed:** Agricultural Land and Multi-Purpose Open Space

**Species Impact Findings:** Findings to be determined by SJMSCP biologist.

Dear Mr. Meissner:

San Joaquin County is a signatory to San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP). Participation in the SJMSCP satisfies requirements of both the state and federal endangered species acts, and ensures that the impacts are mitigated below a level of significance in compliance with the California Environmental Quality Act (CEQA). Although participation in the SJMSCP is voluntary, lead agents should be aware that if project applicants choose against participating in the SJMSCP, they will be required to provide alternative mitigation in an amount and kind equal to that provided in the SJMSCP.

4-1

SJCOG, Inc. has reviewed The City of Manteca Silva Estates Projects. It is suggested this project participate in the SJMSCP as necessary. This project involves the subdivision of an approximately 59.9 acre site into 217 single family residential lots. This project is located at the southeast corner of Union Road/Woodward Avenue intersection. The conditions for the project are as follows.

**This Project is subject to the SJMSCP.** Please contact SJMSCP staff regarding completing the following steps to satisfy SJMSCP requirements:

4-2

- Schedule a SJMSCP Biologist to perform a pre-construction survey **prior to any ground disturbance**
- Sign and Return Incidental Take Minimization Measures to SJMSCP staff (given to project applicant after pre-construction survey is completed)
- Pay appropriate fee based on SJMSCP findings
- Receive your Certificate of Payment and release the required permit

If you have any questions, please call (209) 468-3913.

## **Responses to Comment Letter 4—San Joaquin Council of Governments, January 19, 2007**

### **Response to Comment 4-1**

The San Joaquin Council of Governments (SJCOG) presents information regarding voluntary participation in the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP). For more information regarding compliance with the SJMSCP, see Mitigation Measure BIO-2 (Compensate for the Loss of Multipurpose Open Space Lands as Outlined in the SJMSCP) in the IS (Appendix A of the draft EIR).

### **Response to Comment 4-2**

SJCOG presents additional information on process for participation in the SJMSCP. This information is hereby incorporated in the EIR.

## Letter 5

Feb. 16, 2007 4:35PM CA DEPARTMENT OF TRANSPORTATION

No. 5993 P. 2

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY

ARNOLD SCHWARZENEGGER, Governor

**DEPARTMENT OF TRANSPORTATION**

P.O. BOX 2048 STOCKTON, CA 95201  
 (1976 E. CHARTER WAY/1976 E. DR. MARTIN  
 LUTHER KING JR. BLVD. 95205)  
 TTY: California Relay Service (800) 735-2929  
 PHONE (209) 941-1921  
 FAX (209) 948-7194



*Flex your power!  
 Be energy efficient!*

February 16, 2006

**10-SJ-120-PM4.3**  
**SDJ-05-02**  
**Silva Estates**

Mark Meissner  
 City of Manteca  
 Community Development Department  
 1001 West Center Street  
 Manteca, CA 95337

Dear Mr. Meissner:

The California Department of Transportation (Department) appreciates the opportunity to have reviewed the Draft Environmental Impact Report (DEIR) for the proposed 217 single family lots to be located at southeast corner of Union Road and Woodward Avenue approximately 2,100 feet south from the State Route 120 (SR-120)/Union Road interchange. This DEIR is being used by the City of Manteca (City) as part of the entitlement process for the purposes of annexing land, determining pre-zoning, writing a development agreement, and drawing a tentative map for this project.

5-1

This project was previously reviewed on July 31, 2006 as **SDJ-05-02 a major subdivision map proposing 220 single family lots, and on February 28, 2005 as SDJ 05-02 a tentative vesting subdivision map proposing 216 single family lots (under the name Milner Estates).**

The comments provided in those previous letters still apply to this DEIR. Those comments recommended that the cumulative traffic impacts of this and other existing and proposed development in this area (which includes, but is not limited to, The Promenade lifestyle center commented on by the Department on January 19, 2007) be determined. And, that the City collect "fair share" impact fees to be used for the future improvements that are necessary to mitigate those impacts on State transportation facilities.

5-2

The Department recommends that this DEIR not be certified by the City until those cumulative traffic impacts are determined and an agreement between the Department, City and developer can be made that will lead to implementing measures that will mitigate those impacts.

5-3

*"Caltrans improves mobility across California"*

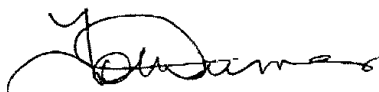
FEB. 16. 2007 4:35PM CA DEPARTMENT OF TRANSPORTATION

No. 5993 P. 3

Mr. Meissner  
February 16, 2006  
Page 2

If you have any questions or would like to discuss our comments in more detail, please contact Dan Brewer at (209) 948-7142 (e-mail: [dan.brewer@dot.ca.gov](mailto:dan.brewer@dot.ca.gov)) or me at (209) 941-1921.

Sincerely,



**TOM DUMAS, Chief**  
**Office of Intermodal Planning**

C: Kathleen Wold  
City of Manteca  
Community Development Department  
1001 West Center Street  
Manteca, CA 95337

Scott Morgan State Clearinghouse

*"Caltrans improves mobility across California"*

# **Responses to Comment Letter 5—California Department of Transportation, February 16, 2007**

## **Response to Comment 5-1**

On January 17, 2007, the City and the California Department of Transportation (Caltrans) met to discuss local and regional improvements to State Route (SR) 120 and the interchanges at Airport Way, Union Road, and Main Street. The City and Caltrans agreed to hold a second meeting that includes SJCOG and to develop a corridor-wide set of improvements that are required to serve local traffic generated by the Manteca General Plan and regional trips using SR 120. In the meantime, Project Study Reports (PSRs) are currently underway for the SR 120/Airport Way and SR 120/Union Road interchanges.

## **Response to Comment 5-2**

In addition to the Regional Transportation Impact Fee that the project applicant shall submit to the City as contribution toward funding of regional roadway improvements, the City is updating the Citywide Public Facilities Implementation Plan (PFIP). When completed by the end of 2007, the PFIP will constitute both a Capital Improvement Plan (CIP) within the meaning of Government Code 66002 and a description of how each capital improvement project included in the CIP will be financed through fair share contributions. The purpose of the PFIP is to ensure that public facilities are adequate as Manteca grows and develops in accordance with the Manteca General Plan. The transportation facilities required to meet the City's LOS standards shall be constructed in a timely manner and financed in a manner that equitably divides financial responsibility in proportion to the demands placed on existing facilities (i.e., fair share costs analysis).

## **Response to Comment 5-3**

The City is taking the lead in developing phased improvements at the SR 120/Union Road interchange as part of the PSR. These improvements are being evaluated and designed to address the interim and cumulative traffic impacts to the state and local transportation system. The interim improvements will be applied for through the Encroachment Permit Office and will include all-way stop-controlled ramp intersections and signalized ramp intersections. Mitigation measures for cumulative impacts will be implemented through Caltrans' planning and construction processes, and will include reconstruction of the SR 120/Union Road interchange to serve projected cumulative traffic volumes. As stated in Response to Comment 5-2, the City is updating the PFIP. When completed by the end of 2007, the PFIP will constitute both a CIP within the meaning of Government Code 66002 and a description of how each capital

improvement project included in the CIP will be financed through fair share contributions.





Land Services, 4040 West Lane, Stockton, CA 95204

**RECEIVED**

FEB 13 2007

Community Development Department

**Letter 6**

February 13, 2007

City of Manteca  
c/o Community Development Dept.  
Planning Division  
1001 West Center Street  
Manteca, CA 95337  
Attn: Mark Meissner  
fax: 209-825-2349

RE: Completion of Draft Environmental Impact Report (DEIR)  
For: Silva Estates project  
Loc: SE corner of Union Rd/ Woodward Ave., Manteca  
PG&E File : 40618523, 40138970 (WL 612)

Dear Mr. Meissner,

Thank you for this opportunity to comment on this Draft Environmental Impact Report (DEIR) for the above Project. PG&E has the following comments to offer:

PG&E owns and operates gas and electric facilities which are located within and adjacent to the proposed project. To promote the safe and reliable maintenance and operation of utility facilities, the California Public Utilities Commission (CPUC) has mandated specific clearance requirements between utility facilities and surrounding objects or construction activities. To ensure compliance with these standards, project proponents should coordinate with PG&E early in the development of their project plans. Any proposed development plans should provide for unrestricted utility access and prevent easement encroachments that might impair the safe and reliable maintenance and operation of PG&E's facilities.

6-1

The requesting party will be responsible for the costs associated with the relocation of existing PG&E facilities to accommodate their proposed development. Because facilities relocation's require long lead times and are not always feasible, the requesting party should be encouraged to consult with PG&E as early in their planning stages as possible.

Relocations of PG&E's electric transmission and substation facilities (50,000 volts and above) could also require formal approval from the California Public Utilities Commission. If required, this approval process could take up to two years to complete. Proponents with development plans which could affect such electric transmission facilities should be referred to PG&E for additional information and assistance in the development of their project schedules.

6-2

We would also like to note that continued development consistent with the City's General Plans will have a cumulative impact on PG&E's gas and electric systems and may require on-site and off-site additions and improvements to the facilities which supply these services. Because utility facilities are operated as an integrated system, the presence of an existing gas or electric transmission or distribution facility does not necessarily mean the facility has capacity to connect new loads.

Expansion of distribution and transmission lines and related facilities is a necessary consequence of growth and development. In addition to adding new distribution feeders, the range of electric system improvements needed to accommodate growth may include upgrading existing substation and transmission line equipment, expanding existing substations to their ultimate buildout capacity, and building new substations and interconnecting transmission lines. Comparable upgrades or additions needed to accommodate additional load on the gas system could include facilities such as regulator stations, odorizer stations, valve lots, distribution and transmission lines.

6-3

We would like to recommend that environmental documents for proposed development projects include adequate evaluation of cumulative impacts to utility systems, the utility facilities needed to serve those developments and any potential environmental issues associated with extending utility service to the proposed project. This will assure the project's compliance with CEQA and reduce potential delays to the project schedule.

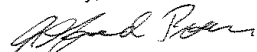
PG&E remains committed to working with the City to provide timely, reliable and cost effective gas and electric service to the planned area. We would also appreciate being copied on future correspondence regarding this subject as this project develops.

The California Constitution vests in the California Public Utilities Commission (CPUC) exclusive power and sole authority with respect to the regulation of privately owned or investor owned public utilities such as PG&E. This exclusive power extends to all aspects of the location, design, construction, maintenance and operation of public utility facilities. Nevertheless, the CPUC has provisions for regulated utilities to work closely with local governments and give due consideration to their concerns. PG&E must balance our commitment to provide due consideration to local concerns with our obligation to provide the public with a safe, reliable, cost-effective energy supply in compliance with the rules and tariffs of the CPUC.

6-4

Should you require any additional information or have any questions, please call me at (209) 942-1419.

Sincerely,



Alfred Poon  
Land Agent  
Land Rights Protection  
Northern Area  
External: (209) 942-1419  
Fax: (209) 942-1485

# **Responses to Comment Letter 6—Pacific Gas & Electric Company, Land Services, February 13, 2007**

## **Response to Comment 6-1**

The Pacific Gas & Electric Company (PG&E) presents information on the clearance requirements between utility facilities and surrounding objects or construction activities. This information may or may not be applicable to the current project, but is here presented in the EIR.

## **Response to Comment 6-2**

PG&E presents information on the process for relocation of its facilities, should this be required. This information may or may not be applicable to the current project, but is here presented in the EIR.

## **Response to Comment 6-3**

Cumulative energy impacts are addressed in Impact CE-4 on pages 4-3 and 4-4 of the draft EIR.

## **Response to Comment 6-4**

PG&E requests to be copied on future correspondence regarding providing gas and electric service to the planned area, as this project develops. As such, PG&E will be added to the list of interested parties requesting communications related to the proposed project.



# San Joaquin Valley

## AIR POLLUTION CONTROL DISTRICT

**Letter 7**

February 20, 2007

Mark Meissner, Senior Planner  
City of Manteca  
Community Development Department  
1001 West Center Street  
Manteca, CA 95337

**Project: Silva Estates Subdivision**

**Subject:** CEQA comments regarding the Draft Environmental Impact Report (DEIR) for the Silva Estates Subdivision (217 new residential units on 59.9 acres)

**District Reference No: 200700022**

Dear Mr. Meissner:

The San Joaquin Valley Unified Air Pollution Control District (District) has reviewed the project referenced above and offers the following comments:

### Findings of Significance

Upon review of the project, the District concurs with the conclusions that there will be a less than significant impact on the following: health risk to sensitive receptors from exposure to construction diesel particulate matter (Impact AQ-2), ongoing operational emissions (Impact AQ-3), and carbon monoxide exposure to sensitive receptors (Impact AQ-4).

Based on the size of the project the District expects that construction emissions will be less than the District's Thresholds of Significance of 10 tons per year for ROG and NOx. However, the District cannot duplicate the construction emissions estimates presented in Table 3.2-5 and Appendix C. For example, estimates of construction ROG emissions for architectural coatings, appears to be overestimated. Appendix F appears to more accurately describe the construction emissions expected for a project of this size. Appendix F indicates that construction emissions would have a less than significant impact on air quality.

7-1

**Seyed Sadredin**  
Executive Director/Air Pollution Control Officer

**Northern Region**  
4800 Enterprise Way  
Modesto, CA 95356-8718  
Tel: (209) 557-6400 FAX: (209) 557-6475

**Central Region (Main Office)**  
1990 E. Gettysburg Avenue  
Fresno, CA 93726-0244  
Tel: (559) 230-6000 FAX: (559) 230-6061  
[www.valleyair.org](http://www.valleyair.org)

**Southern Region**  
2700 M Street, Suite 275  
Bakersfield, CA 93301-2373  
Tel: (661) 326-6900 FAX: (661) 326-6985

Mr. Meissner  
DEIR, Silva Estates

Page 2 of 2

### **Applicable District Rules**

The project will be subject to many District rules. These rules are adequately identified in the DEIR. Although emission reductions associated with compliance with District Rule 9510 (Indirect Source Review) is presented in the DEIR, the District has not received an Indirect Source Review Air Impact Assessment application for the project. As such, the District cannot verify the emissions or mitigation measures presented in Appendix F will be implemented.

7-2

### **Recommended Mitigation Measures**

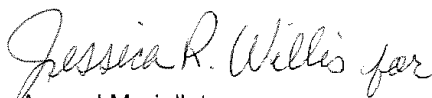
Mitigation measures were included in the URBEMIS runs found in Appendix C and Appendix F. The application of soil stabilizers, replacing ground cover, and watering exposed surfaces are appropriately selected in the emissions model as, they are required by the District's Regulation VIII (Fugitive Dust) requirements. However, until the project proponent has submitted an Air Impact Assessment Application to the District as compliance with Rule 9510, the District cannot confirm that the analysis is representative of the actual project emissions. For example, emission reductions associated with the use of aqueous diesel fuel, diesel particulate filters, and diesel oxidation catalysts cannot be confirmed.

7-3

District staff is available to meet with you and/or the applicant to further discuss the regulatory requirements that are associated with this project. If you have any questions or require further information, please call Jessica Willis at (559) 230-5818 and provide the reference number at the top of this letter.

Sincerely,

David Warner  
Director of Permits Services

  
Arnaud Marjollet  
Permit Services Manager

DW:jrw

cc: File

# **Responses to Comment Letter 7—San Joaquin Valley Air Pollution Control District, February 20, 2007**

## **Response to Comment 7-1**

The San Joaquin Valley Air Pollution Control District (SJVAPCD) comments that the district concurs with the findings of the draft EIR in Impacts AQ-2 to AQ-4. The SJVAPCD further comments that although it finds a small inconsistency in the quantification of construction impacts of the project in Impact AQ-1, it does agree that the impact will be less than significant.

## **Response to Comment 7-2**

The SJVAPCD comments that its rules are adequately presented in the draft EIR. The SJVAPCD further comments that it has not received the Indirect Source Review (ISR) application from the project proponent.

## **Response to Comment 7-3**

The SJVAPCD comments that the URBEMIS modeling was performed correctly but that it has not received the ISR application from the project proponent. Please see Response to Comment 7-2.

Dec. 30. 2009 9:02AM

No. 0176 P. 2 Letter 8

STATE OF CALIFORNIA—BUSINESS TRANSPORTATION AND HOUSING AGENCY

ARNOLD SCHWARZENEGGER, Governor

**DEPARTMENT OF TRANSPORTATION**

DISTRICT 10

P.O. BOX 2048, STOCKTON, CA 95201

(1976 E. DR. MARTIN LUTHER KING JR. BLVD., 95205

PHONE (209) 948-7943

FAX (209) 948-3670

TTY 711

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Be energy efficient!*

December 30, 2009

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DEC 30 2009

**COMMUNITY DEVELOPMENT  
DEPARTMENT**

10-SJ-120-PM4.3

Silva Estates

SCH #2006072118

Mr. Mark Meissner  
City of Manteca  
Community Development Department  
1001 West Center Street  
Manteca, CA 95337

Dear Mr. Meissner:

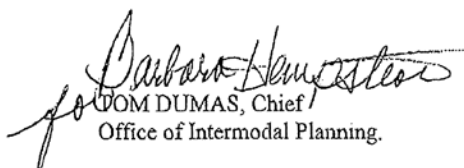
The California Department of Transportation (Department) appreciates the opportunity to have reviewed the recirculated revisions to the Draft Environmental Impact Report (DEIR) for the Silva Estates Project. This project would subdivide approximately 59.9 acres into 217 single-family lots and would include the removal of two of the five existing single-family homes on the site.

8-1

The Department does not have any additional comments for this project.

If you have any questions, please contact Barbara Hempstead at (209) 948-3909 (e-mail [Barbara\\_hempstead@dot.ca.gov](mailto:Barbara_hempstead@dot.ca.gov)) or me at (209) 941-1921.

Sincerely,

  
JOANN DUMAS, Chief  
Office of Intermodal Planning.

*"Caltrans improves mobility across California"*

# **Responses to Comment Letter 8—California Department of Transportation, December 30, 2009**

## **Response to Comment 8-1**

Caltrans comments that it has reviewed the recirculated portion of the DEIR and has no further comments.



# Mitigation Monitoring and Reporting Program

## Purpose of and Need for Monitoring

In compliance with CEQA, an IS and EIR have been prepared for the proposed project. Both the IS and the EIR identified potentially significant impacts in the resource areas listed below mitigation measures to reduce these impacts to a less-than-significant level, where feasible. Project-level significant impacts pertaining to the following resource areas would be reduced to a less-than-significant level by mitigation measures identified in the IS:

- aesthetics;
- biological resources;
- land use and planning; and
- recreation.

Project-level significant impacts pertaining to the following resource areas would be reduced to a less-than-significant level by mitigation measures identified in the EIR:

- air quality;
- cultural resources;
- geology, soils, and paleontology;
- hazards and hazardous materials;
- hydrology and water quality;
- noise; and
- utilities and service systems.

The following project-level significant impacts would be reduced by mitigation measures identified in the EIR, but not to a less-than-significant level:

- AG-1: Direct Conversion of Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or Other Farmland to Nonagricultural Use
- AG-2: Result in Changes in the Existing Environment, Including Conversion of Farmland to Nonagricultural Use

- Impact CC-2: Cumulative Increase in Greenhouse Gas Emissions
- TRA-3: Unacceptable Level of Service at Unsignalized Airport Way/Woodward Avenue Intersection under Cumulative Plus Project Conditions
- TRA-4: Unacceptable Level of Service at Unsignalized Union Road/Woodward Avenue Intersection under Cumulative Plus Project Conditions
- TRA-8: Unacceptable Westbound State Route 120 Freeway Mainline Level of Service between Main Street and Union Road under Cumulative Plus Project AM Peak-Hour Conditions
- TRA-9: Unacceptable Westbound State Route 120 Freeway Mainline Level of Service between Union Road and Airport Way under Cumulative Plus Project AM Peak-Hour Conditions
- TRA-10: Unacceptable Eastbound State Route 120 Freeway Mainline Level of Service between Airport Way and Union Road under Cumulative Plus Project PM Peak-Hour Conditions
- TRA-11: Unacceptable Eastbound State Route 120 Freeway Mainline Level of Service between Union Road and Main Street under Cumulative Plus Project PM Peak-Hour Conditions
- CE-1: Cumulative Loss of Agricultural Lands
- CE-2: Cumulative Effect on Air Quality
- CE-4: Cumulative Impacts to Energy

CEQA requires that a lead agency adopt an MMRP for the measures the agency has proposed to avoid or mitigate significant environmental effects (CEQA Guidelines Section 15097). The purpose of the MMRP is to ensure that the mitigation measures identified in the EIR are implemented and to identify who is responsible for their implementation.

Table 4-1, which follows this introductory section, identifies the mitigation measures for the proposed project, the parties responsible for implementing and monitoring the measures, the timing of each measure, and a summary of the actions necessary to implement and monitor each measure.

## Mitigation Monitoring and Reporting Program

The MMRP has been prepared for the proposed project in accordance with Public Resources Code 21081.6, which specifies that when a public agency makes findings required by paragraph (1) of subdivision (a) of Section 21081, it “shall adopt a reporting or monitoring program for the changes made to the project or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment.” Public Resources Code 21081.6 further specifies that the MMRP will “ensure compliance during project implementation.”

This MMRP is intended to ensure the effective implementation of mitigation measures that are within the City's authority to implement, including monitoring where identified, throughout all phases of development and operation of the proposed project.

**Table 4-1.** Mitigation Monitoring and Reporting Plan

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Timing                                             | Implementing Party | Monitoring Party | Monitoring Actions                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|--------------------|------------------|-----------------------------------------------------------------------------|
| <b>Aesthetics</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                    |                    |                  |                                                                             |
| <i>Initial Study</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                    |                    |                  |                                                                             |
| <b>Mitigation Measure VIS-1: Require Lighting Design to Be Shielded and Directed Downward in Compliance with City of Manteca Standards</b><br><br>Night lighting along the streets in the Silva Estates (formerly Milner Estates) development shall be focused downward and/or shielded to avoid glare and point sources of light interfering with the vision of onsite and offsite residents and motorists on local roadways. Night lighting for streets will be required to conform with City standards regarding street lighting. Lighting elements will be required to be recessed within their fixtures to prevent glare. A specialist in lighting design shall be consulted during project design to determine light source locations, light intensities, and type of light source.<br><br>New lighting levels provided shall be compatible with general illumination levels in existing areas to avoid a noticeable contrast in light emissions, consistent with the need to provide for safety and security. The overall objective would be to establish area lighting that would be adequate for safety and surveillance but minimize the potential effects on nighttime views from locations around and within the project area. | Prior to construction                              | Project proponent  | City of Manteca  | Require in improvement plans<br><br>Verify periodically during construction |
| <b>Agricultural Resources</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                    |                    |                  |                                                                             |
| <i>Environmental Impact Report</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                    |                    |                  |                                                                             |
| <b>Mitigation Measure AG-1: Agricultural Mitigation Fee</b><br><br>The applicant shall pay the agricultural mitigation fee as required by Manteca Municipal Code Chapter 13.42.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | As required by Manteca Municipal Code Chapter 1342 | Project proponent  | City of Manteca  | Verify before issuance of building permit                                   |
| <b>Mitigation Measure AG-2: Phase Development of the Project to Provide Buffers and Protect Ongoing Agriculture</b><br><br>The project applicants shall phase the development of agricultural lands at the project site in a way that avoids the fragmentation of continuing agricultural operations. As development occurs at the project site, fencing, walls, or other suitable barriers shall be constructed or established at the interface between development and adjacent agricultural lands. Growers cultivating lands near or adjacent to urban development in the vicinity of the project site can be expected to comply with all necessary federal, state, and local restrictions regarding buffers between pesticide or herbicide application and sensitive areas.                                                                                                                                                                                                                                                                                                                                                                                                                                                            | At the time of approval of final maps              | Project proponent  | City of Manteca  | Verify before approval of final map                                         |

Table 4-1. Continued

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Timing                                     | Implementing Party | Monitoring Party | Monitoring Actions                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Air Quality</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                            |                    |                  |                                                                                                                                          |
| <i>Environmental Impact Report</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                            |                    |                  |                                                                                                                                          |
| <b>Mitigation Measure AQ-1a: Prepare and Implement a Dust Control Plan</b><br>To control the generation of construction-related PM10 emissions, the City shall require construction contractors to prepare and submit a dust control plan to the SJVAPCD at least 48 hours prior to any earthmoving or construction activities. The requirements of the dust control plan are included in Appendix E (SJVAPCD Regulation VIII Fugitive PM10 Prohibitions Dust Control Plan).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Prior to construction                      | Project proponent  | City of Manteca  | Require prior to issuing grading and building permits<br><br>Verify implementation of dust control plan periodically during construction |
| <b>Climate Change</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                            |                    |                  |                                                                                                                                          |
| <i>Environmental Impact Report</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                            |                    |                  |                                                                                                                                          |
| <b>Mitigation Measure CC-1: Implement Project Design Features to Reduce Project Contribution to Climate Change</b><br><br><b>Energy Efficiency</b> <ul style="list-style-type: none"> <li>■ Design buildings to be energy efficient.</li> <li>■ Install efficient lighting and lighting control systems. Site and design building to take advantage of daylight.</li> <li>■ Use trees, landscaping and sun screens on west and south exterior building walls to reduce energy use.</li> <li>■ Install “cool” roofs.</li> <li>■ Provide information on energy management services for large energy users.</li> <li>■ Install energy efficient heating and cooling systems, appliances and equipment, and control systems.</li> <li>■ Install light emitting diodes (LEDs) for traffic, street and other outdoor lighting.</li> <li>■ Limit the hours of operation of outdoor lighting.</li> <li>■ Use solar heating, automatic covers, and efficient pumps and motors for pools and spas.</li> <li>■ Provide education on energy efficiency.</li> </ul> <b>Renewable Energy</b> <ul style="list-style-type: none"> <li>■ Install solar or wind power systems and solar hot water heaters. Educate consumers about existing incentives.</li> </ul> | During design, construction, and operation | Project proponent  | City of Manteca  | Require in and building permits and improvement plans<br><br>Verify periodically during construction                                     |

**Table 4-1.** Continued

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Timing | Implementing Party | Monitoring Party | Monitoring Actions |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------------|------------------|--------------------|
| <ul style="list-style-type: none"> <li>■ Install solar panels on carports and over parking areas.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |        |                    |                  |                    |
| <b>Water Conservation and Efficiency</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |                    |                  |                    |
| <ul style="list-style-type: none"> <li>■ Create water-efficient landscapes.</li> <li>■ Install water-efficient irrigation systems and devices.</li> <li>■ Use reclaimed water for landscape irrigation in new developments and on public property. Install the infrastructure to deliver and use reclaimed water.</li> <li>■ Design buildings to be water-efficient. Install water-efficient fixtures and appliances.</li> <li>■ Restrict watering methods (<i>e.g.</i>, prohibit systems that apply water to non-vegetated surfaces) and control runoff.</li> <li>■ Restrict the use of water for cleaning outdoor surfaces and vehicles.</li> <li>■ Implement low-impact development practices that maintain the existing hydrologic character of the site to manage storm water and protect the environment. (Retaining storm water runoff on-site can drastically reduce the need for energy-intensive imported water at the site).</li> <li>■ Devise a comprehensive water conservation strategy appropriate for the project and location. The strategy may include many of the specific items listed above, plus other innovative measures that are appropriate to the specific project.</li> <li>■ Provide education about water conservation and available programs and incentives, such as in water bills.</li> </ul> |        |                    |                  |                    |
| <b>Solid Waste Measures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |                    |                  |                    |
| <ul style="list-style-type: none"> <li>■ Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).</li> <li>■ Provide exterior storage areas for recyclables and green waste and adequate recycling containers located in public areas.</li> <li>■ Provide education and publicity about reducing waste and available recycling services.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |                    |                  |                    |
| <b>Transportation and Motor Vehicles</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |                    |                  |                    |
| <ul style="list-style-type: none"> <li>■ Limit idling time for commercial vehicles, including delivery and construction vehicles.</li> <li>■ Encourage use of low or zero-emission vehicles, including construction vehicles.</li> <li>■ Create local “light vehicle” networks, such as neighborhood electric vehicle (NEV) systems.</li> <li>■ Provide the necessary facilities and infrastructure to encourage the use of low or zero-emission vehicles (<i>e.g.</i>, electric vehicle charging facilities and conveniently located alternative fueling stations).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |                    |                  |                    |

Table 4-1. Continued

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Timing              | Implementing Party | Monitoring Party | Monitoring Actions                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------------|------------------|----------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>■ Institute a low-carbon fuel vehicle incentive program.</li> <li>■ Provide shuttle service to public transit.</li> <li>■ Provide public transit incentives such as free or low-cost monthly transit passes.</li> <li>■ Promote “least polluting” ways to connect people and goods to their destinations.</li> <li>■ Incorporate bicycle lanes and routes into street systems, new subdivisions, and large developments.</li> <li>■ Incorporate bicycle-friendly intersections into street design.</li> <li>■ For commercial projects, provide adequate bicycle parking near building entrances to promote cyclist safety, security, and convenience. For large employers, provide facilities that encourage bicycle commuting, including, <i>e.g.</i>, locked bicycle storage or covered or indoor bicycle parking.</li> <li>■ Create bicycle lanes and walking paths directed to the location of schools, parks and other destination points.</li> <li>■ Work with the school district to restore or expand school bus services.</li> <li>■ Institute a telecommute and/or flexible work hours program. Provide information, training, and incentives to encourage participation. Provide incentives for equipment purchases to allow high-quality teleconferences.</li> <li>■ Provide information on all options for individuals and businesses to reduce transportation-related emissions. Provide education and information about public transportation.</li> </ul> |                     |                    |                  |                                                                                        |
| <b>Biological Resources</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |                    |                  |                                                                                        |
| <i>Initial Study</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                     |                    |                  |                                                                                        |
| <b>Mitigation Measure BIO-1: Conduct Tree Removal Activities during the Nonbreeding Season for Swainson’s Hawk and Non-Special-Status Migratory Birds and Raptors or Retain a Qualified Biologist to Conduct a Nesting Bird Survey before Tree Removal Activities</b><br><br>To avoid removing any active Swainson’s hawk or other non-special-status bird and raptor nests, tree removal activities will be conducted during the nonbreeding season for these species (generally August 16 through February 28) or after a qualified biologist determines that fledglings have left the nest, as described in the SJMSCP (Sections 5.2.3.1[G], 5.2.4.11, 5.2.4.18, and 5.2.4.19).<br><br>If tree removal activities will be conducted before August 16 and after February 28, a qualified biologist will be retained to survey for nesting birds in all trees that will be removed and any tree located within 100 feet of construction activities, including grading.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | During construction | Project proponent  | City of Manteca  | Require in grading and building permits<br><br>Verify periodically during construction |

Table 4-1. Continued

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Timing                                | Implementing Party | Monitoring Party | Monitoring Actions                                                                     |
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| The nesting bird survey will be conducted at most 48 hours before tree removal activities. If the biologist determines that the area surveyed does not contain any active nests, then tree removal activities can commence without any further mitigation. If active nests are found, construction will not occur until nesting activities have ceased (after a qualified biologist determines that fledglings have left the nest).                                                                                                                                                                                                                                                                                                                                                                                                                |                                       |                    |                  |                                                                                        |
| <b>Mitigation Measure BIO-2: Compensate for the Loss of Multipurpose Open Space Lands as Outlined in the SJMSCP</b><br><br>As required under Section 4.1.2 of the SJMSCP, the applicant will pay the current fee for each acre of habitat that is converted from multipurpose open space land to non-open-space uses. The final cost to fulfill project compensation requirements will be determined during coordination with SJCOG. Compensation fees must be paid before any ground-disturbing activities, including grading (SJMSCP Section 5.3.2.3[A]).                                                                                                                                                                                                                                                                                        | Prior to issuance of building permits | Project proponent  | City of Manteca  | Verify prior to issuing grading and building permits                                   |
| <b>Cultural Resources</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                       |                    |                  |                                                                                        |
| <b>Environmental Impact Report</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                       |                    |                  |                                                                                        |
| <b>Mitigation Measure CR-1a: Stop Work in Case of Accidental Discovery of Buried Archeological Resources</b><br><br>If buried cultural resources, such as chipped or ground stone, historic debris, building foundations, or human bone, are inadvertently discovered during ground-disturbing activities, work will stop in that area and within 100 feet of the find until a qualified archaeologist can assess the significance of the find and, if necessary, develop appropriate treatment measures in consultation with the City and other appropriate agencies. (See also Implementation Measure RC-I-46 of the City of Manteca General Plan 2023 Policy Document [City of Manteca 2003c]).                                                                                                                                                 | During construction                   | Project proponent  | City of Manteca  | Require in grading and building permits<br><br>Verify periodically during construction |
| <b>Mitigation Measure CR-2a: Stop Work in Case of Accidental Discovery of Buried Human Remains</b><br><br>If human remains of Native American origin are discovered during project construction, it is necessary to comply with state laws relating to the disposition of Native American burials, which fall within the jurisdiction of the NAHC (PRC 5097). If any human remains are discovered or recognized in any location other than a dedicated cemetery, there will be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until: <ul style="list-style-type: none"> <li>■ the county coroner has been informed and has determined that no investigation of the cause of death is required; and</li> <li>■ if the remains are of Native American origin,</li> </ul> | During construction                   | Project proponent  | City of Manteca  | Require in grading and building permits<br><br>Verify periodically during construction |



Table 4-1. Continued

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Timing              | Implementing Party | Monitoring Party | Monitoring Actions                                                                     |
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| <ul style="list-style-type: none"> <li>❑ the descendants of the deceased Native Americans have made a recommendation to the landowner or the person responsible for the excavation work for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in PRC 5097.98, or</li> <li>❑ the NAHC was unable to identify a descendant or the descendant failed to make a recommendation within 24 hours after being notified by the commission.</li> </ul> <p>According to California Health and Safety Code, six or more human burials at one location constitute a cemetery (Section 8100), and disturbance of Native American cemeteries is a felony (Section 7052). Section 7050.5 requires that construction or excavation be stopped in the vicinity of discovered human remains until the coroner can determine whether the remains are those of a Native American. If the remains are determined to be Native American, the coroner must contact the NAHC.</p> |                     |                    |                  |                                                                                        |
| <b>Geology and Soils</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |                    |                  |                                                                                        |
| <b>Environmental Impact Report</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |                    |                  |                                                                                        |
| <b>Mitigation Measure GEO-4a: Stockpile Excavated Topsoil for Onsite Reuse</b><br><br>The proponent will require the contractors retained for project construction and landscaping to stockpile excavated topsoil so it can be reused for revegetation and landscaping on the project site. Topsoil will be stockpiled separately from other excavated materials to ensure that as much as possible can be effectively salvaged.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | During construction | Project proponent  | City of Manteca  | Require in improvement plans<br><br>Verify periodically during construction            |
| <b>Mitigation Measure GEO-7a: Conduct Preconstruction Survey, Salvage, and Protection</b><br><br>Before site preparation (including vegetation clearing) and project earthwork begin, the applicant will retain a qualified professional paleontologist as defined by the SVP Conformable Impact Mitigation Guidelines Committee (1995) to conduct a pedestrian surface survey and, if necessary, a paleontological salvage operation. The goal of the salvage operation, if needed, will be to ensure that any paleontological materials exposed at the surface are recovered and properly prepared and curated, or protected from damage using exclusion fencing or other appropriate means. The completed survey shall be submitted to the City. Protection will be designed and installed in consultation with the City and the project engineering consultant to ensure that it is appropriate and effective, but does not unduly impede construction activities.                                                            | During construction | Project proponent  | City of Manteca  | Require in grading and building permits<br><br>Verify periodically during construction |

Table 4-1. Continued

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Timing              | Implementing Party | Monitoring Party | Monitoring Actions                                                                     |
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| <b>Mitigation Measure GEO-7b: Retain a Qualified Professional Paleontologist to Monitor During Ground-Disturbing Activities</b><br><br>The applicant will retain a qualified professional paleontologist as defined by the SVP Conformable Impact Mitigation Guidelines Committee (1995) to monitor during any activities with the potential to disturb the Modesto Formation or any other substrate units of Pleistocene age.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | During construction | Project proponent  | City of Manteca  | Require in grading and building permits<br><br>Verify periodically during construction |
| <b>Mitigation Measure GEO-7c: Provide Worker Sensitivity Training for Paleontological Resources, and Stop Work and Implement Evaluation and Treatment Measures if Macrofossil Remains are Encountered During Construction</b><br><br>The project proponent will ensure that all construction personnel receive training provided by a qualified professional paleontologist, experienced in teaching nonspecialists, to ensure that they can recognize fossil materials in the event any are discovered during construction. If known or potential macrofossil materials (vertebrate remains, fossil shell, etc.) are discovered during any site preparation, excavation, or project-related activities, work will stop in the area of the find, and the contractor will notify the City's project manager and the qualified paleontologist retained to perform project monitoring. The paleontologist will assess the nature and importance of the find and recommend appropriate treatment, consistent with the SVP's 1995 guidelines and all other applicable standards of care. If the paleontologist identifies a need, a state-licensed professional geologist (California PG) will also be retained to assist with evaluating the potential for project work to further disturb the geologic units in which the find was made. Work will not resume in the area of the find until the find has been assessed by the paleontologist and any treatment identified as necessary has been implemented. However, with the paleontologist's approval, work may resume on other portions of the site during evaluation and treatment of the find. Depending on the nature of the find, site-specific geologic conditions, and the project activities planned for the site, treatment may include paleontological monitoring, preparation and recovery of fossil materials so that they can be housed in an appropriate museum or university collection, preparation of a report for publication describing the finds, or other approaches developed for the site. The project proponent will be responsible for ensuring that the paleontologist's recommendations regarding treatment and reporting are implemented. | During construction | Project proponent  | City of Manteca  | Require in grading and building permits<br><br>Verify periodically during construction |

Table 4-1. Continued

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Timing                                   | Implementing Party | Monitoring Party | Monitoring Actions                                                                     |
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| <b>Hazards and Hazardous Materials</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                          |                    |                  |                                                                                        |
| <i>Initial Study</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                          |                    |                  |                                                                                        |
| <b>Mitigation Measure HAZ-1c: Perform Hazards Records Search Prior to Development of Project Site and Implement Necessary Remediation</b><br><br>Prior to development of project site, the City will perform hazardous records searches to determine whether the site is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, could create a significant hazard to the public or the environment. If any hazardous sites are discovered, the City will implement necessary remediation actions as required by law before developing the site.                                                                                                                                                                                                                                  | Prior to construction, including grading | Project proponent  | City of Manteca  | Verify prior to issuing grading and building permits                                   |
| <b>Mitigation Measure HAZ-3: Incorporate Emergency Access Routes during Construction</b><br><br>The MFD shall have oversight on emergency access during construction of the program elements. The MFD will verify that adequate emergency access throughout the project area continues during project construction. The MFD and other emergency service providers will be notified of lane closures and detours at least 1 week in advance of the closure so that adequate alternate routes can be determined.                                                                                                                                                                                                                                                                                                                                   | During construction                      | Project proponent  | City of Manteca  | Require in grading and building permits<br><br>Verify periodically during construction |
| <i>Environmental Impact Report</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                          |                    |                  |                                                                                        |
| <b>Mitigation Measure HAZ-2a: Develop and Implement Plans to Reduce Exposure to Hazardous Conditions</b><br><br>A site-specific safety plan and operations and maintenance plan shall be prepared by the project applicant for review and approval by the Manteca Fire Department (MFD). A fire safety plan shall also be prepared by the project applicant for review and approval by the MFD. The applicant shall also develop and implement a hazardous materials management plan that addresses public health and safety issues by providing safety measures, including release-prevention measures; employee training, notification, and evacuation procedures; and adequate emergency response protocols and cleanup procedures. This plan shall be submitted prior to the approval of grading permits for review and approval by the MFD. | During construction                      | Project proponent  | City of Manteca  | Require in grading and building permits<br><br>Verify periodically during construction |
| <b>Mitigation Measure HAZ-2b: Follow Manteca Fire Department and Other Guidelines for Storage and Handling of Hazardous Materials</b><br><br>The project applicant shall require that contractors transport, store, and handle hazardous materials required for construction in a manner consistent with relevant regulations and guidelines, including those recommended and enforced by the MFD.                                                                                                                                                                                                                                                                                                                                                                                                                                               | During construction                      | Project proponent  | City of Manteca  | Require in grading and building permits<br><br>Verify periodically during construction |

Table 4-1. Continued

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Timing                                   | Implementing Party | Monitoring Party | Monitoring Actions                                                                            |
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| <p><b>Mitigation Measure HAZ-2c: Immediately Contain Spills, Excavate Spill-Contaminated Soil, and Dispose of It at Approved Facility</b></p> <p>In the event of a spill of hazardous materials in an amount reportable to the MFD (as established by fire department guidelines), the project applicant shall immediately control the source of the leak and contain the spill. If required by the fire department or other regulatory agencies, contaminated soils shall be excavated and disposed of offsite at a facility approved to accept such soils.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | During construction                      | Project proponent  | City of Manteca  | <p>Require in grading and building permits</p> <p>Verify periodically during construction</p> |
| <p><b>Mitigation Measure HAZ-2d: Screen Surface Soils in Project Area for Residuals from Agricultural Chemicals and Other Hazardous Materials</b></p> <p>As described under “Environmental Setting” above, known hazardous materials and potentially contaminated soils located in the proposed project area could create a hazard by exposing the public to hazardous materials such as pesticides and other chemicals. To reduce the potential for human exposure to potentially harmful pesticide, fertilizer, and other chemical residues during construction in areas with potential for harmful pesticide and fertilizer residues, surface soils in the area shall be sampled or field screened by a qualified hazardous materials consultant for residuals from agricultural chemicals during construction. The structure dripline soils around the existing buildings and any remaining foundations of former buildings shall be tested for lead, asbestos, and pesticides prior to development.</p> <p>The San Joaquin County Environmental Health Department (SJCEHD) shall review the results of soils sampling or screening and, in the event that soil sampling or field screening indicates the presence of hazardous concentrations of agricultural chemicals and other hazards, the soils shall be excavated and properly disposed of before development begins.</p> | Prior to construction, including grading | Project proponent  | City of Manteca  | <p>Verify prior to issuing grading and building permits</p>                                   |
| <p><b>Mitigation Measure HAZ-2e: Proper Removal of Hazardous Materials and Hazardous Material Containers from the Site</b></p> <p>The project applicant shall require the removal of drums and containers of known hazardous substances from the site. If an underground storage tank is found during development of the site, the project applicant shall obtain a permit from the SJCEHD for proper removal. In addition, debris piles and tires shall be properly disposed of prior to grading.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | During construction                      | Project proponent  | City of Manteca  | <p>Require in grading and building permits</p> <p>Verify periodically during construction</p> |

Table 4-1. Continued

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Timing                                   | Implementing Party | Monitoring Party | Monitoring Actions                                                                     |
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| <b>Mitigation Measure HAZ-2f: Proper Abandonment of Septic Systems</b><br><br>Septic systems are also present on the project site, and the project applicant must properly abandon the systems. The project applicant shall obtain a permit from the SJCEHD, and licensed sewage haulers shall pump and remove the sewage. The project applicant shall be responsible for collapsing and removing the top of the septic system and shall then backfill the empty septic tank with clean fill material (soil, sand, or pea gravel) to the upper edge of the tank. The SJCEHD will inspect the site to ensure that the septic systems have been properly abandoned.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | During construction                      | Project proponent  | City of Manteca  | Require in grading and building permits<br><br>Verify periodically during construction |
| <b>Hydrology and Water Quality</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                          |                    |                  |                                                                                        |
| <b>Environmental Impact Report</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                          |                    |                  |                                                                                        |
| <b>Mitigation Measure HYD-1a: Implement Erosion and Sediment Control Measures</b><br><br>Before onset of construction activities on construction sites of 1 acre or more, the applicant or its contractor shall obtain coverage under the NPDES General Construction Permit. The City will be responsible for ensuring that construction activities comply with the conditions in this permit, which require development of a SWPPP, implementation of BMPs identified in the SWPPP, and monitoring to ensure that effects on water quality are minimized. As a performance standard, BMPs implemented shall include controls of pollutant discharges that utilize the best available technology (BAT) that is economically achievable, best conventional technology (BCT) to reduce pollutants, and any more stringent controls necessary to meet water quality standards.<br><br>The following erosion and sediment control BMPs are examples of BMPs that may be part of the SWPPP to be included in the construction specifications and project performance specifications, based on standard City measures and standard dust-reduction measures: <ul style="list-style-type: none"> <li>■ Cover or apply nontoxic soil stabilizers to inactive construction areas (previously graded areas inactive for 10 days or more) that could contribute sediment to waterways.</li> <li>■ Enclose and cover exposed stockpiles of dirt or other loose, granular construction materials that could contribute sediment to waterways.</li> <li>■ Control and contain soil and filter runoff from disturbed areas. This will be done by using berms, silt fencing, straw bales or wattles, plastic sheeting or geofabric, silt/sediment traps and catch basins, silt fencing, sand bag dikes, temporary vegetation or other groundcover, or other means necessary to prevent the escape of sediment from the disturbed area.</li> <li>■ Ensure that no earth or organic material shall be deposited or placed where it may be directly carried into a stream, marsh, slough, lagoon, or body of standing water.</li> </ul> | Prior to construction, including grading | Project proponent  | City of Manteca  | Verify prior to issuing grading and building permits                                   |

**Table 4-1.** Continued

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Timing                                   | Implementing Party | Monitoring Party | Monitoring Actions                                   |
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| <ul style="list-style-type: none"> <li>■ Prohibit the following types of materials from being rinsed or washed into the streets, shoulder areas, or gutters: concrete; solvents and adhesives; thinners; paints; fuels; sawdust; dirt; gasoline; asphalt and concrete saw slurry; and heavily chlorinated water.</li> <li>■ Ensure that dewatering activities shall be conducted according to the provisions of the SWPPP. No dewatered materials shall be placed in local water bodies or in storm drains leading to such bodies without implementation of proper construction water quality control measures.</li> <li>■ Ensure that drainage facilities in downstream offsite areas will be protected from sediment using BMPs acceptable to the City and Central Valley RWQCB.</li> <li>■ Ensure that grass or other vegetative cover will be established on the construction site as soon as possible after disturbance.</li> </ul> <p>Preparation and implementation of a SWPPP will be conducted by the applicant or its contractors. The City will review the SWPPP and ensure that its contractors have submitted an NOI to comply with the General Construction Permit to the Central Valley RWQCB before construction begins. The City or its agent will perform routine inspections of the construction area to verify that the BMPs specified in the SWPPP are properly implemented and maintained. The City will notify its contractors immediately if there is a noncompliance issue and will require compliance.</p> |                                          |                    |                  |                                                      |
| <p><b>Mitigation Measure HYD-1b: Develop and Implement a Spill Prevention, Control, and Countermeasure Program for Construction Activities</b></p> <p>The project contractor will develop and implement a spill prevention, control, and countermeasure program (SPCCP) to minimize the potential for and effects from spills of hazardous, toxic, or petroleum substances during construction activities. The SPCCP will be completed before any construction activities begin. Implementation of this measure shall comply with state and federal water quality regulations.</p> <p>The federal reportable spill quantity for petroleum products, as defined in 40 CFR 110, is any oil spill that:</p> <ul style="list-style-type: none"> <li>■ violates applicable water quality standards,</li> <li>■ causes a film or sheen on or discoloration of the water surface or adjoining shoreline, or</li> <li>■ causes a sludge or emulsion to be deposited beneath the surface of the water or adjoining shorelines.</li> </ul> <p>If a spill is reportable, the contractor's superintendent will notify the City and take action to contact the appropriate safety and cleanup crews to implement the SPCCP. A written description of reportable releases must be submitted to the Central Valley RWQCB. This submittal must contain a description of the release, including the type of material, and an</p>                                                                                                                      | Prior to construction, including grading | Project proponent  | City of Manteca  | Verify prior to issuing grading and building permits |

Table 4-1. Continued

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Timing                                   | Implementing Party | Monitoring Party | Monitoring Actions                                   |
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| <p>estimate of the amount spilled, the date of the release, an explanation of why the spill occurred, and a description of the steps taken to prevent and control future releases. The releases shall be documented on a spill report form.</p> <p>If an appreciable spill has occurred and results determine that project activities have adversely affected surface water or groundwater quality, a detailed analysis shall be performed to identify the likely cause of contamination, and recommendations shall be made for reducing or eliminating the source or mechanisms of contamination. Using this analysis, the project contractor will select and implement measures to control contamination, with a performance standard that surface water and/or groundwater quality must be returned to baseline conditions. These measures will be subject to review by the City.</p> <p>The City will review the SPCCP before onset of construction activities as required. The City will routinely inspect the construction area to verify that the measures specified in the SPCCP are properly implemented and maintained. The City will notify its contractors immediately if there is a noncompliance issue and will require compliance.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                          |                    |                  |                                                      |
| <p><b>Mitigation Measure HYD-1c: Develop and Implement a Frac-Out Contingency Plan for Jack-and-Bore Activities</b></p> <p>For tunneling activities that use drilling lubricants (e.g., construction of pipelines using jack-and-bore methods), the contractor will prepare and implement a frac-out contingency plan to minimize the potential for a frac-out associated with tunneling activities, provide for the timely detection of frac-outs, and ensure an organized, timely, and “minimum-impact” response in the event of a frac-out and release of drilling lubricant (e.g., bentonite). The frac-out contingency plan will require, at a minimum, the following measures.</p> <ul style="list-style-type: none"> <li>■ A full-time monitor will attend all drilling activities to look for observable frac-out conditions or lowered pressure readings on drilling equipment.</li> <li>■ If a frac-out is identified, all work will stop, including the recycling of drilling lubricant. In the event of a frac-out into water, the pressure of water above the tunnel will keep excess mud from escaping through the fracture. The location and extent of the frac-out will be determined, and the frac-out will be monitored for 4 hours to determine whether the drilling lubricant congeals (bentonite will usually harden, effectively sealing the frac-out location).</li> <li>■ If the drilling lubricant congeals, no other actions will be taken that potentially suspend sediments in the water column.</li> <li>■ Surface releases of bentonite will be allowed to harden and then will be removed.</li> <li>■ The Frac-Out Contingency Plan will identify additional measures to be taken to contain</li> </ul> | Prior to construction, including grading | Project proponent  | City of Manteca  | Verify prior to issuing grading and building permits |

Table 4-1. Continued

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Timing                                   | Implementing Party | Monitoring Party | Monitoring Actions                                                                            |
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| <p>or remove the drilling lubricant if it does not congeal.</p> <p>Preparation and implementation of a frac-out contingency plan will be reflected in contract documents.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                          |                    |                  |                                                                                               |
| <p><b>Mitigation Measure HYD-2a: Provisions for Dewatering</b></p> <p>Dewatering effluent shall be discharged to the SSJID drainage system and is subject to the SSJID–City of Manteca Storm Drainage Agreement (South San Joaquin Irrigation District 1999). Before discharging any substance that could reach surface waters, the applicant’s contractors shall obtain an NPDES permit and WDRs from the Central Valley RWQCB. Depending on the volume and characteristics of the discharge, coverage under the RWQCB’s General Construction Permit or General Dewatering Permit is possible. As part of the permit, the contractors will design and implement measures as necessary so that the discharge limits identified in the relevant permit are met. As a performance standard, these measures will be selected to achieve maximum sediment removal and represent the BAT that is economically achievable. Implemented measures may include retention of dewatering effluent until particulate matter has settled before it is discharged, use of infiltration areas, and other BMPs. Final selection of water quality control measures will be subject to review by the City.</p> <p>The City will verify that coverage under the appropriate NPDES permit has been obtained before allowing dewatering activities to begin. The City or its agent shall perform routine inspections of the construction area to verify that the water quality control measures are properly implemented and maintained. The City will notify the contractors immediately if there is a noncompliance issue and will require compliance.</p> | During construction                      | Project proponent  | City of Manteca  | <p>Require in grading and building permits</p> <p>Verify periodically during construction</p> |
| <p><b>Mitigation Measure HYD-3a: Implement Best Management Practices to Maximize Stormwater Quality</b></p> <p>To reduce or eliminate water quality effects from polluted runoff from the project, the developer or applicant shall implement multiple BMPs in areas with a potential to drain into storm drainage systems or surface waters. The BMPs may include a combination of source control, structural elements, and treatment systems. BMPs may include:</p> <ul style="list-style-type: none"> <li>■ The streets and sidewalks create new impervious surfaces. To help minimize the amount of pollutants entering the storm drain system, paved project roadways and parking areas shall be cleaned regularly using street sweeping equipment. Additionally, litter and debris that may accumulate on the project site shall be regularly collected and properly disposed. These measures shall be carried out at least monthly if construction occurs during the rainy season (October–April).</li> <li>■ Dry detention basins, which are typically dry except after a major rainstorm when it will</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Prior to construction, including grading | Project proponent  | City of Manteca  | Verify prior to issuing grading and building permits                                          |



Table 4-1. Continued

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Timing              | Implementing Party | Monitoring Party | Monitoring Actions                                                                            |
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| <p>temporarily fill with stormwater, will be created and designed to decrease runoff during storm events, prevent flooding, and allow for off-peak discharge. Basin features shall include maintenance schedules for periodic removal of sedimentation, excessive vegetation, and debris that may clog basin inlets and outlets.</p> <ul style="list-style-type: none"> <li>■ Grass buffer strips, high infiltration substrates, and grassy swales shall be used where feasible throughout the project site to reduce runoff, serve as biofilters, and provide initial stormwater treatment. This type of treatment will apply particularly to parking lots.</li> <li>■ Physical devices shall be placed at outlets of pipes and channels to reduce the velocity or the energy of exiting water. Outlet protection helps to prevent scour and minimize the potential for downstream erosion by reducing the velocity or energy of concentrated stormwater flows.</li> </ul> <p>The City, contractors, or applicant shall select a combination of BMPs that is expected to remove contaminants from stormwater discharges. The final selection and design of BMPs shall provide maximum contaminant removal, represent the best available technology that is economically achievable, and explicitly identify the expected level of effectiveness at contaminant removal.</p> <p>The City shall inspect following construction to ensure that all identified BMPs have been properly installed. The project shall adopt a regular maintenance and monitoring schedule to ensure that these BMPs function properly during project operations. If necessary, the City shall require that additional BMPs be designed and implemented if those originally constructed do not achieve the identified performance standard.</p> |                     |                    |                  |                                                                                               |
| <b>Noise</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                     |                    |                  |                                                                                               |
| <b>Environmental Impact Report</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                     |                    |                  |                                                                                               |
| <p><b>Mitigation Measure NOI-1a: Employ Noise-Reducing Construction Practices</b></p> <p>The project applicant shall employ noise-reducing construction practices so that construction noise does not exceed 50 dBA <math>L_{eq}</math> between 7 p.m. and 10 p.m. or 45 dBA <math>L_{eq}</math> between 10 p.m. and 7 a.m. Measures that can be used to limit noise include:</p> <ul style="list-style-type: none"> <li>■ prohibiting noise-generating construction activity between 7 p.m. and 7 a.m.,</li> <li>■ locating equipment as far as practical from noise-sensitive uses,</li> <li>■ requiring that all construction equipment powered by gasoline or diesel engines have sound-control devices that are at least as effective as those originally provided by the manufacturer and that all equipment be operated and maintained to minimize noise generation,</li> <li>■ prohibiting gasoline or diesel engines from having unmuffled exhaust,</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | During construction | Project proponent  | City of Manteca  | <p>Require in grading and building permits</p> <p>Verify periodically during construction</p> |

Table 4-1. Continued

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Timing                   | Implementing Party | Monitoring Party | Monitoring Actions                                                                     |
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| <ul style="list-style-type: none"> <li>■ selecting haul routes that affect the fewest people,</li> <li>■ using noise-reducing enclosures around noise-generating equipment, and</li> <li>■ constructing barriers between noise sources and noise-sensitive land uses or taking advantage of existing barrier features (terrain, structures) to block sound transmission.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                          |                    |                  |                                                                                        |
| <b>Mitigation Measure NOI-1b: Disseminate Essential Information to Residences and Implement a Complaint/Response Tracking Program</b><br><br>Before construction begins, the contractor shall notify residences within 500 feet of the construction areas of the construction schedule in writing. The contractor will designate a noise-disturbance coordinator who will be responsible for responding to complaints regarding construction noise during the full term of construction. The coordinator will determine the cause of the complaint and ensure that reasonable measures are implemented to correct the problem. A contact telephone number for the noise-disturbance coordinator will be conspicuously posted on construction site fences and included in the written notification of the construction schedule sent to nearby residents. The noise-disturbance coordinator shall submit to the City a weekly summary of any noise complaints that have been received. The summary shall include, but is not limited to, the name of the complainant and location, the nature of the complaint, and the action being taken to address the complaint. | During construction      | Project proponent  | City of Manteca  | Require in grading and building permits<br><br>Verify periodically during construction |
| <b>Mitigation Measure NOI-3a: Construct Noise Barriers along Woodward Avenue and Union Road so that Traffic Noise Does Not Exceed 60 dBA Ldn in Outdoor Use Areas</b><br><br>The project applicant shall construct noise barriers along Woodward Avenue and Union Road so that traffic noise in primary outdoor use areas at residences does not exceed 60 dBA Ldn. A preliminary analysis indicates that barriers 6 to 8 feet high will reduce traffic noise to 60 dBA Ldn or less. Once the tentative map and roadway alignments are finalized, the project applicant shall prepare a report identifying final wall heights and materials necessary to reduce noise at outdoor residential use areas to 60 dBA Ldn or less. The walls shall require conditions of approval for all tentative maps that contain any primary outdoor use area that is exposed to more than 60 dBA Ldn abutting Woodward Avenue and Union Road.                                                                                                                                                                                                                                      | Prior to building permit | Project proponent  | City of Manteca  | Require in improvement plans                                                           |
| <b>Public Services</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                          |                    |                  |                                                                                        |
| <i>Initial Study</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |                    |                  |                                                                                        |
| <b>Mitigation Measure PUB-1: Require Payment of School Development Fees</b><br><br>The project proponent shall pay the required school development fees.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Prior to building permit | Project proponent  | City of Manteca  | Verify prior to issuance of building permits                                           |

Table 4-1. Continued

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Timing                   | Implementing Party | Monitoring Party | Monitoring Actions                                                                     |
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| <b>Recreation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                          |                    |                  |                                                                                        |
| <i>Initial Study</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                          |                    |                  |                                                                                        |
| <b>Mitigation Measure REC-1: Pay Park Acquisition and Improvement Fee</b><br>The project applicants shall comply with Policy PFP-53 of the General Plan, which requires payment of a park acquisition and improvement fee to fund systemwide improvements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Prior to building permit | Project proponent  | City of Manteca  | Verify prior to issuance of building permits                                           |
| <b>Transportation/Traffic</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                          |                    |                  |                                                                                        |
| <i>Initial Study</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                          |                    |                  |                                                                                        |
| <b>Mitigation Measure TRF-1: Develop and Implement a Traffic Control and Safety Plan for Project Construction</b><br>The contractor shall mitigate the proposed project's construction-related traffic impacts by developing and implementing a traffic control plan as part of the overall construction management plan, in accordance with City policies. The traffic control plan will be implemented throughout the course of project construction and will include, but may not be limited to, the following elements: <ul style="list-style-type: none"> <li>■ Provide a plan for communicating construction plans with RTD, emergency service providers, residences located in the project vicinity, and anyone else who may be affected by project construction.</li> <li>■ Identify roadway segments or intersections that are at or approaching LOS that exceeds local standards and provide for construction-generated traffic to avoid these locations at the peak periods, either by traveling different routes or by traveling at non-peak times of day.</li> <li>■ Maintain vehicular access to existing residences in the area at all times.</li> <li>■ Maintain existing nonmotorized access or provide detour and warning signs in construction area.</li> <li>■ Provide for adequate parking for construction trucks and equipment within the designated staging areas throughout the construction period.</li> <li>■ Provide adequate parking for construction workers within the designated staging areas.</li> <li>■ Restrict delivery of construction materials to between the hours of 9:00 a.m. and 3:00 p.m. to avoid more-congested morning and evening hours.</li> <li>■ Construction warning signs should be posted in accordance with local standards or those set forth in the Manual on Uniform Traffic Control Devices (Federal Highway Administration 2001) in advance of the construction area and at any intersection that</li> </ul> | During construction      | Project proponent  | City of Manteca  | Require in grading and building permits<br><br>Verify periodically during construction |

Table 4-1. Continued

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Timing                   | Implementing Party | Monitoring Party | Monitoring Actions                           |
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| <p>provides access to the construction area.</p> <ul style="list-style-type: none"> <li>Require that written notification be provided to contractors regarding appropriate routes to and from the construction site, and the weight and speed limits on local roads used to access the construction site.</li> <li>Specify that a sign be posted at all active construction areas, giving the name and telephone number or email address of the City staff person designated to receive complaints regarding construction traffic.</li> </ul>                                                                                                                                                                                                                                         |                          |                    |                  |                                              |
| <b>Environmental Impact Report</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                          |                    |                  |                                              |
| <p><b>Mitigation Measure TRA-1a: Pay Fair Share for the Installation of a Traffic Signal at the Union Road/Westbound State Route 120 On- and Off-Ramp Intersection</b></p> <p>As part of the project, the project applicant will pay its fair share of the cost for signalization of the Union Road/westbound SR 120 on- and off-ramp intersection. If the project applicant prefers to fund and install these signals at its expense, it would be reimbursed monies in excess of its fair-share portions. The total dollar amount shall be determined in consultation with the City at the time of the final map. Payment for improvements will occur as part of the collection of PFIP fees at the issuance of building permits.</p>                                                | Prior to building permit | Project proponent  | City of Manteca  | Verify prior to issuance of building permits |
| <p><b>Mitigation Measure TRA-2a: Pay Fair Share for Signalization of the Union Road/Eastbound State Route 120 On- and Off-Ramp Intersection</b></p> <p>As part of the project, the project applicant will pay its fair share of the cost for signalization of the Union Road/eastbound SR 120 on- and off-ramp intersection. If the project applicant prefers to fund and install these signals at its expense, it would be reimbursed monies in excess of its fair-share portions. The total dollar amount shall be determined in consultation with the City at the time of the final map. Payment for improvements will occur as part of the collection of PFIP fees at the issuance of building permits.</p>                                                                       | Prior to building permit | Project proponent  | City of Manteca  | Verify prior to issuance of building permits |
| <p><b>Mitigation Measure TRA-3a: Pay Fair Share for Signalization of the Airport Way/Woodward Avenue Intersection</b></p> <p>As part of the project, the project applicant will pay its fair share of the cost for signalization of the Airport Way/Woodward Avenue intersection to mitigate the project's contribution to the cumulative impact. Figure 3.8-11 presents the proposed mitigation measures. If project buildout would occur prior to signalization of the intersection, the applicant may either delay construction of the remainder of the project until the signals have been installed or choose to fund and install these signals at its expense. If the applicant funds signalization, it would be reimbursed monies in excess of its fair share portion. The</p> | Prior to building permit | Project proponent  | City of Manteca  | Verify prior to issuance of building permits |

Table 4-1. Continued

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Timing                   | Implementing Party | Monitoring Party | Monitoring Actions                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------|------------------|----------------------------------------------|
| total dollar amount shall be determined in consultation with the City at the time of the final map. Payment for improvements will occur as part of the collection of PFIP fees at the issuance of building permits.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |                    |                  |                                              |
| <b>Mitigation Measure TRA-4a: Pay Fair Share for Signalization of the Union Road/Woodward Avenue Intersection</b><br><br>As part of the project, the project applicant will pay its fair share of the cost for signalization of the Union Road/Woodward Avenue intersection to mitigate the project's cumulative impact. Figure 3.8-11 presents the proposed mitigation measures. If project buildout would occur prior to signalization of the intersection, the applicant may either delay construction of the remainder of the project until the signals have been installed or choose to fund and install these signals at its expense. If the applicant funds signalization, it would be reimbursed monies in excess of its fair-share portion. The total dollar amount shall be determined in consultation with the City at the time of the final map. Payment for improvements will occur as part of the collection of PFIP fees at the issuance of building permits. | Prior to building permit | Project proponent  | City of Manteca  | Verify prior to issuance of building permits |
| <b>Mitigation Measure TRA-5a: Pay Fair Share for Construction of an Additional Eastbound Left-Turn Pocket at the Signalized Union Road/Eastbound State Route 120 On- and Off-Ramp Intersection</b><br><br>As part of the project, the project applicant will pay its fair share of the cost of constructing an additional left-turn lane at the signalized Union Road/SR 120 eastbound on- and off-ramp intersection to mitigate the project's cumulative impact. Figure 3.8-11 presents the proposed mitigation measures. The total dollar amount shall be determined in consultation with the City at the time of the final map. Payment for improvements will occur as part of the collection of PFIP fees at the issuance of building permits.                                                                                                                                                                                                                           | Prior to building permit | Project proponent  | City of Manteca  | Verify prior to issuance of building permits |
| <b>Mitigation Measure TRA-6a: Pay Fair Share for Widening of Union Road from Two to Four Lanes between Daniels Street and Westbound State Route 120 On- and Off-Ramps</b><br><br>As development occurs along this section of roadway, the City will require dedication of right-of-way along Union Road between Daniels Street and the westbound SR 120 on- and off-ramps in order to widen the roadway from two to four lanes. The project applicant shall pay its fair share of the cost of widening Union Road between Daniels Street and the westbound SR 120 on- and off-ramps from two to four lanes, which would improve roadway-segment operations to acceptable LOS D. The total dollar amount shall be determined in consultation with the City at the time of the final map. Payment for improvements will occur as part of the collection of PFIP fees at the issuance of building permits.                                                                      | Prior to building permit | Project proponent  | City of Manteca  | Verify prior to issuance of building permits |

Table 4-1. Continued

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Timing                   | Implementing Party | Monitoring Party | Monitoring Actions                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------|------------------|----------------------------------------------|
| <p><b>Mitigation Measure TRA-7a: Pay Fair Share for Widening of Union Road from Two to Six Lanes between Westbound State Route 120 On- and Off-Ramps and Woodward Avenue</b></p> <p>As development occurs along this section of roadway, the City will require dedication of right-of-way along Union Road between the westbound SR 120 on- and off-ramps and Woodward Avenue in order to widen the roadway from two to six lanes. In addition, the Union Road overcrossing of SR 120 would be widened as part of intersection improvements identified in Mitigation Measures TRA-1a and TRA-2a. The project applicant shall pay its fair share of the cost of widening Union Road between the westbound SR 120 on- and off-ramps and Woodward Avenue from two to six lanes, which would improve roadway-segment operations to acceptable LOS C. The total dollar amount shall be determined in consultation with the City at the time of the final map. Payment for improvements will occur as part of the collection of PFIP fees at the issuance of building permits.</p> | Prior to building permit | Project proponent  | City of Manteca  | Verify prior to issuance of building permits |
| <p><b>Mitigation Measure TRA-8a: Pay Fair Share for Widening of State Route 120 from Two to Three Westbound Freeway Mainline Lanes between Main Street and Union Road</b></p> <p>The widening of westbound SR 120 from two to three mainline travel lanes in each direction between I-5 and SR 99 is identified by the SJCOG RTP as a Tier 1 improvement but is currently not funded for design and construction. The project applicant shall submit its regional transportation fee to the City as a contribution toward the funding of regional roadway improvements. The exact calculation of the fee shall be determined at the time of the final map.</p>                                                                                                                                                                                                                                                                                                                                                                                                               | Prior to building permit | Project proponent  | City of Manteca  | Verify prior to issuance of building permits |
| <p><b>Mitigation Measure TRA-9a: Pay Fair Share for Widening of State Route 120 from Two to Three Westbound Freeway Mainline Lanes between Union Road and Airport Way</b></p> <p>The widening of westbound SR 120 from two to three mainline travel lanes in each direction between I-5 and SR 99 is identified by the SJCOG RTP as a Tier 1 improvement but is currently not funded for design and construction. The project applicant shall submit its regional transportation fee to the City as a contribution toward the funding of regional roadway improvements. The exact calculation of the fee shall be determined at the time of the final map.</p>                                                                                                                                                                                                                                                                                                                                                                                                               | Prior to building permit | Project proponent  | City of Manteca  | Verify prior to issuance of building permits |

Table 4-1. Continued

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Timing                   | Implementing Party | Monitoring Party | Monitoring Actions                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------|------------------|----------------------------------------------|
| <b>Mitigation Measure TRA-10a: Pay Fair Share for Widening of State Route 120 from Two to Three Eastbound Freeway Mainline Lanes between Airport Way and Union Road</b><br><br>The widening of westbound SR 120 from two to three mainline travel lanes in each direction between I-5 and SR 99 is identified by SJCOG RTP as a Tier 1 improvement but is currently not funded for design and construction. The project applicant shall submit its regional transportation fee to the City as a contribution toward the funding of regional roadway improvements. The exact calculation of the fee shall be determined at the time of the final map.                                                                                                                                          | Prior to building permit | Project proponent  | City of Manteca  | Verify prior to issuance of building permits |
| <b>Mitigation Measure TRA-11a: Pay Fair Share for Widening of State Route 120 from Two to Three Eastbound Freeway Mainline Lanes between Union Road and Main Street</b><br><br>The widening of westbound SR 120 from two to three mainline travel lanes in each direction between I-5 and SR 99 is identified by the SJCOG RTP as a Tier 1 improvement but is currently not funded for design and construction. The project applicant shall submit its regional transportation fee to the City as a contribution toward the funding of regional roadway improvements. The exact calculation of the fee shall be determined at the time of the final map.                                                                                                                                      | Prior to building permit | Project proponent  | City of Manteca  | Verify prior to issuance of building permits |
| <b>Mitigation Measure TRA-12a: Install Bicycle Facility Improvements in the Vicinity of the Project Site</b><br><br>The construction of dedicated bicycle lanes, bicycle routes, or other bicycle improvements along the project frontage on Union Road and Woodward Avenue consistent with the 2003 Bicycle Master Plan would mitigate the project's impact of increased demand on bicycle facilities. Proposed bicycle access to and from the project site meeting the 2003 Bicycle Master Plan and city standards for bicycle facilities shall be shown on improvement plans submitted by the applicant to the City prior to final map. The applicant shall construct the bicycle access improvements along with the other infrastructure improvements for the project prior to occupancy. | Prior to building permit | Project proponent  | City of Manteca  | Require in improvement plans                 |
| <b>Mitigation Measure TRA-13a: Coordinate with the City of Manteca to Develop Transit Service and Construct Facilities in the Vicinity of the Project Site</b><br><br>The project applicant shall pay for the construction of a sheltered transit stop along the project frontage on either Union Road or Woodward Avenue to meet the increased demand on public transportation by project residents.                                                                                                                                                                                                                                                                                                                                                                                         | Prior to building permit | Project proponent  | City of Manteca  | Require in improvement plans                 |

Table 4-1. Continued

| Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Timing                   | Implementing Party | Monitoring Party | Monitoring Actions                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------|------------------|----------------------------------------------|
| <b>Utilities and Service Systems</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                          |                    |                  |                                              |
| <i>Environmental Impact Report</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                          |                    |                  |                                              |
| <b>Mitigation Measure USS-5a: Pay Park Acquisition and Improvement Fee</b><br>The project applicants shall comply with Policy PF-P-53 of the General Plan 2023, which requires payment of a park acquisition and improvement fee to fund systemwide improvements.                                                                                                                                                                                                                                       | Prior to building permit | Project proponent  | City of Manteca  | Verify prior to issuance of building permits |
| <b>Mitigation Measure USS-10a: Identify and Relocate Existing Utilities Where Necessary</b><br>Project design and specifications shall identify all underground utilities in the areas of proposed excavations. Underground Services Alert shall be contacted to identify underground utilities. Where possible, existing utilities shall be avoided. In instances where utilities cannot be avoided, relocation of existing utilities shall be completed either before or during project construction. | Prior to building permit | Project proponent  | City of Manteca  | Require in improvement plans                 |



Appendix A

**Public Draft Partial Recirculation of  
Draft Environmental Impact Report  
for the Silva Estates Project**

**NOTICE OF RECIRCULATION OF REVISIONS TO  
DRAFT ENVIRONMENTAL IMPACT REPORT  
FOR THE SILVA ESTATES PROJECT  
SCH #2006072118**

Notice is hereby given that the City of Manteca is releasing for public review revisions to portions of the Project Description, Sections 3.1, 3.2, 3.5, 3.7 and Chapter 4 of the Draft Environmental Impact Report (EIR) for the following project:

**PROJECT DESCRIPTION:** The proposed project includes the construction of the Silva Estates (formerly Milner Estates) subdivision. The project would subdivide approximately 59.9 acres into 217 single-family lots. The project would include the removal of two of the five existing single-family homes on the site. The project would also involve annexation of the project site and 29.1 acres of adjacent land west of Union Road, rezoning, a development agreement, and a tentative map for residential development.

**PROJECT LOCATION:** The proposed project is located in San Joaquin County directly south of the Manteca city limits but within the Primary Urban Service Boundary (PUSA). The project site is located at the southeast corner of the Union Road/Woodward Avenue intersection. The adjacent annexation lands are located directly to the west of the project site across Union Road. (See location map below.)

**ADDITIONAL PUBLIC COMMENT LIMITED TO SPECIFIC REVISIONS TO:** portions of the Project Description, Sections 3.1, 3.2, 3.5, and Chapter 4. The draft EIR was distributed to various public agencies, citizen groups, and interested individuals for a 45-day public review period, from January 2, 2007 through February 16, 2007. As a result of important public policy changes that have taken place since the Draft EIR was prepared, and as a result of minor changes to the project and new information that has become available since the Draft EIR was prepared, revisions to these sections of the Draft EIR have become necessary.

CEQA Guidelines 15088.5 describes the procedures for recirculation of a portion of a Draft EIR. Comments are to be limited to those pertaining to the revisions to portions of the Project Description, Sections 3.1, 3.2, 3.5, and Chapter 4 of the Draft EIR, per Subsection 15088.5(f)(2) of the CEQA Guidelines, which provides, in pertinent part, that, “[w]hen the EIR is revised only in part and the lead agency is recirculating only the revised chapters or portions of the EIR, the lead agency may request that reviewers limit their comments to the revised chapters or portions of the recirculated EIR. The lead agency need only respond to (i) comments received during the initial circulation period that relate to chapters or portions of the document that were not revised and recirculated, and (ii) comments received during the recirculation period that relate to the chapters or portions of the earlier EIR that were revised and recirculated.” Consistent with this provision, the City will not respond to newly submitted comments that address portions of the Draft EIR that have not been revised. Comments received on the original Draft EIR

during the previous comment period will be responded to in the Final EIR and need not be resubmitted.

Copies of the proposed revisions to portions of the Project Description, Sections 3.1, 3.2, 3.5, and Chapter 4 of the Draft EIR, as well as the original Draft EIR itself, are available for your review at the following location:

City of Manteca  
Community Development Department  
1001 West Center St.  
Manteca, CA 95337  
Contact: Lantz Rey  
Phone: 209/456-8519  
Fax: 209/825-2349

The Draft EIR and the proposed revisions to portions of the Project Description, Sections 3.1, 3.2, 3.5, and Chapter 4 of the Draft EIR are also available on the City's website, which can be accessed at [www.ci.manteca.ca.us](http://www.ci.manteca.ca.us).

All written comments on the revisions to the Draft EIR should be directed to Lantz Rey, Senior Planner, of the Community Development Department at the above address. As noted above, comments shall be limited to the revisions to chapters from the original Draft EIR, which was previously circulated for a full 45 days, as required by CEQA. The required 45-day review period for this partial recirculation of the Draft EIR shall begin on Tuesday December 1, 2009 and shall end at 5:00 p.m. on Thursday January 14, 2010. All comments regarding revisions to the Draft EIR must be received by this ending date/time.

**Public Draft**

**Partial Recirculation of  
Draft Environmental Impact Report  
for the Silva Estates Project**

**SCH # 2006072118**

*Prepared for:*

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November 2009

ICF Jones & Stokes. 2009. *Partial Recirculation of Draft Environmental Impact Report for the Silva Estates Project*. Public Draft. November. (ICF J&S 06362.06) Sacramento, CA. Prepared for: City of Manteca Community Development Department, Manteca, CA.

# Contents

|                                                        | Page       |
|--------------------------------------------------------|------------|
| Tables .....                                           | ii         |
| Figures .....                                          | iv         |
| Acronyms and Abbreviations .....                       | v          |
| <br>                                                   |            |
| <b>Chapter 2    Project Description (Revised).....</b> | <b>2-1</b> |
| Project Location.....                                  | 2-1        |
| Existing Conditions.....                               | 2-1        |
| Purpose and Need .....                                 | 2-1        |
| Project Characteristics.....                           | 2-2        |
| Proposed Land Uses .....                               | 2-2        |
| Public Services and Utilities.....                     | 2-2        |
| Related Projects.....                                  | 2-4        |
| Required Permits and Approvals .....                   | 2-4        |
| <br>                                                   |            |
| <b>Text Changes to Draft EIR .....</b>                 | <b>1</b>   |
| Section 3.1—Agricultural Resources .....               | 2          |
| Section 3.2—Air Quality .....                          | 3          |
| Climate Change & Greenhouse Gas Emissions .....        | 9          |
| Introduction.....                                      | 9          |
| Environmental Setting.....                             | 10         |
| Regulatory Setting .....                               | 18         |
| Methodology.....                                       | 26         |
| Significance Criteria.....                             | 39         |
| Impacts and Mitigation.....                            | 41         |
| Printed References .....                               | 47         |
| Personal Communications .....                          | 53         |
| Section 3.5—Hazards and Hazardous Materials .....      | 53         |
| Section 3.7—Noise.....                                 | 55         |
| Chapter 4—Other CEQA Considerations.....               | 55         |
| <br>                                                   |            |
| <b>Appendix C    URBEMIS Model Output (Revised)</b>    |            |
| <br>                                                   |            |
| <b>Appendix H    Greenhouse Gas Model Output</b>       |            |

# Tables

|                                                                                                                                              | Page        |
|----------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| ES-1 Revised Summary of Impacts and Mitigation Measures .....                                                                                | follows 2-4 |
| 3.2-4 Anticipated Construction Equipment.....                                                                                                | 5           |
| 3.2-5 Emissions Unmitigated and Mitigated Construction Emissions of<br>Criteria Pollutants from Construction Activities (Tons per Year)..... | 8           |
| 3.2-6 Emissions of Criteria Pollutants from Project Operations<br>(Tons per Year) .....                                                      | 9           |
| 1 Lifetimes and Global Warming Potentials of Several<br>Significant GHGs.....                                                                | 13          |
| 2 Global GHG Emissions from the IPCC 2004 Inventory .....                                                                                    | 16          |
| 3 U.S. Greenhouse Gas Emissions from the EPA 2007 Inventory .....                                                                            | 16          |
| 4 U.S. Greenhouse Gas Emissions from the 2007 EIA Inventory .....                                                                            | 17          |
| 5 Statewide Greenhouse Gas Emissions from the 2004 CEC<br>Inventory .....                                                                    | 18          |
| 6 Statewide Greenhouse Gas Emissions from the 2006 ARB<br>Inventory .....                                                                    | 18          |
| 7 Construction Equipment Summary .....                                                                                                       | 28          |
| 8 Total Estimated GHG Emissions from Construction Activities.....                                                                            | 29          |
| 9 Vehicle Fleet Profile and Annual (2015) VMT by Fuel Type.....                                                                              | 31          |
| 10 Annual (2015) Mobile Source Emissions from On-Road Traffic .....                                                                          | 32          |
| 11 Annual (2015) Area Source GHG Emissions .....                                                                                             | 33          |
| 12 Assumptions and Annual (2015) Project-Related<br>Emissions of HFCs from Refrigeration and Air Conditioning .....                          | 34          |

|    |                                                                                          |    |
|----|------------------------------------------------------------------------------------------|----|
| 13 | Total Emissions Associated with Annual (2015) Electricity Consumption .....              | 35 |
| 14 | GHG Emission Factors for Residential Natural Gas Combustion.....                         | 36 |
| 15 | Total Emissions Associated with Annual (2015) Natural Gas Consumption.....               | 36 |
| 16 | Annual (2015) Water Supply Intensity and Resulting GHG emissions at Silva Estates .....  | 37 |
| 17 | Annual (2015) GHG Emissions from Wastewater Treatment.....                               | 38 |
| 18 | Total Estimated GHG Emissions from Construction and Operation of the Silva Estates ..... | 43 |
| 19 | Annual Silva Estates GHG Emissions in California, U.S., and Global Context.....          | 44 |



# Figures

## Follows Page

|       |                                                       |     |
|-------|-------------------------------------------------------|-----|
| 2-1   | Project Vicinity.....                                 | 2-2 |
| 2-2   | Location of the Silva Estates Project .....           | 2-2 |
| 2-3   | Aerial Photograph of the Silva Estates Location ..... | 2-2 |
| 2-4   | Silva Estates Site Plan .....                         | 2-2 |
| 2-5   | Proposed Annexation .....                             | 2-2 |
| 3.1-1 | Existing Land Use .....                               | 2   |
| 3.7-1 | Noise Measurement Locations .....                     | 56  |

# Acronyms and Abbreviations

|                       |                                                                                                                                         |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| CAFE                  | Corporate Average Fuel Economy                                                                                                          |
| CAPCOA                | California Air Pollution Control Officers Association                                                                                   |
| CAT                   | Climate Action Team                                                                                                                     |
| CCA                   | community choice aggregator                                                                                                             |
| CCR                   | California Code of Regulations                                                                                                          |
| CPUC                  | California Public Utilities Commission                                                                                                  |
| <br>                  |                                                                                                                                         |
| Draft CARB Thresholds | Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act” |
| <br>                  |                                                                                                                                         |
| EISA                  | Energy Independence and Security Act of 2007                                                                                            |
| ESP                   | energy service provider                                                                                                                 |
| <br>                  |                                                                                                                                         |
| General Plan 2023     | City of Manteca General Plan 2023                                                                                                       |
| <br>                  |                                                                                                                                         |
| IOU                   | investor-owned utility                                                                                                                  |
| <br>                  |                                                                                                                                         |
| mgd                   | million gallons per day                                                                                                                 |
| <br>                  |                                                                                                                                         |
| PFC                   | perfluorocompound                                                                                                                       |
| PG&E                  | Pacific Gas & Electric Company                                                                                                          |
| PUSA                  | Primary Urban Service Boundary                                                                                                          |
| <br>                  |                                                                                                                                         |
| SCSWSP                | South County Surface Water Supply Project                                                                                               |
| SF <sub>6</sub>       | Sulfur hexafluoride                                                                                                                     |
| SJCOES                | San Joaquin County Office of Emergency Services                                                                                         |
| SR                    | State Route                                                                                                                             |
| SSJID                 | South San Joaquin Irrigation District                                                                                                   |
| <br>                  |                                                                                                                                         |
| WQCF                  | wastewater quality control facility                                                                                                     |

## Chapter 2

# Project Description (Revised)

## Project Location

The proposed project is located in San Joaquin County (Figure 2-1) directly south of the Manteca city limits but within the Primary Urban Service Boundary (PUSA) (Figure 2-2). The project site is located at the southeast corner of the Union Road/Woodward Avenue intersection (Figure 2-3). The specific site plan is shown in Figure 2-4. The adjacent annexation lands are located directly to the west of the project site across Union Road, as shown on Figure 2-2.

## Existing Conditions

The project site is currently used primarily for agriculture (orchard). Five single-family homes are located on the site, two of which would be removed as part of the proposed project.

The Antigua development is under construction to the north of the project site. The land northwest of the project site is in the application stage for the Union Commercial development. The land west of the project site is the site of the proposed Oleander Estates development. The land use diagram of the *City of Manteca General Plan 2023* (General Plan 2023) (City of Manteca 2003c, 2006a) indicates that all of the land directly adjacent to the project site is planned for development.

## Purpose and Need

The purpose of the project is to provide additional housing for an expanding population in Manteca. This project would help to accommodate the growing community. Additional lands west of Union Road are not proposed for development and are proposed for annexation in order to comply with the San Joaquin LAFCo General Policy for Annexation and Detachment regarding annexations, contained in the *Annexation Policies and Procedures* adopted September 21, 2007.

Territory proposed to be annexed to a city must be contiguous to the annexing city or district unless specifically allowed by statute. Territory is

not contiguous if the only connection is a strip of land more than 300 feet long and less than 200 feet wide, that width to be exclusive of highways. The boundaries of a proposed annexation or reorganization must not create or result in areas that are difficult to serve.

#### **Annexations that Create Islands**

An annexation will not be approved if it will result in the creation of an island of unincorporated territory or otherwise cause or further the distortion of existing boundaries. The Commission may nevertheless approve such an annexation where it finds that the application of this policy would be detrimental to the orderly development of the community and that a reasonable effort has been made to include the island in the annexation but that inclusion is not feasible at this time.

## **Project Characteristics**

The proposed project includes the City's approval of the following:

- rezoning,
- annexation of the project site and adjacent lands to the west (west of Union Road) to the City of Manteca as shown on Figure 2-5,
- a development agreement, and
- a tentative map for residential development.

## **Proposed Land Uses**

The proposed project includes subdivision of the approximately 59.9-acre site into 217 single-family residential lots and construction of the Silva Estates development. Two of the five existing single-family homes on the site would be removed.

The 28.1-acre adjacent annexation area west of Union Road is proposed for annexation to prevent creating an island of unincorporated land, but the land is not proposed for subdivision or development at this time. At the time lands within the additional annexation area are proposed for development, project applications, such as subdivisions, will be required to be processed by the City, and environmental review under CEQA will be required for those development projects.

## **Public Services and Utilities**

The project proponents propose that the project site connect to existing city public services and utilities, which are described below.

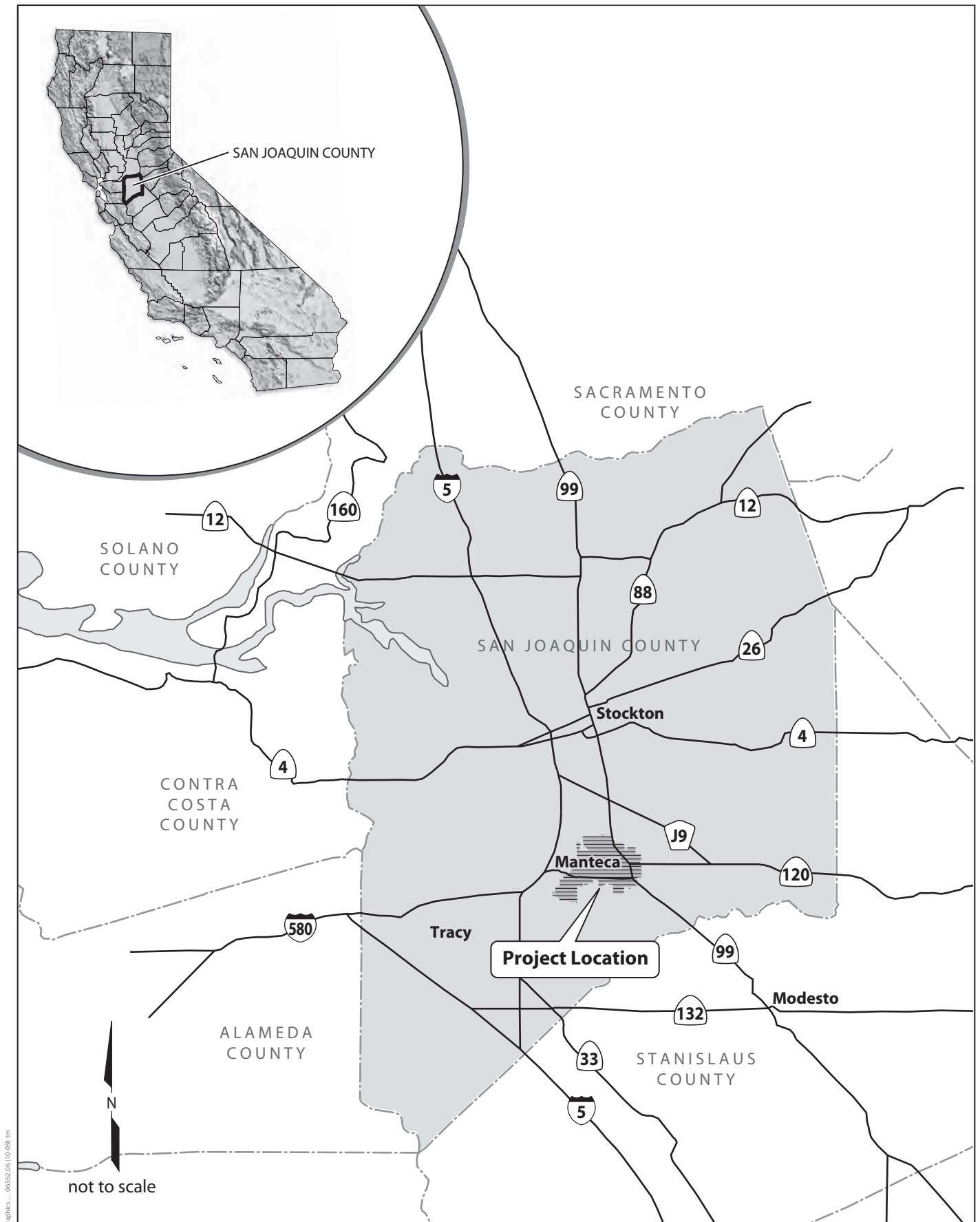


**Figure 2-1**  
**Project Vicinity**



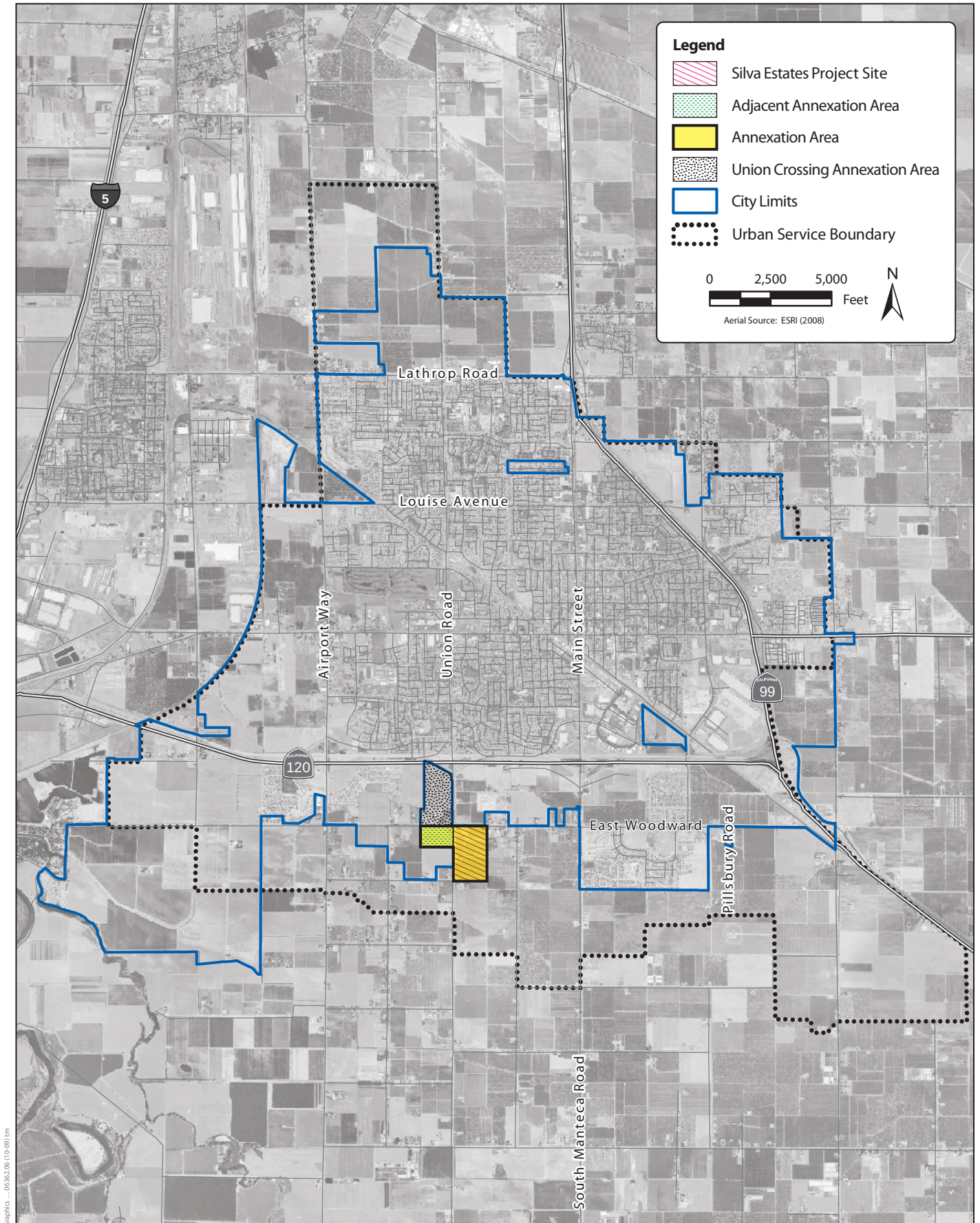


**Figure 2-2**  
**Location of the Silva Estates Project**



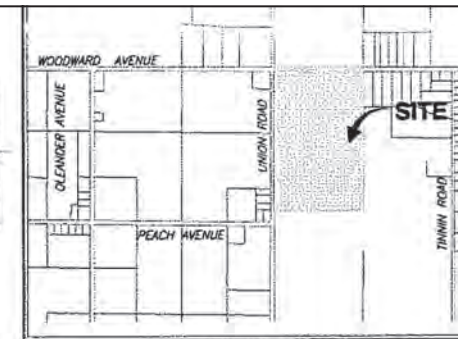


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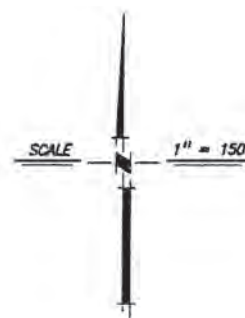
**Figure 2-3**  
**Aerial Photograph – Project Site**



TENTATIVE SUBDIVISION MAP  
TRACT NO. 3436  
**SILVA ESTATES**  
A SINGLE FAMILY SUBDIVISION  
BEING A PORTION OF THE SOUTHWEST QUARTER OF SECTION 8, T.2S., R.7E., M.D.B.M.,  
CITY OF MANTECA, SAN JOAQUIN COUNTY, CALIFORNIA



VICINITY MAP  
N.T.S.



- LEGEND:**
- 8" W. PROPOSED WATER LINE
  - 12" SD. PROPOSED STORM DRAIN
  - 8" SS. PROPOSED SANITARY SEWER
  - PROPOSED MANHOLE
  - EX. W. EXISTING WATER LINE
  - EX. SD. EXISTING STORM DRAIN
  - EX. SS. EXISTING SANITARY SEWER
  - EXISTING MANHOLE



**DEVELOPERS:**

ANDERSON HOMES  
1420 S. MILLS AVENUE  
LODI, CA 95421

**ENGINEER:**

MCR ENGINEERING  
1242 DUPONT CT.  
MANTECA, CA 95336  
PHONE: 239-6229

**NOTES:**

1. ALL IMPROVEMENTS TO CONFORM TO CITY OF MANTECA STANDARDS.
2. ALL UTILITIES TO BE UNDERGROUND.
3. SEWAGE DISPOSAL BY CONNECTION TO CITY SEWER SYSTEM.
4. STORM DRAINAGE SHALL BE BY COLLECTION SYSTEM PER CITY OF MANTECA MASTER PLAN.
5. DOMESTIC WATER BY CONNECTION TO CITY WATER SYSTEM.
6. PUBLIC UTILITY EASEMENT WILL BE PROVIDED ALONG ALL STREET FRONTAGES.
7. THIS SUBDIVISION CONTAINS 216 LOTS ON 60 ACRES.
8. THE SITE SHALL BE CLEARED OF ALL EXISTING STRUCTURES.
9. THIS PROJECT MAY BE DEVELOPED IN PHASES. PARCEL MAPS MAY BE FILED ON PHASE BOUNDARIES FOR PURPOSE OF SALE OR FARMING.
10. THIS PROPERTY IS RELATIVELY FLAT AT EL. 202.
11. BOUNDARY LINES ARE BASED ON ASSESSORS MAP AND ARE SUBJECT TO CHANGE.

**INDEX**

| SHEET | DESCRIPTION                          |
|-------|--------------------------------------|
| 1     | COVER SHEET                          |
| 2     | CROSS SECTIONS                       |
| 3     | BOUNDARY AND TOPOGRAPHIC SURVEY PLAN |
| 4     | UTILITY PLAN                         |
| 5     | DIMENSION PLAN                       |

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Source: MCR Engineering 2006.

**Figure 2-4  
Silva Estates Site Plan**





**Figure 2-5  
Proposed Annexation**

## Gas and Electricity

The Pacific Gas & Electric Company (PG&E) currently provides natural gas and electric service to residents and businesses in Manteca.

## Telephone

Verizon provides local telephone service for more than 45,000 customers in the Manteca area. The existing community is equipped with fiber optic lines. Digital data services include DSL, T-1, ISDN (BRI and PRI), Frame Relay, Centranet, and telephone services.

## Water

The City provides water service for the existing community, with an average use of 11 million gallons per day (mgd). Approximately 15,000 connected customers are served. An elevated water storage tank that holds 300,000 gallons augments the water supplied from groundwater wells. The City of Manteca, along with the Cities of Escalon, Tracy, and Lathrop, is participating in the South County Surface Water Supply Project (SCSWSP). This project was developed to address future water needs through construction of a water treatment plant, transmission mains, surface storage reservoirs, and booster pump stations. The surface water and groundwater are utilized in a conjunctive use program in which the surface water becomes the primary source of domestic water for the city. Manteca began receiving deliveries of water from the SCSWSP in August 2005 (Jones & Stokes 2005).

## Garbage

The City provides solid waste service for the Manteca area.

## Sewer

The City's wastewater quality control facility (WQCF) serves Manteca, Lathrop, and Raymus Village in San Joaquin County. The plant currently treats 6.5 mgd of wastewater and has been rated with a capacity of approximately 8.11 mgd. The City plans to increase the plant capacity to 9.87 mgd in July 2007 (Govea pers. comm.).

## Storm Drainage

The City operates and maintains a storm drain system that serves the existing community. The system consists of approximately 170 miles of pipeline, 36 pump stations, and 35 detention basins. Runoff from rainfall flows through the system into South San Joaquin Irrigation District (SSJID) drains and laterals and eventually into the San Joaquin River.

## Related Projects

The Manteca Community Development Department has identified 28 other residential developments throughout or directly outside Manteca that are slated for construction or tentatively proposed and pending environmental review. These projects are listed in Table 2-1. They range in size from small projects, such as the Westport development (5.27 acres, 24 total lots), to large ones, such as the Union Ranch development (356 acres, 1,960 total lots).

Additionally, the City is currently proposing to widen the existing overcrossing and ramps for the State Route (SR) 120/South Union Road interchange within the city and install traffic signals. An initial study/environmental assessment for this project is currently being prepared. The City is also proposing to improve the existing Union Road and extend Atherton Drive to Main Street. Environmental review for this project is underway.

## Required Permits and Approvals

As noted under “Project Characteristics,” the proposed Silva Estates project would require rezoning, annexation, a development agreement, and a tentative map for residential development.

**Table ES-1.** Revised Summary of Impacts and Mitigation Measures

| Impact                                                                                                                                        | Significance before Mitigation   | Mitigation Measure                                                                                                 | Significance with Mitigation     |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------|
| <b>Agricultural Resources</b>                                                                                                                 |                                  |                                                                                                                    |                                  |
| Impact AG-1: Direct Conversion of Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or Other Farmland to Nonagricultural Use | Significant                      | Mitigation Measure AG-1: Agricultural Mitigation Fee                                                               | Significant and unavoidable      |
| Impact AG-2: Result in Changes in the Existing Environment, Including Conversion of Farmland to Nonagricultural Use                           | Significant                      | Mitigation Measure AG-2: Phase Development of the Project to Provide Buffers and Protect Ongoing Agriculture       | Significant and unavoidable      |
| <b>Air Quality</b>                                                                                                                            |                                  |                                                                                                                    |                                  |
| Impact AQ-1: Generation of Significant Levels of Emissions from Project Construction                                                          | Significant                      | Mitigation Measure AQ-1a: Prepare and Implement a Dust Control Plan                                                | Less than significant            |
| Impact AQ-2: Elevated Health Risk from Exposure to Construction-Related Diesel Particulate Matter                                             | Less than significant            | –                                                                                                                  | –                                |
| Impact AQ-3: Generation of Significant ROG, NOx, CO, and PM10 Emissions from Project Operations                                               | Less than significant            | –                                                                                                                  | –                                |
| Impact AQ-4: Exposure of Sensitive Receptors to Substantial Concentrations of Carbon Monoxide                                                 | Less than significant            | –                                                                                                                  | –                                |
| <u>Impact CC-1: Increase in Greenhouse Gas Emissions</u>                                                                                      | <u>Less than significant</u>     | =                                                                                                                  | =                                |
| <u>Impact CC-2: Cumulative Increase in Greenhouse Gas Emissions</u>                                                                           | <u>Cumulatively Considerable</u> | <u>Mitigation Measure CC-1: Implement Project Design Features to Reduce Project Contribution to Climate Change</u> | <u>Cumulatively Considerable</u> |
| <b>Cultural Resources</b>                                                                                                                     |                                  |                                                                                                                    |                                  |
| Impact CR-1: Potential Destruction of Buried Archeological Resources                                                                          | Potentially Significant          | Mitigation Measure CR-1a: Stop Work in Case of Accidental Discovery of Buried Archeological Resources              | Less than significant            |
| Impact CR-2: Destruction or Disturbance of Human Remains                                                                                      | Potentially Significant          | Mitigation Measure CR-2a: Stop Work in Case of Accidental Discovery of Buried Human Remains                        | Less than significant            |
| Impact CR-3: Disturbance or Destruction of Significant Historic Resources                                                                     | No Impact                        | –                                                                                                                  | –                                |
| <b>Geology, Soils, and Paleontological Resources</b>                                                                                          |                                  |                                                                                                                    |                                  |
| Impact GEO-1: Potential for Increased Exposure of People or Structures to Hazards Related to Strong Seismic Groundshaking                     | Less than significant            | –                                                                                                                  | –                                |

Table ES-1. Continued

| Impact                                                                                                                                 | Significance before Mitigation | Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                                                                   | Significance with Mitigation |
|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Impact GEO-2: Potential for Increased Exposure of People or Structures to Hazards Related to Liquefaction and Ground Failure           | Less than significant          | –                                                                                                                                                                                                                                                                                                                                                                                                                                    | –                            |
| Impact GEO-3: Potential for Increased Exposure of Persons or Structures to Landslide Hazards                                           | Less than significant          | –                                                                                                                                                                                                                                                                                                                                                                                                                                    | –                            |
| Impact GEO-4: Contribution to Substantial Soil Erosion or Loss of Topsoil                                                              | Significant                    | Mitigation Measure HYD-1a: Implement Erosion and Sediment Control Measures<br>Mitigation Measure GEO-4a: Stockpile Excavated Topsoil for Onsite Reuse.                                                                                                                                                                                                                                                                               | Less than significant        |
| Impact GEO-5: Location on a Geologic Unit or Soil That is Unstable or That Would Become Unstable as a Result of Construction           | Less than significant          | –                                                                                                                                                                                                                                                                                                                                                                                                                                    | –                            |
| Impact GEO-6: Location on Expansive Soils                                                                                              | Less than significant          | –                                                                                                                                                                                                                                                                                                                                                                                                                                    | –                            |
| Impact GEO-7: Damage to Paleontological Resources                                                                                      | Potentially Significant        | Mitigation Measure GEO-7a: Conduct Preconstruction Survey, Salvage, and Protection<br>Mitigation Measure GEO-7b: Retain a Qualified Professional Paleontologist to Monitor During Ground-Disturbing Activities<br>Mitigation Measure GEO-7c: Provide Worker Sensitivity Training for Paleontological Resources; Stop Work and Implement Evaluation and Treatment Measures if Macrofossil Remains are Encountered During Construction | Less than significant        |
| <b>Hazards and Hazardous Materials</b>                                                                                                 |                                |                                                                                                                                                                                                                                                                                                                                                                                                                                      |                              |
| Impact HAZ-1: Potential Hazard to the Public or the Environment through the Routine Transport, Use, or Disposal of Hazardous Materials | Less than significant          | –                                                                                                                                                                                                                                                                                                                                                                                                                                    | –                            |
| Impact HAZ-2: Significant Hazard from Reasonably Foreseeable Upset and Accident Conditions Involving Release of Hazardous Materials    | Significant                    | Mitigation Measure HAZ-2a: Develop and Implement Plans to Reduce Exposure to Hazardous Conditions<br>Mitigation Measure HAZ-2b: Follow Manteca Fire Department and Other Guidelines for Storage and Handling of Hazardous Materials<br>Mitigation Measure HAZ-2c: Immediately Contain Spills, Excavate Spill-Contaminated Soil, and Dispose of It at Approved Facility                                                               | Less than significant        |

Table ES-1. Continued

| Impact                                                                                                           | Significance before Mitigation | Mitigation Measure                                                                                                                      | Significance with Mitigation |
|------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Impact HAZ-3: Potential Exposure of School Children to Hazardous Materials                                       | Significant                    | Mitigation Measure HAZ-2d: Screen Surface Soils in Project Area for Residuals from Agricultural Chemicals and Other Hazardous Materials | Less than significant        |
|                                                                                                                  |                                | Mitigation Measure HAZ-2e: Proper Removal of Hazardous Materials and Hazardous Material Containers from the Site                        |                              |
|                                                                                                                  |                                | Mitigation Measure HAZ-2f: Proper Abandonment of Septic Systems                                                                         |                              |
|                                                                                                                  |                                | Mitigation Measure HYD-1a: Implement Erosion and Sediment Control Measures                                                              |                              |
|                                                                                                                  |                                | Mitigation Measure HAZ-2a: Develop and Implement Plans to Reduce Exposure to Hazardous Conditions                                       |                              |
| Impact HAZ-4: Significant Hazard from Location on a Site that is Included on a List of Hazardous Materials Sites | Significant                    | Mitigation Measure HAZ-2b: Follow Manteca Fire Department and Other Guidelines for Storage and Handling of Hazardous Materials          | Less than significant        |
|                                                                                                                  |                                | Mitigation Measure HAZ-2c: Immediately Contain Spills, Excavate Spill-Contaminated Soil, and Dispose of It at Approved Facility         |                              |
|                                                                                                                  |                                | Mitigation Measure HAZ-2d: Screen Surface Soils in Project Area for Residuals from Agricultural Chemicals and Other Hazardous Materials |                              |
|                                                                                                                  |                                | Mitigation Measure HAZ-2e: Proper Removal of Hazardous Materials and Hazardous Material Containers from the Site                        |                              |
|                                                                                                                  |                                | Mitigation Measure HAZ-2f: Proper Abandonment of Septic Systems                                                                         |                              |
| Impact HAZ-4: Significant Hazard from Location on a Site that is Included on a List of Hazardous Materials Sites | Significant                    | Mitigation Measure HAZ-2a: Develop and Implement Plans to Reduce Exposure to Hazardous Conditions                                       | Less than significant        |
|                                                                                                                  |                                | Mitigation Measure HAZ-2b: Follow Manteca Fire Department and Other Guidelines for Storage and Handling of Hazardous Materials          |                              |
|                                                                                                                  |                                | Mitigation Measure HAZ-2c: Immediately Contain Spills, Excavate Spill-Contaminated Soil, and Dispose of It at Approved Facility         |                              |
|                                                                                                                  |                                | Mitigation Measure HAZ-2d: Screen Surface Soils in Project Area for Residuals from Agricultural Chemicals and Other Hazardous Materials |                              |

Table ES-1. Continued

| Impact                                                                                                                             | Significance before Mitigation | Mitigation Measure                                                                                                                                                                                                                                                                                                              | Significance with Mitigation |
|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
|                                                                                                                                    |                                | Mitigation Measure HAZ-2e: Proper Removal of Hazardous Materials and Hazardous Material Containers from the Site<br>Mitigation Measure HAZ-2f: Proper Abandonment of Septic Systems                                                                                                                                             |                              |
| <b>Hydrology and Water Quality</b>                                                                                                 |                                |                                                                                                                                                                                                                                                                                                                                 |                              |
| Impact HYD-1: Construction-Related Erosion, Sedimentation, and Potential Release of Hazardous Materials                            | Significant                    | Mitigation Measure HYD-1a: Implement Erosion and Sediment Control Measures<br>Mitigation Measure HYD-1b: Develop and Implement a Spill Prevention, Control, and Countermeasure Program for Construction Activities<br>Mitigation Measure HYD-1c: Develop and Implement a Frac-Out Contingency Plan for Jack-and-Bore Activities | Less than significant        |
| Impact HYD-2: Water Quality Impacts from Construction below the Water Table                                                        | Significant                    | Mitigation Measure HYD-2a: Provisions for Dewatering                                                                                                                                                                                                                                                                            | Less than significant        |
| Impact HYD-3: Increased Amounts of Surface Runoff and Associated Impacts to Water Quality and Drainage Facilities during Operation | Significant                    | Mitigation Measure HYD-3a: Implement Best Management Practices to Maximize Stormwater Quality                                                                                                                                                                                                                                   | Less than significant        |
| Impact HYD-4: Impacts to Water Supply                                                                                              | No Impact                      | –                                                                                                                                                                                                                                                                                                                               | –                            |
| Impact HYD-5: Decrease in Groundwater Recharge                                                                                     | Less than significant          | –                                                                                                                                                                                                                                                                                                                               | –                            |
| <b>Noise</b>                                                                                                                       |                                |                                                                                                                                                                                                                                                                                                                                 |                              |
| Impact NOI-1: Exposure of Noise-Sensitive Land Uses to Vibration and Noise during Construction Activities                          | Significant                    | Mitigation Measure NOI-1a: Employ Noise-Reducing Construction Practices<br>Mitigation Measure NOI-1b: Disseminate Essential Information to Residences and Implement a Complaint/Response Tracking Program                                                                                                                       | Less than significant        |
| Impact NOI-2: Exposure of Existing Noise-Sensitive Land Uses on Project Approach Roadways to Increased Traffic Noise               | Less than significant          | –                                                                                                                                                                                                                                                                                                                               | –                            |
| Impact NOI-3: Exposure of Future Noise-Sensitive Land Uses within the Silva Estates Project to Traffic Noise                       | Significant                    | Mitigation Measure NOI-3a: Construct Noise Barriers along Woodward Avenue and Union Road so that Traffic Noise Does Not Exceed 60 dBA Ldn in Outdoor Use Areas                                                                                                                                                                  | Less than significant        |

Table ES-1. Continued

| Impact                                                                                                                                                                             | Significance before Mitigation | Mitigation Measure                                                                                                                                                                                                                                                                                                                                                       | Significance with Mitigation                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| <b>Transportation and Traffic</b>                                                                                                                                                  |                                |                                                                                                                                                                                                                                                                                                                                                                          |                                                                  |
| Impact TRA-1: Unacceptable Level of Service at Unsignalized Union Road/Westbound State Route 120 On- and Off-Ramp Intersection under Existing Plus Project Conditions              | Significant                    | Mitigation Measure TRA-1a: Pay Fair Share for the Installation of a Traffic Signal at the Union Road/Westbound State Route 120 On- and Off-Ramp Intersection                                                                                                                                                                                                             | Less than significant                                            |
| Impact TRA-2: Unacceptable Level of Service at Unsignalized Union Road/Eastbound State Route 120 On- and Off-Ramp Intersection under Existing Plus Project Conditions              | Significant                    | Mitigation Measure TRA-2a: Pay Fair Share for Signalization of the Union Road/Eastbound State Route 120 On- and Off-Ramp Intersection                                                                                                                                                                                                                                    | Less than significant                                            |
| Impact TRA-3: Unacceptable Level of Service at Unsignalized Airport Way/Woodward Avenue Intersection under Cumulative Plus Project Conditions                                      | Significant                    | Mitigation Measure TRA-3a: Pay Fair Share for Signalization of the Airport Way/Woodward Avenue Intersection<br>Short-term impact: Project construction may proceed faster than expected. If the intersection is not signalized prior to the applicant being ready to construct the 200th dwelling unit, it will result in an interim significant and unavoidable impact. | Less than significant<br>Short term: Significant and unavoidable |
| Impact TRA-4: Unacceptable Level of Service at Unsignalized Union Road/Woodward Avenue Intersection under Cumulative Plus Project Conditions                                       | Significant                    | Mitigation Measure TRA-4a: Pay Fair Share for Signalization of the Union Road/Woodward Avenue Intersection<br>Short-term impact: Project construction may proceed faster than expected. If the intersection is not signalized prior to the applicant being ready to construct the 200th dwelling unit, it will result in an interim significant and unavoidable impact.  | Less than significant<br>Short term: Significant and unavoidable |
| Impact TRA-5: Unacceptable Level of Service at Signalized Union Road/Eastbound State Route 120 On- and Off-Ramp Intersection under Cumulative Plus Project Conditions              | Significant                    | Mitigation Measure TRA-5a: Pay Fair Share for Construction of an Additional Eastbound Left-Turn Pocket at the Signalized Union Road/Eastbound State Route 120 On/Off Ramp Intersection                                                                                                                                                                                   | Less than significant                                            |
| Impact TRA-6: Unacceptable Roadway Level of Service on Union Road between Daniels Street and Westbound State Route 120 On- and Off-Ramps under Cumulative Plus Project Conditions  | Significant                    | Mitigation Measure TRA-6a: Pay Fair Share for Widening of Union Road from Two to Four Lanes between Daniels Street and Westbound State Route 120 On- and Off-Ramps                                                                                                                                                                                                       | Less than significant                                            |
| Impact TRA-7: Unacceptable Roadway Level of Service on Union Road between Westbound State Route 120 On- and Off-Ramps and Woodward Avenue under Cumulative Plus Project Conditions | Significant                    | Mitigation Measure TRA-7a: Pay Fair Share for Widening of Union Road from Two to Six Lanes between Westbound State Route 120 On- and Off-Ramps and Woodward Avenue                                                                                                                                                                                                       | Less than significant                                            |



Table ES-1. Continued

| Impact                                                                                                                                                                           | Significance before Mitigation | Mitigation Measure                                                                                                                                               | Significance with Mitigation |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Impact TRA-8: Unacceptable Westbound State Route 120 Freeway Mainline Level of Service between Main Street and Union Road under Cumulative Plus Project AM Peak Hour Conditions  | Significant                    | Mitigation Measure TRA-8a: Pay Fair Share for Widening of State Route 120 from Two to Three Westbound Freeway Mainline Lanes between Main Street and Union Road  | Significant and unavoidable  |
| Impact TRA-9: Unacceptable Westbound State Route 120 Freeway Mainline Level of Service between Union Road and Airport Way under Cumulative Plus Project AM Peak Hour Conditions  | Significant                    | Mitigation Measure TRA-9a: Pay Fair Share for Widening of State Route 120 from Two to Three Westbound Freeway Mainline Lanes between Union Road and Airport Way  | Significant and unavoidable  |
| Impact TRA-10: Unacceptable Eastbound State Route 120 Freeway Mainline Level of Service between Airport Way and Union Road under Cumulative Plus Project PM Peak Hour Conditions | Significant                    | Mitigation Measure TRA-10a: Pay Fair Share for Widening of State Route 120 from Two to Three Eastbound Freeway Mainline Lanes between Airport Way and Union Road | Significant and unavoidable  |
| Impact TRA-11: Unacceptable Eastbound State Route 120 Freeway Mainline Level of Service between Union Road and Main Street under Cumulative Plus Project PM Peak Hour Conditions | Significant                    | Mitigation Measure TRA-11a: Pay Fair Share for Widening of State Route 120 from Two to Three Eastbound Freeway Mainline Lanes between Union Road and Main Street | Significant and unavoidable  |
| Impact TRA-12: Increased Demand for Bicycle Facilities under Existing Plus Project and Cumulative Plus Project Conditions                                                        | Significant                    | Mitigation Measure TRA-12a: Install Bicycle Facility Improvements in the Vicinity of the Project Site                                                            | Less than significant        |
| Impact TRA-13: Increased Demand for Public Transit under Existing Plus Project and Cumulative Plus Project Conditions                                                            | Significant                    | Mitigation Measure TRA-13a: Coordinate with the City of Manteca to Develop Transit Service and Construct Facilities in the Vicinity of the Project Site          | Less than significant        |
| <b>Utilities and Service Systems</b>                                                                                                                                             |                                |                                                                                                                                                                  |                              |
| Impact USS-1: Temporary Construction-Related Impacts to Access Routes and Reduced Response Times for Police, Fire, and Emergency Services                                        | Less than significant          | —                                                                                                                                                                | —                            |
| Impact USS-2: Operational Impacts to Police Service, Including Inadequate Service Ratios and Response Times                                                                      | Less than significant          | —                                                                                                                                                                | —                            |
| Impact USS-3: Operational Impacts to Fire Service, Including Inadequate Service Ratios, Response Times, and Water Pressure and Supply for Fire Suppression                       | Less than significant          | —                                                                                                                                                                | —                            |
| Impact USS-4: Inadequate Service Ratios at Schools in the Project Area                                                                                                           | Less than significant          | —                                                                                                                                                                | —                            |

Table ES-1. Continued

| Impact                                                                                                            | Significance before Mitigation | Mitigation Measure                                                                   | Significance with Mitigation |
|-------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------------------------------------------------|------------------------------|
| Impact USS-5: Inadequate Provision of Parks and Recreational Facilities                                           | Significant                    | Mitigation Measure USS-5a: Pay Park Acquisition and Improvement Fee                  | Less than significant        |
| Impact USS-6: Operational and Construction-Related Impacts to Solid Waste Collection and Storage Capacity         | Less than significant          | –                                                                                    | –                            |
| Impact USS-7: Expansion or Construction of New Wastewater Collection, Conveyance, or Treatment Facilities         | Less than significant          | –                                                                                    | –                            |
| Impact USS-8: Insufficient Drainage Capacity to Serve the Proposed Project                                        | Less than significant          | –                                                                                    | –                            |
| Impact USS-9: Inadequate Energy Sources and Infrastructure                                                        | Less than significant          | –                                                                                    | –                            |
| Impact USS-10: Temporary, Planned, or Accidental Construction-Related Disruptions to Utility Services             | Significant                    | Mitigation Measure USS-10a: Identify and Relocate Existing Utilities Where Necessary | Less than significant        |
| <b>Growth Inducing Impacts</b>                                                                                    |                                |                                                                                      |                              |
| Impact GI-1: Fosters Economic or Population Growth or Additional Housing                                          | Less than significant          | –                                                                                    | –                            |
| Impact GI-2: Removal of a Potential Obstacle to Growth                                                            | Less than significant          | –                                                                                    | –                            |
| Impact GI-3: Tax Community Services or Facilities to an Extent that New Services or Facilities Would Be Necessary | Less than significant          | –                                                                                    | –                            |
| <b>Cumulative Impacts</b>                                                                                         |                                |                                                                                      |                              |
| Impact CE-1: Cumulative Loss of Agricultural Lands                                                                | Significant                    | None feasible                                                                        | Significant and unavoidable  |
| Impact CE-2: Cumulative Effect on Air Quality                                                                     | Significant                    | None feasible                                                                        | Significant and unavoidable  |
| Impact CE-3: Cumulative Impacts to Geology and Soils                                                              | No Impact                      | –                                                                                    | –                            |
| Impact CE-4: Cumulative Impacts to Energy                                                                         | Significant                    | None feasible                                                                        | Significant and unavoidable  |
| Impact CE-5: Cumulative Impacts on Other Public Services and Utilities                                            | Less than significant          | –                                                                                    | –                            |

**Table ES-1.** Continued

| Impact                                                                                                                                                                             | Significance before Mitigation | Mitigation Measure                                                                                                                                            | Significance with Mitigation |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Impact TRA-3: Unacceptable Level of Service at Unsignalized Airport Way/Woodward Avenue Intersection under Cumulative Plus Project Conditions                                      | Significant                    | Mitigation Measure TRA-3a: Signalize the Airport Way/Woodward Avenue Intersection                                                                             | Less than significant        |
| Impact TRA-4: Unacceptable Level of Service at Unsignalized Union Road/Woodward Avenue Intersection under Cumulative Plus Project Conditions                                       | Significant                    | Mitigation Measure TRA-4a: Signalize the Union Road/Woodward Avenue Intersection                                                                              | Less than significant        |
| Impact TRA-5: Unacceptable Level of Service at Signalized Union Road/Eastbound State Route 120 On/Off Ramp Intersection under Cumulative Plus Project Conditions                   | Significant                    | Mitigation Measure TRA-5a: Construct an Additional Eastbound Left-Turn Pocket at the Signalized Union Road/Eastbound State Route 120 On/Off Ramp Intersection | Less than significant        |
| Impact TRA-6: Unacceptable Roadway Level of Service on Union Road between Daniels Street and Westbound State Route 120 On- and Off-Ramps under Cumulative Plus Project Conditions  | Significant                    | Mitigation Measure TRA-6a: Widen Union Road from Two to Four Lanes between Daniels Street and Westbound State Route 120 On- and Off-Ramps                     | Less than significant        |
| Impact TRA-7: Unacceptable Roadway Level of Service on Union Road between Westbound State Route 120 On- and Off-Ramps and Woodward Avenue under Cumulative Plus Project Conditions | Significant                    | Mitigation Measure TRA-7a: Widen Union Road from Two to Six Lanes between Westbound State Route 120 On- and Off-Ramps and Woodward Avenue                     | Less than significant        |
| Impact TRA-8: Unacceptable Westbound State Route 120 Freeway Mainline Level of Service between Main Street and Union Road under Cumulative Plus Project AM Peak Hour Conditions    | Significant                    | Mitigation Measure TRA-8a: Widen State Route 120 from Two to Three Westbound Freeway Mainline Lanes between Main Street and Union Road                        | Significant and unavoidable  |
| Impact TRA-9: Unacceptable Westbound State Route 120 Freeway Mainline Level of Service between Union Road and Airport Way under Cumulative Plus Project AM Peak Hour Conditions    | Significant                    | Mitigation Measure TRA-9a: Widen State Route 120 from Two to Three Westbound Freeway Mainline Lanes between Union Road and Airport Way                        | Significant and unavoidable  |
| Impact TRA-10: Unacceptable Eastbound State Route 120 Freeway Mainline Level of Service between Airport Way and Union Road under Cumulative Plus Project PM Peak Hour Conditions   | Significant                    | Mitigation Measure TRA-10a: Widen State Route 120 from Two to Three Eastbound Freeway Mainline Lanes between Airport Way and Union Road                       | Significant and unavoidable  |
| Impact TRA-11: Unacceptable Eastbound State Route 120 Freeway Mainline Level of Service between Union Road and Main Street under Cumulative Plus Project PM Peak Hour Conditions   | Significant                    | Mitigation Measure TRA-11a: Widen State Route 120 from Two to Three Eastbound Freeway Mainline Lanes between Union Road and Main Street                       | Significant and unavoidable  |

Table ES-1. Continued

| Impact                                                                                                                                                                                                                                                                                                       | Significance before Mitigation | Mitigation Measure                                                                                                                                                                                                                                                                                                                                                                   | Significance with Mitigation |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Impact TRA-12: Increased Demand for Bicycle Facilities under Existing Plus Project and Cumulative Plus Project Conditions                                                                                                                                                                                    | Significant                    | Mitigation Measure TRA-12a: Coordinate with the City of Manteca to Develop Bicycle Facility Improvements in the Vicinity of the Project Site                                                                                                                                                                                                                                         | Less than significant        |
| Impact TRA-13: Increased Demand for Public Transit under Existing Plus Project and Cumulative Plus Project Conditions                                                                                                                                                                                        | Significant                    | Mitigation Measure TRA-13a: Coordinate with the City of Manteca to Develop Transit Service and Facilities in the Vicinity of the Project Site                                                                                                                                                                                                                                        | Less than significant        |
| <b>Initial Study Impacts with Mitigation Measures Not Addressed in the EIR</b>                                                                                                                                                                                                                               |                                |                                                                                                                                                                                                                                                                                                                                                                                      |                              |
| <b>Aesthetics</b>                                                                                                                                                                                                                                                                                            |                                |                                                                                                                                                                                                                                                                                                                                                                                      |                              |
| Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area                                                                                                                                                                                         | Potentially Significant        | Mitigation Measure VIS-1: Require Lighting Design to Be Shielded and Directed Downward in Compliance with City of Manteca Standards                                                                                                                                                                                                                                                  | Less than significant        |
| <b>Biological Resources</b>                                                                                                                                                                                                                                                                                  |                                |                                                                                                                                                                                                                                                                                                                                                                                      |                              |
| 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        | Mitigation Measure BIO-1: Conduct Tree Removal Activities during the Nonbreeding Season for Swainson's Hawk and Non-Special-Status Migratory Birds and Raptors or Retain a Qualified Biologist to Conduct a Nesting Bird Survey before Tree Removal Activities.                                                                                                                      | Less than significant        |
| Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance                                                                                                                                                                              | Potentially Significant        | Mitigation Measure BIO-1: Conduct Tree Removal Activities during the Nonbreeding Season for Swainson's Hawk and Non-Special-Status Migratory Birds and Raptors or Retain a Qualified Biologist to Conduct a Nesting Bird Survey before Tree Removal Activities.                                                                                                                      | Less than significant        |
| Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan                                                                                                                             | Potentially Significant        | Mitigation Measure BIO-1: Conduct Tree Removal Activities during the Nonbreeding Season for Swainson's Hawk and Non-Special-Status Migratory Birds and Raptors or Retain a Qualified Biologist to Conduct a Nesting Bird Survey before Tree Removal Activities.<br><br>Mitigation Measure BIO-2: Compensate for the Loss of Multipurpose Open Space Lands as Outlined in the SJMSCP. | Less than significant        |
| <b>Hazards and Hazardous Materials</b>                                                                                                                                                                                                                                                                       |                                |                                                                                                                                                                                                                                                                                                                                                                                      |                              |
| Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan                                                                                                                                                                                        | Potentially Significant        | Mitigation Measure HAZ-3: Incorporate Emergency Access Routes during Construction                                                                                                                                                                                                                                                                                                    | Less than significant        |

**Table ES-1.** Continued

| Impact                                                                                                                                                                                   | Significance before Mitigation | Mitigation Measure                                                                                         | Significance with Mitigation |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Recreation</b>                                                                                                                                                                        |                                |                                                                                                            |                              |
| Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated | Potentially Significant        | Mitigation Measure REC-1: Pay Park Acquisition and Improvement Fee                                         | Less than significant        |
| <b>Transportation</b>                                                                                                                                                                    |                                |                                                                                                            |                              |
| Substantially increase hazards because of a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)                                   | Potentially Significant        | Mitigation Measure TRF-1: Develop and Implement a Traffic Control and Safety Plan for Project Construction | Less than significant        |
| Result in inadequate emergency access                                                                                                                                                    | Potentially Significant        | Mitigation Measure TRF-1: Develop and Implement a Traffic Control and Safety Plan for Project Construction | Less than significant        |
| Result in inadequate parking capacity                                                                                                                                                    | Potentially Significant        | Mitigation Measure TRF-1: Develop and Implement a Traffic Control and Safety Plan for Project Construction | Less than significant        |

# Text Changes to Draft EIR

This chapter contains revisions to the text of the draft EIR in response to the change in the project to include the adjacent annexation area and changes in the air quality regulatory environment. Revisions are shown with strikethrough text for deletions (~~strikethrough~~) and underlined text for additions (underline). The changes are associated with the addition of the annexation of the adjacent annexation area to the project analyzed in the EIR and with responding to changes in the air quality regulatory setting.

An evaluation of the need for analysis of the impacts of the annexation of the adjacent annexation area was performed, and additional analysis was identified as necessary and performed in the following issue areas:

- Agricultural Resources
- Hazards and Hazardous Materials

Review of the analysis in the Draft EIR indicated that no additional analysis was necessary, no additional impacts would occur, and no additional mitigation measures would be necessary in the following issue areas.

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Geology, Soils, and Paleontology
- Hydrology and Water Quality
- Land use and Planning
- Noise
- Mineral Resources
- Population and Housing
- Public Services and Utilities
- Recreation
- Traffic and Transportation

## Section 3.1—Agricultural Resources

*The following change is made to the fourth full paragraph on page 3.1-4 of the draft EIR and is subsequently reflected in revised Figure 3.1-1:*

A parcel of land adjacent to the project site and west of Union Road, directly north of the ~~proposed~~ approved Oleander Estates site, is currently in agricultural use. However, the parcel is surrounded on four sides by land for which development applications are in process or approved. ~~The site is and~~-zoned AU-20. Eventual conversion of this parcel of land to residential use is planned under the General Plan 2023, although no applications have been filed with the City. This land is proposed for annexation as a part of the annexation of the Silva Estates project site in compliance with LAFCO policy requiring contiguous annexation and prohibiting the creation of islands of unincorporated land, although no subdivision or development of the adjacent annexation land is proposed at this time.

*The following change is made to the discussion of Impact AG-1 on page 3.1-8 of the draft EIR:*

### **Impact AG-1: Direct Conversion of Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or Other Farmland to Nonagricultural Use (Significant and Unavoidable)**

The proposed project would result in the direct conversion of 59.9 acres of important farmland to nonagricultural uses and potentially the indirect conversion of the adjacent annexation lands (28.1 acres). Ninety percent of this farmland is considered Farmland of Statewide Importance, and the remainder is Prime Farmland. This is a significant impact.

To implement the goals and objectives of the General Plan 2023 and mitigate impacts caused by new development in Manteca, the City requires payment of an agricultural mitigation fee. This fee is intended to mitigate the loss of productive agricultural lands converted for urban uses within the city by permanently protecting agricultural lands planned for agricultural use and working with farmers who voluntarily wish to place conservation easements on their land with fair compensation for such easements. This fee is collected by the City before the issuance of building permits and determined by the fee schedule in effect on the date ~~the tentative map or parcel map application is deemed complete or the date a~~ permit is issued. The agricultural mitigation fee schedule is established by Manteca Municipal Code Chapter 13.42, "Agricultural Mitigation Fee." Because the proposed project would convert agricultural land to nonagricultural uses, the project is subject to the agricultural mitigation fee.

Payment of the City's agricultural mitigation fee as identified in Mitigation Measure AG-1 would reduce this impact, but not to a less-than-significant level.



**Figure 3.1-1  
Existing Land Use**



No other feasible mitigation is available. Therefore, this impact is considered significant and unavoidable.

**Mitigation Measure AG-1: Agricultural Mitigation Fee**

The applicant shall pay the agricultural mitigation fee as required by Manteca Municipal Code Chapter 13.42.

*The following change is made to the first paragraph on page 3.1-9 of the draft EIR:*

**Impact AG-2: Result in Changes in the Existing Environment, Including Conversion of Farmland to Nonagricultural Use (Significant and Unavoidable)**

As noted in the “Environmental Setting” section, all of the land surrounding the project site is planned for development in the general plan, and all surrounding land is within the City’s sphere of influence and designated as LDR in the General Plan 2023. Additionally, adjacent lands to the west of the project site west of Union Road are also proposed for annexation to the City. Potential land use conflicts could occur between the proposed project and those adjacent parcels not currently proposed for development. Residential development would be located close to agricultural properties that involve activities such as pesticide application and heavy-equipment operation. Because of the change in character of the project site from agricultural to residential, adjacent agricultural parcels could be affected.

## Section 3.2—Air Quality

Following release of the *2006 Draft Environmental Impact Report (EIR) for the Silva Estates Project*, an updated version of URBEMIS was developed by Microsoft. This version, URBEMIS 2007 (version 9.2.4), reflects more current regulatory and legislative mandates that affect air pollutant emissions. In addition, a number of program enhancements were made, including the use of EMFAC2007 and OFFROAD2007 to generate emission factors for on-road mobile and off-road sources, respectively. Particulate matter less than 2.5 microns in diameter (PM<sub>2.5</sub>) and carbon dioxide (CO<sub>2</sub>) have also been added as new pollutants for analysis. These updates enable users to more accurately predict air quality impacts from development projects.

Construction and operational emissions from Silva Estates were remodeled using URBEMIS 2007 version 9.2.4. As such, the following text updates have been made to “Section 3.2 Air Quality” and are submitted to the public for review.

*The following changes are made to pages 3.2-13 through 3.2-15 of the draft EIR:*

## **Construction-Related Emissions**

As discussed above, the SJVAPCD has not established significance thresholds for construction emissions, nor is quantification of such emissions required. However, to achieve a better understanding of the likely approximate level of construction-related emissions generated by project conditions and provide decision makers with this information, modeling was conducted, using the ~~URBEMIS2002~~ URBEMIS2007 model (version 9.2.4), to estimate emissions associated with construction of the proposed project.

Construction of the proposed project would result in the temporary generation of emissions of ROG, NO<sub>x</sub>, CO, ~~and PM10~~, PM2.5, and CO<sub>2</sub> that would result in short-term impacts on ambient air quality in the area. Emissions would originate from mobile and stationary construction equipment exhaust, employee vehicle exhaust, dust from clearing the land, exposed soil eroded by wind, and ROG from architectural coatings and asphalt paving. Construction-related emissions would vary substantially depending on the level of activity, length of the construction period, specific construction operations, types of equipment, number of personnel, wind and precipitation conditions, and soil moisture content.

To estimate construction emissions, ~~URBEMIS2007~~ URBEMIS2007 analyzes the type of construction equipment used and the duration of the construction period associated with construction of each of the land uses. Because construction impacts vary substantially from day to day, construction is expected to occur over an 8-month period ~~between March 2008 and November 2008~~, with most construction activities occurring concurrently. According to the Construction activities analyzed with URBEMIS2007 model setup, construction of any project is generally were divided into two four phases: site grading, building construction, paving, and architectural coatings an excavation/grading phase and a building construction phase.

The number and type of equipment pieces needed to complete project construction were based on the data presented in the 2006 Draft EIR Air Quality chapter. At the time of the original modeling, a detailed inventory of construction equipment that will be used for the proposed project was not provided. The analysis presented in the 2006 Draft EIR Air Quality chapter used information provided by the project engineer and URBEMIS2002 model default settings (including equipment horsepower and load factor) for construction activities, based on the number of designated land uses, were used to identify the type and number of equipment that would be operating on a typical 8-hour workday during the construction period for site grading, building construction, and paving activities. These equipment estimates were remodeled using URBEMIS 2007 default values for load factor and horsepower. Table 3.2-4 summarizes the anticipated construction equipment and construction vehicle activity data used in the estimation of construction emissions. It was assumed that approximately 15 acres would be disturbed per day, with the sidewalks and paved areas totaling approximately 11 of the 15 acres. Nonmitigated ROG emissions from architectural coatings were estimated assuming the facilitywide

average coatings exhibit a VOC content of 0.0185 pound per square foot (that VOC content corresponds to use of solvent based coatings). Emissions associated with worker travel to the construction site and construction truck deliveries were estimated based on default values in the URBEMIS2007~~2~~ model. The model output for the URBEMIS2007~~2~~ analysis is provided in Appendix C.

**Table 3.2-4. Anticipated Construction Equipment**

| <u>Equipment Pieces by Phase</u>                                                                            | <u>No.<sup>1</sup></u> | <u>Load Factor<sup>2</sup></u> | <u>Horsepower<sup>2</sup></u> | <u>Hours/Day</u> |
|-------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------|-------------------------------|------------------|
| <b><u>Site Grading</u></b>                                                                                  |                        |                                |                               |                  |
| <u>Excavator</u>                                                                                            | <u>1</u>               | <u>168</u>                     | <u>0.570</u>                  | <u>8</u>         |
| <u>Scraper</u>                                                                                              | <u>4</u>               | <u>313</u>                     | <u>0.720</u>                  | <u>8</u>         |
| <b><u>Building Construction</u></b>                                                                         |                        |                                |                               |                  |
| <u>Rough Terrain Forklift</u>                                                                               | <u>1</u>               | <u>93</u>                      | <u>0.600</u>                  | <u>8</u>         |
| <u>Skid Steered Loader</u>                                                                                  | <u>4</u>               | <u>94</u>                      | <u>0.550</u>                  | <u>8</u>         |
| <b><u>Paving</u></b>                                                                                        |                        |                                |                               |                  |
| <u>Grader</u>                                                                                               | <u>2</u>               | <u>174</u>                     | <u>0.610</u>                  | <u>8</u>         |
| <u>Off-Highway Truck</u>                                                                                    | <u>2</u>               | <u>479</u>                     | <u>0.570</u>                  | <u>8</u>         |
| <u>Paver</u>                                                                                                | <u>2</u>               | <u>100</u>                     | <u>0.620</u>                  | <u>8</u>         |
| <u>Paving Equipment</u>                                                                                     | <u>2</u>               | <u>104</u>                     | <u>0.530</u>                  | <u>8</u>         |
| <u>Roller</u>                                                                                               | <u>4</u>               | <u>95</u>                      | <u>0.560</u>                  | <u>8</u>         |
| <b><u>Coating</u></b>                                                                                       |                        |                                |                               |                  |
| <u>None</u>                                                                                                 | <u>N/A</u>             | <u>N/A</u>                     | <u>N/A</u>                    | <u>N/A</u>       |
| <u>Notes:</u>                                                                                               |                        |                                |                               |                  |
| <sup>1</sup> <u>Number of equipment pieces based on data presented in the 2006 EIR Air Quality Chapter.</u> |                        |                                |                               |                  |
| <sup>2</sup> <u>Load factor and horsepower based on URBEMIS2007 defaults.</u>                               |                        |                                |                               |                  |
| <u>Source: URBEMIS2007.</u>                                                                                 |                        |                                |                               |                  |

## Operation-Related Emissions

Two types of air pollutant sources are expected during operation of the proposed project: area and mobile sources. Area sources can include areawide, natural, and groups of stationary sources (e.g., dry cleaners and gas stations). At the proposed project site, area sources include emissions from natural gas combustion for heating requirements (i.e., water heater and furnace), landscaping activities, consumer products (i.e., automotive products, household cleaners, personal care products), and periodic paint emissions from facility upkeep.

Area source emissions associated with the ~~school-proposed project~~ were estimated using the URBEMIS2007~~2~~ model, with the assumption that there would be ~~220-217~~ single-family houses on a total of 59.9 acres and no construction on the lands to be annexed west of Union Road. Based on information supplied by the project applicant, it was assumed that the development would not include wood burning fireplaces or stoves (Res. pers. comm.). As a result, wood hearth emissions were not estimated and are assumed

to be zero. Landscape emissions are based on the URBEMIS default summer length of 180 days.

Mobile sources are associated with vehicle trips, and include employees, deliveries, and maintenance activities. The primary operational emissions associated with the project are ozone precursors, CO, ~~and~~ PM10, PM2.5, and CO<sub>2</sub> emitted as vehicle exhaust. Emissions of ~~ozone precursors, CO, and PM10~~ pollutants were evaluated using the URBEMIS2007~~2~~ model and the recommended district fleet mix provided by the SJVAPCD (San Joaquin Valley Air Pollution Control District 2009) for full buildout year (2015) conditions. Based on information presented in Section 3.8 - Traffic of the EIR, it was assumed that 13 weekday transit busses would stop within ¼ mile of the project, the development would contain 17 intersections per square mile, and 50% of streets within the development would have sidewalks on both sides. The effects of CO “hot spot” emissions were evaluated through CO dispersion modeling for existing and full buildout year (2015) with and without project conditions. Both models are briefly described below.

### **URBEMIS2007~~2~~ Model**

Operational emissions of ozone precursors, CO, PM10, PM2.5, and ~~and~~ PM10 ~~and~~ were modeled using the URBEMIS2007~~2~~ model. Emission calculations for area sources were based on default URBEMIS2007 calculations based on land use type and size, whereas mobile source emissions were based on the daily trip generation data provided by the project traffic engineers, Fehr & Peers, and the recommended district fleet mix provided by the SJVAPCD (San Joaquin Valley Air Pollution Control District 2009). URBEMIS2007~~2~~ is a computer program used to estimate typical emissions (construction, area source, and mobile) associated with land use development projects. URBEMIS2007 estimates construction emissions based on the type and duration of activity during each construction phase, the construction equipment mix required for each project phase, ARB OFFROAD2007 and EMFAC2007 emission factors for off-road and on-road internal combustion emissions, respectively. Likewise, the URBEMIS2007 model calculates mobile and area source emissions based on a series of emission factors and input data for the desired year of analysis and selected type of land use. ~~URBEMIS2002 estimates emissions based on the type of land use and area source and vehicular emissions typically associated with the land use. This ARB~~ SJVAPCD-approved model is widely recommended and used by many California air districts for calculating emissions from a variety of projects. Output of URBEMIS analysis is provided in Appendix C.

Page 3.2-16:

### **Impact AQ-1: Generation of Significant Levels of Emissions from Project Construction (Less than Significant with Mitigation)**

As indicated above, the SJVAPCD does not require quantification of construction emissions, because compliance with Regulation VIII through implementation of a dust control plan is sufficient to reduce any potentially significant air quality effects generated by construction activities to a less-than-significant level. Consequently, this impact is considered less than significant with the implementation of Mitigation Measure AQ-1a.

~~As indicated above, A~~ although the SJVAPCD does not require the quantification of construction emissions, modeling was conducted, using the URBEMIS20072 model, to estimate emissions associated with construction of the proposed project to achieve a better understanding of the likely approximate level of construction-related emissions generated by project conditions and provide decision makers with this information. Table 3.2-5 summarizes yearly unmitigated and mitigated emissions resulting from construction activities associated with the proposed project. Mitigated emissions reflect compliance with SJVAPCD Regulation VIII and implementation of other recommended measures to future reduce emissions of criteria pollutants. Criteria pollutant emissions from construction activities are presented in Table 3.2-5.

**Table 3.2-5. Emissions Unmitigated and Mitigated Construction Emissions of Criteria Pollutants from Construction Activities (Tons per Year)**

| Phase                        | ROG         | NO <sub>x</sub> | CO          | PM10        | PM2.5       | CO <sub>2</sub> <sup>1</sup> |
|------------------------------|-------------|-----------------|-------------|-------------|-------------|------------------------------|
| <b>Unmitigated</b>           |             |                 |             |             |             |                              |
| Site Grading                 | 0.05        | 0.46            | 0.23        | 1.67        | 0.36        | 35.82                        |
| Building Construction        | 0.42        | 1.86            | 3.61        | 0.16        | 0.14        | 325.09                       |
| Architectural Coatings       | 2.94        | 0.00            | 0.08        | 0.00        | 0.00        | 6.11                         |
| Paving                       | 0.08        | 0.52            | 0.24        | 0.03        | 0.03        | 42.26                        |
| <b>Total</b>                 | <b>3.49</b> | <b>2.84</b>     | <b>4.16</b> | <b>1.86</b> | <b>0.53</b> | <b>409.29</b>                |
| <b>Mitigated<sup>2</sup></b> |             |                 |             |             |             |                              |
| Site Grading                 | 0.05        | 0.31            | 0.23        | 0.44        | 0.09        | 35.82                        |
| Building Construction        | 0.42        | 1.41            | 3.61        | 0.04        | 0.03        | 325.09                       |
| Architectural Coatings       | 2.94        | 0.00            | 0.08        | 0.00        | 0.00        | 6.11                         |
| Paving                       | 0.08        | 0.37            | 0.24        | 0.00        | 0.00        | 42.26                        |
| <b>Total</b>                 | <b>3.49</b> | <b>2.09</b>     | <b>4.16</b> | <b>0.48</b> | <b>0.12</b> | <b>409.29</b>                |

**Notes:**

<sup>1</sup> CO<sub>2</sub> is presented in metric tons per year. One ton equals 0.9071847 metric tons (tonnes).

<sup>2</sup> Mitigated emissions reflect compliance with SJVAPCD Regulation VIII and implementation of other recommended measures to future reduce emissions of criteria pollutants (see below).

<sup>3</sup> Complete URBEMIS outputs are provided in Appendix C.

Source: URBEMIS2007.

| Full Project Buildout  | Unmitigated |                 |            |            | Mitigated   |                 |            |            |
|------------------------|-------------|-----------------|------------|------------|-------------|-----------------|------------|------------|
|                        | ROG         | NO <sub>x</sub> | CO         | PM10       | ROG         | NO <sub>x</sub> | CO         | PM10       |
| Site grading           | 0.1         | 0.6             | 0.8        | 0.8        | 0.1         | 0.4             | 0.8        | 0.3        |
| Building construction  | 0.5         | 2.3             | 6.7        | 0.1        | 0.5         | 1.7             | 6.7        | 0.0        |
| Architectural coatings | 9.9         | 0.0             | 0.2        | 0.0        | 9.9         | 0.0             | 0.2        | 0.0        |
| Asphalt                | 0.1         | 0.7             | 0.9        | 0.0        | 0.1         | 0.5             | 0.9        | 0.0        |
| <b>Total</b>           | <b>10.6</b> | <b>3.6</b>      | <b>8.6</b> | <b>0.9</b> | <b>10.6</b> | <b>2.6</b>      | <b>8.6</b> | <b>0.3</b> |

Page 3.2-17:

### **Impact AQ-3: Generation of Significant ROG, NO<sub>x</sub>, CO, and PM10, and PM2.5 Emissions from Project Operations (Less than Significant)**

Estimated emissions of area and mobile source emissions from project operations were evaluated using the ~~URBEMIS2002~~ URBEMIS2007 computer model and the recommended district fleet mix provided by the SJVAPCD (San Joaquin Valley Air Pollution Control District 2009). Hearth emissions were not estimated and are assumed to be zero as the project applicant indicated that the development would not include wood burning fireplaces and stoves (Rey pers.

comm.). It was assumed that 13 weekday transit busses would stop within ¼ mile of the project, the development would contain 17 intersections per square mile, and 50% of streets within the development would have sidewalks on both sides. The results of these calculations are summarized in Table 3.2-6.

**Table 3.2-6.** Emissions of Criteria Pollutants from Project Operations (Tons per Year)

| Emission Source                                                                                                   | Emissions at Full Project Buildout (2015) |                 |              |             |             |                              |
|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-----------------|--------------|-------------|-------------|------------------------------|
|                                                                                                                   | ROG                                       | NO <sub>x</sub> | CO           | PM10        | PM2.5       | CO <sub>2</sub> <sup>1</sup> |
| <b><u>Area sources</u></b>                                                                                        |                                           |                 |              |             |             |                              |
| <u>Natural gas</u>                                                                                                | 0.02                                      | 0.30            | 0.13         | 0.00        | 0.00        | 353.013                      |
| <u>Landscaping</u>                                                                                                | 0.15                                      | 0.01            | 0.85         | 0.00        | 0.00        | 1.27                         |
| <u>Consumer products</u>                                                                                          | 1.40                                      | –               | –            | –           | –           | –                            |
| <u>Architectural coatings</u>                                                                                     | 0.29                                      | –               | –            | –           | –           | –                            |
| <b><u>Mobile sources</u></b>                                                                                      |                                           |                 |              |             |             |                              |
| <u>Vehicular emissions</u>                                                                                        | 1.76                                      | 2.27            | 21.54        | 2.37        | 0.51        | 2,387.501                    |
| <b><u>Total</u></b>                                                                                               | <b>3.62</b>                               | <b>2.58</b>     | <b>22.52</b> | <b>2.37</b> | <b>0.51</b> | <b>2,741.784</b>             |
| <u>SJVAPCD Threshold</u>                                                                                          | 10                                        | 10              | –            | 15          | –           | –                            |
| <b>Notes:</b>                                                                                                     |                                           |                 |              |             |             |                              |
| <sup>1</sup> CO <sub>2</sub> is presented in metric tons per year. One ton equals 0.9071847 metric tons (tonnes). |                                           |                 |              |             |             |                              |
| <sup>2</sup> Wood burning fireplaces and stoves will not be included in the development                           |                                           |                 |              |             |             |                              |
| <sup>3</sup> Complete URBEMIS outputs are provided in Appendix C.                                                 |                                           |                 |              |             |             |                              |
| Source: URBEMIS2007; Rey pers. comm.                                                                              |                                           |                 |              |             |             |                              |

*The following references are added to the draft EIR:*

San Joaquin Valley Air Pollution Control District. 2009. URBEMIS: District Changes to Default Values. Last Revised January 2009: Available: <<http://www.valleyair.org/ISR/ISRResources.htm#Models>>. Accessed: September 23, 2009.

Rey, Lantz. Senior Planner. City of Manteca, Manteca, CA. September 23, 2009—Email messages to Laura Smith.

*The following is added to “Section 3.2 Air Quality” of the draft EIR:*

## **Climate Change & Greenhouse Gas Emissions**

### **Introduction**

This chapter provides background information on global climate change and details current federal and state greenhouse gas (GHG) inventories. It also

discusses federal, state, and local regulations related to GHGs that would apply to the proposed project. Finally, the chapter identifies impacts on GHG levels that would result from implementation of the project and proposes mitigation measures where necessary.

## **Environmental Setting**

This section provides the necessary context to determine the potential impacts of the Silva Estates GHG emissions. It first summarizes relevant information on global climate change and then describes the characteristics, sources, and units used to quantify the following six GHGs: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>). Following this, the section presents an analysis of the statewide, national, and global GHG emissions inventories.

## **Global Climate Change**

Global climate change is caused in large part by anthropogenic (man-made) emissions of GHGs released into the atmosphere through the combustion of fossil fuels and by other activities that affect the global GHG budget, such as deforestation and land-use change. According to the California Energy Commission (CEC), GHG emissions in California are attributable to human activities associated with industrial/manufacturing, utilities, transportation, residential, and agricultural sectors as well as natural processes (California Energy Commission 2006a).

GHGs play a critical role in the Earth's radiation budget by trapping infrared radiation emitted from the Earth's surface, which could have otherwise escaped to space. Prominent GHGs contributing to this process include water vapor, CO<sub>2</sub>, N<sub>2</sub>O, CH<sub>4</sub>, ozone, certain HFCs and PFCs, and SF<sub>6</sub>. This phenomenon, known as the "greenhouse effect," keeps the Earth's atmosphere near the surface warmer than it would otherwise be and allows for successful habitation by humans and other forms of life. The combustion of fossil fuels releases carbon that has been stored underground into the active carbon cycle, thus increasing concentrations of GHGs in the atmosphere. Emissions of GHGs in excess of natural ambient concentrations are thought to be responsible for the enhancement of the greenhouse effect and to contribute to what is termed "global warming," a trend of unnatural warming of the Earth's natural climate. Higher concentrations of these gases lead to more absorption of radiation and warm the lower atmosphere further, thereby increasing evaporation rates and temperatures near the surface.

Climate change is a global problem, and GHGs are global pollutants, unlike criteria air pollutants (such as ozone precursors) and toxic air contaminants (TACs), which are primarily pollutants of regional and local concern. Because GHG emissions have long atmospheric lifetimes, GHGs are effectively well mixed globally and are expected to persist in the atmosphere for time periods several orders of magnitude longer than criteria pollutants such as ozone. Given



their long atmospheric lifetimes, GHG emission reduction strategies can be effectively undertaken on a global scale whereby the mitigation of local GHG emissions can be offset by distant GHG reduction activities.

The Intergovernmental Panel on Climate Change (IPCC) was established by the World Meteorological Organization and United Nations Environment Programme to assess scientific, technical, and socioeconomic information relevant for the understanding of climate change, its potential impacts, and options for adaptation and mitigation. The IPCC predicts substantial increases in global temperatures between 1.1 and 6.4° Celsius (depending on scenario) by the year 2100 (Intergovernmental Panel on Climate Change 2007a).

Climate change could potentially impact the natural environment in California, and the world atlarge, in the following ways:

- Rising sea levels along the California coastline, particularly in San Francisco and the Sacramento–San Joaquin River Delta (Delta) due to ocean expansion;
- Changing extreme-heat conditions, such as heat waves and very high temperatures, which could last longer and become more frequent;
- Increasing wildfire frequency and intensity;
- Increasing heat-related human deaths, infectious diseases, and increasing risk of respiratory problems caused by deteriorating air quality;
- Decreasing snow pack and stream flow in the Sierra Nevada mountains, affecting winter recreation and water supplies;
- Increasing severity of winter storms, affecting peak stream flows and flooding;
- Changing growing season conditions that could affect California agriculture, causing variations in crop quality and yield; and
- Changing distribution of plant and wildlife species due to changes in temperature, competition from colonizing species, changes in hydrologic cycles, changes in sea levels, and other climate-related effects.

These changes in California’s climate and ecosystems are occurring at a time when California’s population is expected to increase from 34 million to 59 million by the year 2040 (California Energy Commission 2005). As such, the number of people potentially affected by climate change as well as the amount of anthropogenic GHG emissions expected under a “business as usual” (BAU) scenario is expected to increase.

As a consequence of worldwide GHG emissions altering the global climate, the project area may be subject to increased vulnerability to the following impacts including:

- Reduced water supply to the project area;
- Increased risk of heat-related human deaths;

- Increased spread of infectious diseases; and
- Increased risk of respiratory problems associated with deteriorating air quality in the project area.

## **Greenhouse Gases**

The characteristics, sources, and units used to quantify the six gases listed in AB 32 (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, and SF<sub>6</sub>) are documented in this section, in order of abundance in the atmosphere. Note that water vapor, although the most abundant GHG, is not included in AB 32 because natural concentrations and fluctuations far outweigh anthropogenic influences.

In order to simplify reporting and analysis, methods have been set forth to describe emissions of GHGs in terms of a single gas. The most commonly accepted method to compare GHG emissions is the “global warming potential” (GWP) methodology defined in the IPCC reference documents (Intergovernmental Panel on Climate Change 1996 and 2001). The IPCC defines the GWP of various GHG emissions on a normalized scale that recasts all GHG emissions in terms of CO<sub>2</sub> equivalents (CO<sub>2</sub>e), which compares the gas in question to that of the same mass of CO<sub>2</sub> (CO<sub>2</sub> has a GWP of 1 by definition). For example, a high GWP represents high infrared absorption and long atmospheric lifetime when compared to CO<sub>2</sub>. One must also select a time horizon to convert GHG emissions to equivalent CO<sub>2</sub> emissions to account for chemical reactivity and lifetime differences between various GHG species. The standard time horizon for climate change analysis is 100 years. Generally, GHG emissions are quantified in terms of metric tons of CO<sub>2</sub>e emitted per year.

The “atmospheric residence time” of a gas is equal to the total atmospheric abundance of the gas divided by its rate of removal. This is, in effect, a half-life measurement of how long a gas is expected to persist in the atmosphere when taking into account removal mechanisms, such as chemical transformation and deposition.

Table 1 lists the GWP of each GHG, its lifetime, and abundance in the atmosphere in parts per trillion (ppt). GWPs have been revised twice since they were first quantified by the IPCC’s Second Assessment Report (SAR) in 1996. However, international reporting standards, established under the United Nations Framework Convention on Climate Change (UNFCCC), require the use of GWPs from the SAR (UNFCCC 2003). Units commonly used to describe the concentration of GHGs in the atmosphere are parts per million (ppm), parts per billion (ppb) and ppt, which refer to the number of molecules of the GHG in a sampling of one million, one billion or one trillion molecules of air, respectively. Collectively, HFCs, PFCs, and SF<sub>6</sub> are referred to as high global warming potential gases (HGWPG). CO<sub>2</sub> is by far the largest component of worldwide CO<sub>2</sub>e emissions, followed by CH<sub>4</sub>, N<sub>2</sub>O, and HGWPGs in order of decreasing contribution to CO<sub>2</sub>e.

**Table 1.** Lifetimes and Global Warming Potentials of Several Significant GHGs

| <u>Gas</u>                        | <u>Global Warming Potential (100 years)</u> | <u>Lifetime (years)</u> | <u>1998 Atmospheric Abundance (ppt1)<sup>1</sup></u> |
|-----------------------------------|---------------------------------------------|-------------------------|------------------------------------------------------|
| <u>CO<sub>2</sub></u>             | <u>1</u>                                    | <u>50-200</u>           | <u>365,000,000</u>                                   |
| <u>CH<sub>4</sub></u>             | <u>21</u>                                   | <u>9-15</u>             | <u>1,745</u>                                         |
| <u>N<sub>2</sub>O</u>             | <u>310</u>                                  | <u>120</u>              | <u>314</u>                                           |
| <u>HFC-23</u>                     | <u>11,700</u>                               | <u>264</u>              | <u>14</u>                                            |
| <u>HFC-134a</u>                   | <u>1,300</u>                                | <u>14.6</u>             | <u>7.5</u>                                           |
| <u>HFC-152a</u>                   | <u>140</u>                                  | <u>1.5</u>              | <u>0.5</u>                                           |
| <u>CF<sub>4</sub></u>             | <u>6,500</u>                                | <u>50,000</u>           | <u>80</u>                                            |
| <u>C<sub>2</sub>F<sub>6</sub></u> | <u>9,200</u>                                | <u>10,000</u>           | <u>3</u>                                             |
| <u>SF<sub>6</sub></u>             | <u>23,900</u>                               | <u>3,200</u>            | <u>4.2</u>                                           |

Notes:

<sup>1</sup> 1 ppt is a mixing ratio unit indicating the concentration of a pollutant in parts per trillion by volume.

Source: Intergovernmental Panel on Climate Change 1996, 2001 (pages 388-390)

## **Carbon Dioxide**

CO<sub>2</sub> is the most important anthropogenic GHG, as it accounts for more than 75% of all anthropogenic GHG emissions. Its long atmospheric lifetime (on the order of decades to centuries) ensures that atmospheric concentrations of CO<sub>2</sub> will remain elevated for decades after GHG mitigation efforts to reduce GHG concentrations are implemented (Intergovernmental Panel on Climate Change 2007b).

Increasing concentrations of CO<sub>2</sub> in the atmosphere are largely due to emissions from the burning of fossil fuels, gas flaring, cement production, and land-use changes. Three quarters of anthropogenic CO<sub>2</sub> emissions are the result of fossil fuel burning (and to a very small extent, cement production), and approximately one quarter of emissions are the result of land-use change (Intergovernmental Panel on Climate Change 2007a).

Anthropogenic emissions of CO<sub>2</sub> have increased concentrations in the atmosphere most notably since the Industrial Revolution; the concentration of CO<sub>2</sub> has increased from about 280 to 379 ppm over the last 250 years (Intergovernmental Panel on Climate Change 2007a). IPCC estimates that the present atmospheric concentration of CO<sub>2</sub> has not been exceeded in the last 650,000 years and is likely to be the highest ambient concentration in the last 20 million years (Intergovernmental Panel on Climate Change 2007a; Intergovernmental Panel on Climate Change 2001).

## **Methane**

CH<sub>4</sub>, the main component of natural gas, is the second largest contributor to anthropogenic GHG emissions and has a GWP of 21 (Association of Environmental Professionals 2007; Intergovernmental Panel on Climate Change 1996).

Anthropogenic emissions of CH<sub>4</sub> are the result of growing rice, raising cattle, combusting natural gas, and mining coal (National Oceanic and Atmospheric Administration 2005). Atmospheric CH<sub>4</sub> has increased from a preindustrial concentration of 715 to 1,775 parts per billion in 2005 (Intergovernmental Panel on Climate Change 2007a). Although it is unclear why, atmospheric concentrations of CH<sub>4</sub> have not risen as quickly as anticipated (National Oceanic and Atmospheric Administration 2005).

## **Nitrous Oxide**

N<sub>2</sub>O is a powerful GHG, with a GWP of 310 (Intergovernmental Panel on Climate Change 1996). Anthropogenic sources of N<sub>2</sub>O include agricultural processes, nylon production, fuel-fired power plants, nitric acid production, and vehicle emissions. N<sub>2</sub>O is also used in rocket engines and racecars and as an aerosol spray propellant. Agricultural processes that result in anthropogenic N<sub>2</sub>O emissions are fertilizer use and microbial processes in soil and water (Association of Environmental Professionals 2007).

N<sub>2</sub>O concentrations in the atmosphere have increased from preindustrial levels of 270 ppb to 319 ppb in 2005 (Intergovernmental Panel on Climate Change 2007a).

## **Hydrofluorocarbons**

HFCs are human-made chemicals used in commercial, industrial, and consumer products and have high GWPs (Environmental Protection Agency 2006a). HFCs are generally used as substitutes for ozone-depleting substances (ODS) in automobile air conditioners and refrigerants. As seen in Table 1, the most abundant HFCs, in order from most to least abundant, are HFC-134a (35 ppt), HFC-23 (17.5 ppt), and HFC-152a (3.9 ppt).

Concentrations of HFCs have risen from zero to current levels. Because these chemicals are human-made, they do not exist naturally in ambient conditions.

## **Perfluorocarbons**

The most abundant PFCs include CF<sub>4</sub> (PFC-14) and C<sub>2</sub>F<sub>6</sub> (PFC-116). These human-made chemicals are emitted largely from aluminum production and semiconductor manufacturing processes. PFCs are extremely stable compounds

that are only destroyed by very high-energy ultraviolet rays, which result in the very long lifetimes of these chemicals, as shown in Table 1 (Environmental Protection Agency 2006a).

## **Sulfur Hexafluoride**

SF<sub>6</sub>, another human-made chemical, is used as an electrical insulating fluid for power distribution equipment, in the magnesium industry, in semiconductor manufacturing, and also as a trace chemical for study of oceanic and atmospheric processes (Environmental Protection Agency 2006a). In 1998, atmospheric concentrations of SF<sub>6</sub> were 4.2 ppt and steadily increasing in the atmosphere.

SF<sub>6</sub> is the most powerful of all GHGs listed in IPCC studies with a GWP of 23,900 (Intergovernmental Panel on Climate Change 1996).

## **GHG Inventories**

A GHG inventory is a quantification of all GHG emissions and sinks within a selected physical and/or economic boundary. GHG inventories can be performed on a large scale (i.e., for global and national entities) or on a small scale (i.e., for a particular building or person).

Many GHG emission and sink specifications are complicated to evaluate because natural processes may dominate the carbon cycle. Though some emission sources and processes are easily characterized and well understood, some components of the GHG budget (i.e., the balance of GHG sources and sinks) are not known with accuracy. Because protocols for quantifying GHG emissions from many sources are currently under development by international, national, state, and local agencies, ad-hoc tools must be developed to quantify emissions from certain sources and sinks in the interim.

The following sections outline the global, national, and statewide GHG inventories to contextualize the magnitude of project-related emissions.

## **IPCC 2004 Global GHG Inventory**

The most recent global GHG inventory analyzed emissions in 2004 and was conducted by the IPCC. According to the IPCC, global anthropogenic GHG emissions were estimated at 49,000 million metric tons of CO<sub>2</sub>e in 2004, which is 24% greater than 1990 emissions levels. CO<sub>2</sub> contributed to 76.7% of total emissions, CH<sub>4</sub> accounted for 14.3%, N<sub>2</sub>O contributed to 7.9%, and fluorinated gases (HFCs, PFCs, and SF<sub>6</sub>) contributed to the remaining 1.1% of global emissions (Intergovernmental Panel on Climate Change 2007c). Table 2 presents global GHG emissions by sector, as defined in the IPCC report.

**Table 2.** Global GHG Emissions from the IPCC 2004 Inventory

| <u>Sector</u>                                                                    | <u>CO<sub>2</sub>e Emissions<br/>(million metric tons)</u> |
|----------------------------------------------------------------------------------|------------------------------------------------------------|
| <u>Energy</u>                                                                    | <u>12,691</u>                                              |
| <u>Industry</u>                                                                  | <u>9,506</u>                                               |
| <u>Forestry</u>                                                                  | <u>8,526</u>                                               |
| <u>Agriculture</u>                                                               | <u>6,615</u>                                               |
| <u>Transportation</u>                                                            | <u>6,419</u>                                               |
| <u>Residential and Commercial Buildings</u>                                      | <u>3,871</u>                                               |
| <u>Waste and Wastewater</u>                                                      | <u>1,372</u>                                               |
| <b><u>Total Emissions</u></b>                                                    | <b><u>49,000</u></b>                                       |
| <u>Note: Adapted from Intergovernmental Panel on Climate Change 2007c pg. 5.</u> |                                                            |

### **National 2007 GHG Inventories**

The U.S. Environmental Protection Agency (EPA) estimates that total U.S. GHG emissions in 2007 amounted to 7,150.1 million metric tons of CO<sub>2</sub>e, which is 17% greater than 1990 levels (Environmental Protection Agency 2009a). CO<sub>2</sub> contributed to 85.4% of total emissions, CH<sub>4</sub> accounted for 8.2%, N<sub>2</sub>O contributed to 4.4%, and HFCs, PFCs, and SF<sub>6</sub> contributed to the remaining 2.10% of national emissions. Table 3 summarizes the U.S. GHG emissions in 2007, based on CO<sub>2</sub> equivalents. The largest contributor to U.S. GHG emissions in 2007 was the energy sector, accounting for approximately 86.3% of total emissions (Environmental Protection Agency 2009a).

**Table 3.** U.S. Greenhouse Gas Emissions from the EPA 2007 Inventory

| <u>Sector</u>                                                        | <u>2007 CO<sub>2</sub>e Emissions<br/>(million metric tons)</u> |
|----------------------------------------------------------------------|-----------------------------------------------------------------|
| <u>Energy</u>                                                        | <u>6,170.3</u>                                                  |
| <u>Industrial Processes</u>                                          | <u>353.8</u>                                                    |
| <u>Solvent and Other Product Use</u>                                 | <u>4.4</u>                                                      |
| <u>Agriculture</u>                                                   | <u>413.1</u>                                                    |
| <u>Land Use, Land-Use Change, and Forestry</u>                       | <u>42.9</u>                                                     |
| <u>Waste</u>                                                         | <u>165.6</u>                                                    |
| <b><u>Total Emissions</u></b>                                        | <b><u>7,150.1</u></b>                                           |
| <u>Source: U.S. Environmental Protection Agency 2009a Pg. ES-11.</u> |                                                                 |

The Energy Information Administration (EIA) also conducted an inventory on 2007 GHG emissions. The results of their analysis were similar to those of the EPA, with total U.S. greenhouse gas emissions amounting to 7,282.4 million metric tons CO<sub>2</sub>e. This represents a 1.4 percent increase above the 2006 total. (Energy Information Administration 2008) CO<sub>2</sub> emissions accounted for 82.6%

of total emissions, CH<sub>4</sub> contributed to 9.6%, N<sub>2</sub>O emissions were responsible for 3.5%, and High Global Warming Potential Gases (HGWPGs), which include HFCs, PFCs, and SF<sub>6</sub>, contributed to the remaining 2.4% of national emissions. Table 4 summarizes total GHG emissions by sector, as defined in the EIA report (Energy Information Administration 2008).

**Table 4. U.S. Greenhouse Gas Emissions from the 2007 EIA Inventory**

| <u>Sector</u>                                         | <u>CO<sub>2</sub>e<br/>(million metric tons)</u> |
|-------------------------------------------------------|--------------------------------------------------|
| <u>Industry</u>                                       | <u>2,610</u>                                     |
| <u>Transportation</u>                                 | <u>2,036</u>                                     |
| <u>Commercial</u>                                     | <u>1,355</u>                                     |
| <u>Residential</u>                                    | <u>1,281</u>                                     |
| <u>Total Emissions</u>                                | <u>7,281</u>                                     |
| <u>Source: Energy Information Administration 2008</u> |                                                  |

Total emissions growth—from 2006 to 2007—was largely the result of a 75.9-MMTCO<sub>2</sub>e-increase in CO<sub>2</sub> emissions. There were larger percentage increases in emissions of other greenhouse gases, but their absolute contributions to total emissions growth were relatively small: 13.0 MMTCO<sub>2</sub>e for CH<sub>4</sub>, 8.2 MMTCO<sub>2</sub>e for N<sub>2</sub>O, and 5.6 MMTCO<sub>2</sub>e for high-GWP gases (Energy Information Administration 2008).

The increase in U.S. carbon dioxide emissions in 2007 resulted primarily from two factors: unfavorable weather conditions, which increased demand for heating and cooling in buildings; and a drop in hydropower availability that led to greater reliance on fossil energy sources (coal and natural gas) for electricity generation, increasing the carbon intensity of the power supply (Energy Information Administration 2008). CH<sub>4</sub> emissions increased in the energy, waste management, and agriculture sectors. The increase in N<sub>2</sub>O is attributed primarily to an increase of emissions from nitrogen fertilization of agricultural soils.

## **Statewide 2004 and 2006 Greenhouse Gas Inventories**

The CEC's "Inventory of Greenhouse Gas Emissions and Sinks: 1990–2004" estimates that California is the second largest emitter of GHG emissions in the United States (California Energy Commission 2006a). The commission further estimates that in 1990, California's gross GHG emissions were between 425 and 452 million metric tons of CO<sub>2</sub>e, while in 2004, California's gross GHG emissions were 492 million metric tons of CO<sub>2</sub>e. Similar to the global and national inventories, CO<sub>2</sub> represented the largest percentage of the state's GHG emissions inventory. According to the CEC, 83.8% of statewide emissions were from CO<sub>2</sub>, 5.7% were from CH<sub>4</sub>, 6.8% were from N<sub>2</sub>O, and the remaining 2.9% were from HGWPGs. Table 5 summarizes 2004 statewide GHG emissions by sector, as defined in the CEC report (California Energy Commission 2006a).

**Table 5. Statewide Greenhouse Gas Emissions from the 2004 CEC Inventory**

| <u>Sector</u>                                                  | <u>CO<sub>2</sub>e</u><br><u>(million metric tons)</u> |
|----------------------------------------------------------------|--------------------------------------------------------|
| <u>Transportation</u>                                          | <u>200</u>                                             |
| <u>Electrical Power</u>                                        | <u>109</u>                                             |
| <u>Industry</u>                                                | <u>101</u>                                             |
| <u>Agriculture and Forestry</u>                                | <u>41</u>                                              |
| <u>Other</u>                                                   | <u>41</u>                                              |
| <u>Total Emissions</u>                                         | <u>492</u>                                             |
| <u>Source: Adapted from California Energy Commission 2006a</u> |                                                        |

The California Air Resources Board (ARB) recently completed a GHG inventory of California's 2006 GHG emissions. Their report states that 1990 emissions amounted to 433.3 million metric tons of CO<sub>2</sub>e, while 2006 emissions levels rose to 483.9 million metric tons of CO<sub>2</sub>e (California Air Resources Board 2009a). Based on California's 2006 population of 37,114,598, this amounts to approximately 13 metric tons of CO<sub>2</sub>e per person (State of California, Department of Finance 2008). CO<sub>2</sub> emissions accounted for 89% of the state's 2006 inventory, followed by CH<sub>4</sub> (5%), N<sub>2</sub>O (3%), and other gases included HGWPGs (3%) (California Air Resources Board 2009a). Table 6 summarizes statewide GHG emissions by sector, as defined in the ARB report.

**Table 6. Statewide Greenhouse Gas Emissions from the 2006 ARB Inventory**

| <u>Sector</u>                                                                                                                           | <u>CO<sub>2</sub>e</u><br><u>(million metric tons)</u> |
|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| <u>Transportation</u>                                                                                                                   | <u>188.721</u>                                         |
| <u>Electricity Generation</u>                                                                                                           | <u>106.458</u>                                         |
| <u>Industry</u>                                                                                                                         | <u>101.619</u>                                         |
| <u>Agriculture and Forestry</u>                                                                                                         | <u>29.034</u>                                          |
| <u>Residential</u>                                                                                                                      | <u>29.034</u>                                          |
| <u>Commercial</u>                                                                                                                       | <u>14.517</u>                                          |
| <u>Other</u>                                                                                                                            | <u>14.517</u>                                          |
| <u>Total</u>                                                                                                                            | <u>483.9</u>                                           |
| <u>Note: Emissions inventory includes estimates for CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, SF<sub>6</sub>, HFCs, and PFCs.</u> |                                                        |
| <u>Source: Adapted from California Air Resources Board 2009a</u>                                                                        |                                                        |

## **Regulatory Setting**

Climate change has only recently been widely recognized as an imminent threat to the global climate, economy, and population. Thus, the climate change regulatory setting—nationally, statewide, and locally—is complex and evolving.



The following section identifies key legislation, executive orders, and seminal court cases relevant to the environmental assessment of project GHG emissions.

## **Federal**

### **Federal Action on Greenhouse Gas Emissions**

In 2002, President George W. Bush set a national policy goal of reducing the GHG emission intensity (tons of GHG emissions per million dollars of gross domestic product) of the U.S. economy by 18% by 2012. No binding reductions were associated with the goal. Rather the EPA administers a variety of voluntary programs and partnerships with GHG emitters in which the EPA collaborates with industries producing and utilizing synthetic gases to reduce emissions of these particularly potent GHGs.

### **Massachusetts et al. vs. Environmental Protection Agency et al.**

In *Massachusetts et al. vs. Environmental Protection Agency et al.* (April 2, 2007) the U.S. Supreme Court ruled that the EPA was authorized by the Clean Air Act (CAA) to regulate CO<sub>2</sub> emissions from new motor vehicles. The Court did not mandate that the EPA enact regulations to reduce GHG emissions, but found that EPA could avoid taking action only if it found that GHGs do not contribute to climate change or EPA offered a “reasonable explanation” for not determining that GHGs contribute to climate change.

### **Energy Independence and Security Act of 2007**

On December 19, 2007, the Energy Independence and Security Act of 2007 (EISA) was signed into law, which requires an increased Corporate Average Fuel Economy (CAFE) standard of 35 miles per gallon for the combined fleet of cars and light trucks by model year 2020. EISA requires establishment of interim standards (from 2011 to 2020) that will be the “maximum feasible average fuel economy” for each fleet. EISA also includes several other provisions:

- Renewable Fuel Standard (Section 202);
- Appliance and Lighting Efficiency Standards (Section 301–325);
- Building Energy Efficiency (Sections 411–441).

Additional requirements of the EISA address energy savings in government and public institutions and promote research for alternative energy, carbon capture, international energy programs, and the creation of “green jobs.”

## **EPA Proposed Rule—Mandatory GHG Reporting**

On March 10, 2009 the EPA proposed a rule that requires mandatory reporting of emissions of GHGs from large sources within the United States. The proposed rule includes emissions of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub>, nitrogen trifluoride (NF<sub>3</sub>), hydrofluorinated ethers (HFE), and selected other fluorinated compounds. Under the rule, suppliers of fossil fuels or industrial greenhouse gases, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions would be required to report annual emissions to the EPA. The rule was approved in September 2009 and will go into effect January 1, 2010. The first annual reports for the largest emitting facilities, covering calendar year 2010, will be submitted to EPA in 2011.

## **EPA Finding of Endangerment**

On April 17, 2009, EPA issued a “Proposed Endangerment and Cause or Contribute Finding” for GHGS under the CAA. Through this Finding of Endangerment, the EPA Administrator proposes that current and projected concentrations of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, and SF<sub>6</sub> threaten the public health and welfare of current and future generations. Additionally, the Administrator proposes that combined emissions of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, and HFCs from motor vehicles contribute to the atmospheric concentrations and thus to the threat of climate change. Although the Endangerment Finding in itself does not place requirements on industry, it is an important step in the EPA’s process to develop regulation of GHGs.

The EPA has prepared various documents in support of the endangerment finding including a “Summary of the Science Supporting EPA’s Finding that Greenhouse Gases Threaten Public Health and Welfare” (Environmental Protection Agency 2009b). The summary notes that “[c]limate change is expected to worsen regional ozone pollution, with associated risks in respiratory infection, aggravation of asthma, and premature death. The impact on particulate matter remains less certain.”

## **Update on Corporate Average Fuel Economy (CAFE) Standards**

On May 19, 2009 President Obama issued a requirement to automakers to increase fuel efficiency of cars manufactured in the United States to 35.5 mpg by 2016, four years ahead of the schedule set by the EISA of 2007. The new CAFE standards incorporate stricter fuel economy standards promulgated by the state of California (discussed below) into one uniform standard. Additionally, automakers are required to cut GHG emissions in new vehicles by roughly 25%.

## **State**

A variety of legislation has been enacted in California relating to climate change, much of which sets aggressive goals for GHG reductions within the state. However, none of this legislation provides definitive direction regarding the treatment of climate change in environmental review documents.

### **AB 32 Chapter 488, Statutes of 2006**

The California Global Warming Solutions Act of 2006, widely known as AB 32, requires the ARB to develop and enforce regulations for the reporting and verification of statewide GHG emissions. The ARB is directed to set a GHG emissions limit, based on 1990 levels, to be achieved by 2020. The bill sets a timeline for adopting a scoping plan for achieving reductions in a technologically and economically feasible manner.

The heart of the bill is the requirement that statewide GHG emissions must be reduced to 1990 levels by the year 2020. California needs to reduce GHG emissions by approximately 29% BAU (based on compliance with requirements in effect under applicable federal and state law) of year 2020 GHG emissions to achieve this goal. The bill requires the ARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG reductions. Key AB 32 milestones are as follows:

- June 30, 2007—Identification of discrete early action greenhouse gas emissions reduction measures. On June 21, 2007, the ARB satisfied this requirement by approving three early action measures. On October 25, 2007, the ARB expanded this list to nine.
- January 1, 2008—Identification of the 1990 baseline GHG emissions level and approval of a statewide limit equivalent to that level. Adoption of reporting and verification requirements concerning GHG emissions. On December 6, 2007, the ARB approved a statewide limit on GHG emissions levels for the year 2020 consistent with the determined 1990 baseline.
- January 1, 2009—Adoption of a scoping plan for achieving GHG emission reductions. On December 11, 2008, the ARB adopted the Scoping Plan entitled “Climate Change Proposed Scoping Plan: A Framework for Change”. The Scoping Plan is describe in greater detail below.
- January 1, 2010—Adoption and enforcement of regulations to implement the “discrete” actions.
- January 1, 2011—Adoption of GHG emissions limits and reduction measures by regulation.
- January 1, 2012—GHG emissions limits and reduction measures adopted in 2011 become enforceable.

## **AB 32 Scoping Plan**

A Scoping Plan for AB32 was developed by the ARB and released in October 2008 (California Air Resources Board 2008a). It contains the main strategies California will use to reduce GHG from BAU emissions projected for 2020 back down to 1990 levels. BAU is the projected emissions in 2020, including increases in emissions caused by growth, without any GHG reduction measures. The Scoping Plan has a range of GHG reduction actions which include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system. This proposed Scoping Plan was approved at the ARB's hearing on December 12, 2008. It now requires the ARB and other state agencies to develop and adopt regulations and other initiatives reducing GHGs to be in place by 2012.

As directed by AB 32, the ARB has also approved a State-wide GHG emissions limit. On December 6, 2007, ARB staff resolved an amount of 427 million metric tons of CO<sub>2</sub>e as the total statewide greenhouse gas 1990 emissions level and 2020 emissions limit. The limit is a cumulative State-wide limit, not a sector- or facility-specific limit.

The ARB is conducting rulemaking, culminating in rule adoption by January 1, 2011, for reducing GHG emissions to achieve the emissions cap by 2020. The rules must take effect no later than 2012. In designing emission reduction measures, the ARB must aim to minimize costs, maximize benefits, improve and modernize California's energy infrastructure, maintain electric system reliability, maximize additional environmental and economic co-benefits for California, and complement the State's efforts to improve air quality.

As part of this rulemaking, the ARB adopted the following "Early Action Measures" on June 21, 2007:

- **Group 1:** Three new GHG-only regulations are proposed to meet the narrow legal definition of "discrete early action greenhouse gas reduction measures" in Section 38560.5 of the Health and Safety Code. These include the Governor's Low Carbon Fuel Standard, reduction of refrigerant losses from motor vehicle air conditioning maintenance, and increased methane capture from landfills. These actions are estimated to reduce GHG emissions between 13 and 26 MMT of CO<sub>2</sub>e annually by 2020 relative to projected levels. If approved for listing by the Governing Board, these measures will be brought to hearing in the next 12 to 18 months and take legal effect by January 1, 2010.
- **Group 2:** The ARB is initiating work on another 23 GHG emissions reduction measures in the 2007–2009 time period, with rulemaking to occur as soon as possible where applicable. These GHG measures relate to the following sectors: agriculture, commercial, education, energy efficiency, fire suppression, forestry, oil and gas, and transportation.
- **Group 3:** ARB staff has identified 10 conventional air pollution control measures that are scheduled for rulemaking in the 2007–2009 periods. These control measures are aimed at criteria and toxic air pollutants, but will have

concurrent climate co-benefits through reductions in CO<sub>2</sub> or non-Kyoto pollutants (i.e., DPM, other light-absorbing compounds, and/or ozone precursors) that contribute to global warming.

In October 2007, the ARB expanded the above early actions items to include the following measures:

- **Group 1: Discrete Early Actions—reductions in SF<sub>6</sub> emissions from the non-electricity sector, consumer products; and PFC emissions from semiconductor industry; implementation of the Smartway Truck Efficiency Program (requires existing trucks and trailers to be retrofitted with devices that reduce aerodynamic drag); increased tire inflation regulations (requires tune-up and oil change technicians to ensure proper tire inflation as part of overall service); and expansion of Green ports (allows docked ships to shut off their auxiliary engines by plugging into shoreside electrical outlets or other technologies).**
- **Group 2: Other Early Actions—Refrigerant tracking; reporting and recovery programs; increased energy efficiency in California cement facilities; more blended cements; enhanced anti-idling enforcement; and expanded research on nitrogen land application efficiency.**

### **Executive Order S-03-05 (2005)**

California Executive Order S-03-05 (June 1, 2005) mandates a reduction of GHG emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80% below 1990 levels by 2050. Although the 2020 target is the core of AB 32, and has effectively been incorporated into AB 32, the 2050 target remains the goal of the Executive Order.

### **Executive Order S-01-07 Low Carbon Fuel Standard (LCFS)**

Executive Order S-01-07 (January 18, 2007) requires a 10% or greater reduction in the average fuel carbon intensity for transportation fuels in California regulated by the ARB. The ARB identified the LCFS as a Discrete Early Action item under AB 32. On April 23, 2009, ARB adopted regulations implementing the LCFS.

### **Senate Bill 1368 (Perata), Emissions of Greenhouse Gases, Chapter 598, Statutes of 2006**

Senate Bill (SB) 1368 prohibits any retail seller of electricity in California from entering into a long-term financial commitment for baseload generation if the GHG emissions are higher than those from a combined-cycle natural gas power plant. This performance standard applies to electricity generated out-of-state as well as in-state and to publicly owned as well as investor-owned electric utilities.

## **SB 1078/SB 107—Renewable Portfolio Standard (RPS)**

Established in 2002 under SB 1078 and accelerated in 2006 under SB 107, California's RPS obligates investor-owned utilities (IOUs), energy service providers (ESPs) and community choice aggregators (CCAs) to procure an additional 1% of retail sales per year from eligible renewable sources until 20% is reached, no later than 2010. The California Public Utilities Commission (CPUC) and CEC are jointly responsible for implementing the program.

## **AB 1493 (Pavely), Greenhouse Gases, Chapter 200, Statutes of 2002**

AB 1493 (Pavely) requires the ARB to adopt regulations by January 1, 2005, to reduce GHG emissions from noncommercial passenger vehicles and light-duty trucks of model year 2009 and thereafter. For this mandate to take effect, the ARB was required to obtain a federal waiver from EPA to allow California to deviate from the national car and light duty truck standards set by EPA under the CAA. This waiver, generally referred to as the "Pavley Waiver" after the principal author of AB 1493, was initially requested in 2004; the federal government declined to regulate GHG under the CAA.

California and other states sued the federal government in an attempt to compel EPA to regulate GHG under the CAA and take action on the waiver request, which was also being sought by several other states. In April 2007, the U.S. Supreme Court ruled in *Massachusetts et al. v. Environmental Protection Agency et al.* (discussed above) that EPA has authority to regulate GHG emissions as pollutants. Nevertheless, the Pavley Waiver request was formally denied by the EPA in December 2007.

In January 2008, the State Attorney General filed a new lawsuit against the EPA for denying California's request for the Pavley Waiver to regulate and limit GHG emissions from these automobiles. On June 30, 2009, EPA granted California's waiver of CAA preemption to enforce new GHG emission standards for new motor vehicles beginning with the 2009 model year (U.S. Environmental Protection Agency 2009c).

## **SB 375 (Steinberg), Statutes of 2008**

SB 375 (Steinberg) provides for a new planning process to coordinate land use planning and regional transportation plans and funding priorities in order to help California meet the GHG reduction goals established in AB 32. SB 375 requires regional transportation plans, developed by Metropolitan Planning Organizations (MPOs), to incorporate a "sustainable communities strategy" in their regional transportation plans that will achieve GHG emission reduction targets set by the ARB. SB 375 also includes provisions for streamlined CEQA review for some infill project such as transit-oriented development. SB 375 will be implemented over the next several decades.

## **Energy Conservation Standards (Title 24)**

Energy Conservation Standards for new residential and nonresidential buildings were adopted by the California Energy Resources Conservation and Development Commission in June 1977 and are periodically revised (Title 24, Part 6 of the CCR). Title 24 requires the design of building shells and building components to conserve energy. Title 24 measures compliance based on a time dependant valuation (TDV) methodology. TDV considers not only the type of energy that is used (electricity, natural gas, or propane), but also when it is used. Energy saved during periods when California is likely to have a statewide system peak is worth more than energy saved at times when supply exceeds demand. Therefore, calculations of TDV weights energy used at different times at different values. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. Although new building energy efficiency standards were adopted in April 2008, these standards do not go into effect until August 2010, and were not in effect at the time of adoption of the AB 32 Scoping Plan (discussed above).

The 2006 Appliance Efficiency Regulations (Title 20, CCR Sections 1601 through 1608), dated December 2006, were adopted by the CEC on October 11, 2006, and approved by the California Office of Administrative Law on December 14, 2006. The regulations include standards for both federally regulated appliances and non-federally regulated appliances. While these regulations are now often seen as BAU, and compliance with these standards is part of the ARB Scoping Plan Base Year (2008), they do exceed the standards imposed by any other state and reduce GHG emissions by reducing energy demand.

On July 17, 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (proposed Part 11, Title 24) was adopted as part of the California Building Standards Code (Title 24, California Code of Regulations). Part 11 establishes voluntary standards that will become mandatory in the 2010 edition of the Code, including planning and design for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants.

## **SB 97 (Dutton), Greenhouse Gas Emissions Chapter 185, Statutes of 2007**

SB 97 requires that Office of Planning and Research (ORP) prepare guidelines to submit to the California Resources Agency regarding feasible mitigation of GHG emissions or the effects of GHG emissions as required by CEQA. The resources agency is required to certify and adopt these revisions to the State CEQA Guidelines by January 1, 2010. The guidelines will apply retroactively to any incomplete environmental impact report (EIR), negative declaration, mitigated negative declaration, or other related document.

On April 13, 2009, the OPR released revised proposed amendments to the CEQA Guidelines (Proposed Amendments) to address GHG emissions. The Proposed Amendments do not prescribe a particular threshold of significance or method for determining significance of GHG emissions in CEQA documents. Rather, the draft regulations confirm the discretion of lead agencies to determine appropriate significance thresholds. The Proposed Amendments also require that "an EIR shall analyze greenhouse gas emissions resulting from a proposed project when the incremental contribution of those emissions may be cumulatively considerable" (Governor's Office of Planning and Research 2009).

## **Methodology**

This section describes the methodology and results of the GHG inventory analysis for Silva Estates. GHG emissions from the following seven sources were analyzed: construction activity, transportation, area sources (landscaping activities), high global warming gases, electricity/natural gas use, water supply and distribution, and wastewater treatment.

## **Existing Conditions**

Currently, the project site is used primarily for agricultural (orchard). Five single-family homes are located on the site, two of which would be removed as part of the proposed project. Land to the north of the project site is currently graded and proposed to be used for the Antigua residential development. Land to the east, south, and west is currently used as agricultural land (orchards and row crops) with rural residences.

The existing GHG emissions of the Silva Estates site were not quantified and are considered net zero even though there are agricultural activities and natural carbon cycling known to occur on the project site. Carbon cycling is the natural process by which carbon is exchanged among the atmosphere and biosphere (i.e. plants, animals, etc.). Estimating emissions from carbon cycling is inherently difficult because it requires an understanding of the carbon sequestration capacity of the land. Removing existing vegetation, which is a GHG sink, is conceptually similar to actions that increase GHG emissions. However, the deposition of vegetation also releases CO<sub>2</sub> from stored carbon back into the atmosphere. Estimating the magnitude of these emissions is far more uncertain than quantifying GHG emissions from project construction or operation.

Because future Silva Estate-related emissions will be considered relative to existing emissions, the consequence of specifying current emissions as net zero is conservative from an environmental perspective, as demonstrated in the analysis below.



## **2015 No-Project Conditions**

If the project is not constructed, all existing uses would remain equal and unchanged on the project site. As a consequence, GHG emissions for the 2015-no project scenario are the same as the existing conditions which are defined here as net zero. Establishing the future no-project baseline as net zero is a conservative approach for the following two major reasons:

1. The proposed project will provide additional residential opportunities for the expanding population of the City of Manteca. Consequently, if the project is not built, it is reasonable to assume that additional residences will be constructed elsewhere to support the City's population. As a result, GHG emissions from the proposed project may be produced from similar residential communities. Since climate change is a global problem, these potential emissions would have the same effect on climate change if they occurred in other communities as they would if they were a direct result of the proposed project.
2. Estimates of emissions presented in this analysis do not include the potential effects of any current or future proposed GHG reduction measures and regulations resulting from implementation of AB 32 and other legislative enactments discussed above. These regulations will likely significantly reduce GHG emissions from the Silva Estates.

Thus, the inventory of GHG emissions produced by the project in this analysis is considered a conservative estimate. Because existing and future no-project scenarios have identical and zero emissions, comparing the project emissions to existing conditions or to the future no-build conditions will be identical.

## **Construction GHG Emissions**

Construction emissions were calculated for the project based on construction activity estimates summarized in "Chapter 3.6 Air Quality". GHG emissions from construction activities are primarily the result of fuel use by construction equipment, as well as worker and vendor trips. It was assumed that construction would begin in March 2008 and last approximately 8-months, with most construction activities occurring concurrently. Construction was broken into the following four phases: site grading, building construction, paving, and architectural coatings.

The URBEMIS2007 model (version 9.2.4) was used to calculate CO<sub>2</sub> emissions associated with construction. URBEMIS2007 accounts for CO<sub>2</sub> emissions resulting from fuel use by construction equipment and worker commutes. As stated above, emissions calculations were based on activity estimates summarized in the Air Quality Chapter, including anticipated equipment (Table 7). Equipment horsepower and load factors were updated using URBEMIS2007 default values. It was assumed that approximately 15 acres would be disturbed per day, with the sidewalks and paved areas totaling approximately 11 of the 15

acres. Emissions associated with worker and vendor travel to the construction site were estimated based on URBEMIS2007 default values.

**Table 7. Construction Equipment Summary**

| <u>Equipment Pieces by Phase</u>    | <u>No.<sup>1</sup></u> | <u>Load Factor<sup>2</sup></u> | <u>Horsepower<sup>2</sup></u> | <u>Hours/Day</u> |
|-------------------------------------|------------------------|--------------------------------|-------------------------------|------------------|
| <b><u>Site Grading</u></b>          |                        |                                |                               |                  |
| <u>Excavator</u>                    | <u>1</u>               | <u>168</u>                     | <u>0.570</u>                  | <u>8</u>         |
| <u>Scraper</u>                      | <u>4</u>               | <u>313</u>                     | <u>0.720</u>                  | <u>8</u>         |
| <b><u>Building Construction</u></b> |                        |                                |                               |                  |
| <u>Rough Terrain Forklift</u>       | <u>1</u>               | <u>93</u>                      | <u>0.600</u>                  | <u>8</u>         |
| <u>Skid Steered Loader</u>          | <u>4</u>               | <u>94</u>                      | <u>0.550</u>                  | <u>8</u>         |
| <b><u>Paving</u></b>                |                        |                                |                               |                  |
| <u>Grader</u>                       | <u>2</u>               | <u>174</u>                     | <u>0.610</u>                  | <u>8</u>         |
| <u>Off-Highway Truck</u>            | <u>2</u>               | <u>479</u>                     | <u>0.570</u>                  | <u>8</u>         |
| <u>Paver</u>                        | <u>2</u>               | <u>100</u>                     | <u>0.620</u>                  | <u>8</u>         |
| <u>Paving Equipment</u>             | <u>2</u>               | <u>104</u>                     | <u>0.530</u>                  | <u>8</u>         |
| <u>Roller</u>                       | <u>4</u>               | <u>95</u>                      | <u>0.560</u>                  | <u>8</u>         |
| <b><u>Coating</u></b>               |                        |                                |                               |                  |
| <u>None</u>                         | <u>N/A</u>             | <u>N/A</u>                     | <u>N/A</u>                    | <u>N/A</u>       |

**Notes:**

<sup>1</sup> Number of equipment pieces based on data presented in the 2006 EIR Air Quality Chapter.

<sup>2</sup> Load factor and horsepower based on URBEMIS2007 defaults.

Source: URBEMIS2007.

It was assumed that project specific mitigation outlined in Chapter 3.6 Air Quality would be implemented by the project applicable during construction. These measures include application of soil stabilizers, quick replacement of ground cover, and twice daily watering of exposed surfaces. In addition, all construction equipment would use Tire 1 diesel particulate filters, aqueous diesel fuel, and a 20% diesel oxidation catalyst. While these measures significantly reduce criteria pollutants from construction activity, they have a negligible effect on CO<sub>2</sub> emissions. Consequently, GHG emissions associated with the current mitigated and unmitigated project scenarios are identical. The model outputs for both mitigated and unmitigated construction emissions are provided in Appendix A.

URBEMIS does not quantify CH<sub>4</sub> and N<sub>2</sub>O emissions, although these two pollutants are known to be emitted from construction equipment. CH<sub>4</sub> and N<sub>2</sub>O emissions associated with construction emissions from off-road equipment were determined by scaling the construction CO<sub>2</sub> emissions predicted by URBEMIS by the ratio of CH<sub>4</sub>/CO<sub>2</sub> and N<sub>2</sub>O/CO<sub>2</sub> emissions expected per gallon of diesel fuel according to The Climate Registry General Reporting Protocol Version 3.1 (Climate Registry 2009). The California Climate Action Registry (CCAR) emission factor for CO<sub>2</sub> is 10.15 kilogram (kg) CO<sub>2</sub> per gallon of diesel fuel. Construction equipment using diesel fuel emits 0.58 gram CH<sub>4</sub> per gallon and

0.26 gram N<sub>2</sub>O per gallon (California Climate Action Registry 2009). The ratios of CH<sub>4</sub> and N<sub>2</sub>O to CO<sub>2</sub> per gallon of diesel fuel are 0.00006 and 0.00003, respectively. CO<sub>2</sub> emissions from off-road diesel sources (Appendix A) were multiplied by these ratios to estimate CH<sub>4</sub> and N<sub>2</sub>O emissions from construction equipment operation. These emissions were then converted to CO<sub>2</sub>e using the GWPs of each gas.

Construction worker and vendor commutes also produce GHGs from the consumption of fuel in on-road vehicles. Since on-road vehicles used for commuting will not all be using diesel fuel, the previous methodology for calculating non-CO<sub>2</sub> GHGs from construction equipment is inappropriate. The EPA recommends assuming that CH<sub>4</sub>, N<sub>2</sub>O, and HFC emissions account for 5% of on-road GHG emissions, accounting for their GWPs (Environmental Protection Agency 2005). The annual CO<sub>2</sub> emissions from construction worker and vendor commutes (Appendix A) were divided by 0.95 to account for emissions of CH<sub>4</sub>, N<sub>2</sub>O, and HFCs.

Table 8 lists the annual GHG emissions from off-road diesel equipment and on-road worker and vendor commutes associated with construction of the proposed project. As Table 8 indicates, construction of the project would result in 423.009 metric tons CO<sub>2</sub>e from construction activities.

**Table 8. Total Estimated GHG Emissions from Construction Activities**

| <u>Off-Road Emissions</u><br><u>(metric tons/year)<sup>1</sup></u> |                       |                       | <u>On-Road Emissions</u><br><u>(metric tons/yr)<sup>2</sup></u> |                  | <u>On-Road Emissions</u><br><u>(metric tons/yr)<sup>2</sup></u> |
|--------------------------------------------------------------------|-----------------------|-----------------------|-----------------------------------------------------------------|------------------|-----------------------------------------------------------------|
| <u>CO<sub>2</sub></u>                                              | <u>CH<sub>4</sub></u> | <u>N<sub>2</sub>O</u> | <u>CO<sub>2</sub></u>                                           | <u>Other GHG</u> | <u>CO<sub>2</sub>e</u>                                          |
| <u>179.722</u>                                                     | <u>0.010</u>          | <u>0.005</u>          | <u>229.561</u>                                                  | <u>13.318</u>    | <u>423.009</u>                                                  |

Notes: Construction year is 2008

<sup>1</sup> From construction equipment (diesel)

<sup>2</sup> From construction worker and vendor commutes (mix of fuels). Other GHGs include CH<sub>4</sub>, N<sub>2</sub>O, and HFCs (metric tons/yr in CO<sub>2</sub>e emissions), which represents 5% of total GHG emission from on-road sources (calculated by dividing CO<sub>2</sub> emissions by 0.95 and multiply by the resulting number by 0.05) (U.S. EPA 2005).

Sources: URBEMIS2007; California Climate Action Registry 2009; U.S. Environmental Protection Agency 2005.

## **Operational Emissions**

The full buildout year of 2015 was used in this analysis to analyze GHG emissions associated with project operations. Greenhouse gas emissions from operation of the project at full buildout estimated in this analysis include:

- Transportation emissions;
- Area source emissions resulting from landscaping activities;
- Emissions of HFCs form refrigeration and air conditioning;

- Emissions resulting from electricity and natural gas consumption;
- Emissions resulting from water supply and distribution; and
- Emissions from wastewater treatment.

The following sections outline annual operational emissions from these sources, as well as the methodology used to calculate emissions. It was assumed that 59.9 acres would be developed into 217 single-family homes. Note that emission factors associated with transportation and energy usage are likely to decrease as a function of time due to future regulations not accommodated for in the model. As such, emissions calculations for the project buildout year (2015) likely overestimate future long-term emissions from Silva Estates.

## **Transportation**

Traffic CO<sub>2</sub> emissions were estimated based on the daily trip generation rate identified in “Chapter 3.8 Traffic” and the recommended district fleet mix provided by the SJVAPCD (San Joaquin Valley Air Pollution Control District 2009c). Based on information presented in Chapter 3.8, it was assumed that 9.57 daily trips would be made per household. It was also assumed that 13 weekday transit busses would stop within ¼ mile of the project, the development would contain 17 intersections per square mile, and 50% of streets within the development would have sidewalks on both sides.

Operational GHG emissions were modeled using the URBEMIS2007 (version 9.2.4) model and the assumptions described above. URBEMIS2007 estimates mobile source emissions based on the type of land use and area source and vehicular emissions typically associated with the land use. URBEMIS utilizes ARB’s EMFAC2007 (version 2.3) emission rate program to produce emissions estimates for transportation. URBEMIS is an SJVAPCD-approved model that is widely recommended and used by many California air districts for calculating criteria pollutant emissions from a variety of projects. Operational outputs generated by the URBEMIS2007 model are provided in Appendix B.

CH<sub>4</sub> emissions from transportation were estimated using the EMFAC2007 model. The vehicle fleet profile and VMT generated by the URBEMIS simulations were used to calculate total CH<sub>4</sub> emissions based on the EMFAC2007 running exhaust and starting emissions factors. Table 9 describes the vehicle fleet and VMT profiles by fuel type used in this analysis.

**Table 9. Vehicle Fleet Profile and Annual (2015) VMT by Fuel Type**

| <u>Vehicle Class</u>            | <u>Percent<br/>Vehicle Type<sup>1</sup></u> | <u>VMT<br/>(Diesel)<sup>2</sup></u> | <u>VMT<br/>(Gasoline)<sup>2</sup></u> | <u>Total VMT<sup>2</sup></u> |
|---------------------------------|---------------------------------------------|-------------------------------------|---------------------------------------|------------------------------|
| <u>Light Auto</u>               | <u>51.1</u>                                 | <u>0</u>                            | <u>2,850,990</u>                      | <u>2,850,990</u>             |
| <u>Light Truck 1</u>            | <u>22.5</u>                                 | <u>21,341</u>                       | <u>1,233,988</u>                      | <u>1,255,328</u>             |
| <u>Light Truck 2</u>            | <u>16.4</u>                                 | <u>0</u>                            | <u>914,995</u>                        | <u>914,995</u>               |
| <u>Medium Truck</u>             | <u>6.4</u>                                  | <u>0</u>                            | <u>357,071</u>                        | <u>357,071</u>               |
| <u>Light Heavy Duty Truck 1</u> | <u>0.2</u>                                  | <u>2,310</u>                        | <u>8,849</u>                          | <u>11,158</u>                |
| <u>Light Heavy Duty Truck 2</u> | <u>0.1</u>                                  | <u>2,232</u>                        | <u>3,348</u>                          | <u>5,579</u>                 |
| <u>Medium Heavy Duty Truck</u>  | <u>0.7</u>                                  | <u>30,033</u>                       | <u>9,022</u>                          | <u>39,055</u>                |
| <u>Heavy Duty Truck</u>         | <u>0.5</u>                                  | <u>27,282</u>                       | <u>614</u>                            | <u>27,896</u>                |
| <u>Line Haul</u>                | <u>0.0</u>                                  | <u>0</u>                            | <u>0</u>                              | <u>0</u>                     |
| <u>Urban Bus</u>                | <u>0.1</u>                                  | <u>5,579</u>                        | <u>0</u>                              | <u>5,579</u>                 |
| <u>Motorcycle</u>               | <u>1.2</u>                                  | <u>0</u>                            | <u>66,951</u>                         | <u>66,951</u>                |
| <u>School Bus</u>               | <u>0.1</u>                                  | <u>5,579</u>                        | <u>0</u>                              | <u>5,579</u>                 |
| <u>Motor Home</u>               | <u>0.7</u>                                  | <u>3,007</u>                        | <u>36,047</u>                         | <u>39,055</u>                |
| <b><u>Total</u></b>             | <b><u>100.0</u></b>                         | <b><u>97,363</u></b>                | <b><u>5,481,873</u></b>               | <b><u>5,579,237</u></b>      |

Notes:

<sup>1</sup> Percent vehicle type based on recommended district fleet mix provided by the SJVAPCD

<sup>2</sup> Estimated VMT based on URBEMIS modeled output (Appendix B)

Sources: URBEMIS2007; EMFAC2007; San Joaquin Valley Air Pollution Control District 2009c

Emissions of N<sub>2</sub>O from transportation were calculated using the default vehicle fleet mix provided by the SJVAPCD and estimates of VMT by vehicle and fuel type listed above. EMFAC produced estimates of miles traveled per gallon of fuel by vehicle type for gasoline and diesel in 2015. Annual fuel use by vehicle type was then used to determine N<sub>2</sub>O emissions per gallon of fuel using the ARB 2006 emission factors for diesel and gasoline. The ARB emission factors for 2006 were 0.332 grams of N<sub>2</sub>O per gallon of diesel for all vehicle types and 0.668, 0.661, 1.36 and 2.38 grams N<sub>2</sub>O per gallon of gasoline for passenger cars, light duty trucks, heavy duty trucks, and motorcycles, respectively (California Air Resources Board 2009b-h). Emissions of N<sub>2</sub>O per gallon of fuel used were assumed to remain constant over time to represent a worst-case emissions scenario. EMFAC outputs are attached in Appendix C.

GHG emissions from transportation are presented in Table 10. These emissions represent a conservative estimate of project-related emissions because the emission factors produced by EMFAC2007 do not include the reductions in mobile-source GHG emissions that would result from implementation of AB 1493 or AB 32. For these reasons, the emissions from transportation presented in this analysis are likely an overestimate. The URBEMIS model indicates that total daily VMT is 15,285.58 at full project buildout in 2015. This data accounts for reductions in overall project trips and associated VMT due to internal passby trip reductions and anticipated regional transit stops.

**Table 10.** Annual (2015) Mobile Source Emissions from On-Road Traffic

| <u>CO<sub>2</sub></u><br>(metric/yr)                                          | <u>CH<sub>4</sub></u><br>(metric tons/yr) | <u>N<sub>2</sub>O</u><br>(metric tons/yr) | <u>CO<sub>2</sub>e</u><br>(metric tons/yr) |
|-------------------------------------------------------------------------------|-------------------------------------------|-------------------------------------------|--------------------------------------------|
| <u>2,388</u>                                                                  | <u>0.136</u>                              | <u>0.171</u>                              | <u>2,443.235</u>                           |
| <u>Source: URBEMIS2007; EMFAC2007; California Air Resources Board 2009b-h</u> |                                           |                                           |                                            |

## **Area Source GHG Emissions**

URBEMIS 2007 model (version 9.2.4) was used to calculate GHG emissions from area sources under full buildout assumptions. Emission calculations were based on default URBEMIS 2007 calculations for land-use type and size. The only area sources emitting CO<sub>2</sub> are landscaping activities and natural gas combustion. However, based on information supplied by the project applicant, it was assumed that the development would not include wood burning fireplaces and stoves (Rey pers. comm.). As a result, wood hearth emissions were not estimated and are assumed to be zero. Landscape emissions are based on the URBEMIS default summer length of 180 days.

Natural gas will be supplied to the Silva Estates by the Pacific Gas & Electric Company (PG&E). To obtain a more specific estimate of GHG emissions from the project, natural gas combustion were calculated independent of the URBEMIS model using PG&E's monthly natural gas usage rates for an average household in California (Pacific Gas and Electric n.d.). GHG emissions factors for CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O were obtain from PG&E and the CCAR (Pacific Gas and Electric n.d; California Climate Action Registry 2009). These emissions are included in the "Residential Electricity and Natural Gas Use Section."

Emissions of CH<sub>4</sub> and N<sub>2</sub>O from the landscaping activities were not estimated because URBEMIS is not able to calculate these emissions and any other reliable methodology is currently unavailable. However, area source emissions of CH<sub>4</sub> and N<sub>2</sub>O emissions are expected to be trivial compared to tailpipe and energy related to GHG emissions. For completeness, the area source URBEMIS output is provided in Appendix D.

Table 11 presents the annual area source GHG emissions from landscaping activities, which amount to 1.27 metric tons CO<sub>2</sub>e.

**Table 11. Annual (2015) Area Source GHG Emissions**

| Source               | CO <sub>2</sub><br>(metric tons/year) | CH <sub>4</sub><br>(metric tons/year) <sup>1</sup> | N <sub>2</sub> O<br>(metric tons/year) <sup>1</sup> | CO <sub>2</sub> e<br>(metric tons/year) |
|----------------------|---------------------------------------|----------------------------------------------------|-----------------------------------------------------|-----------------------------------------|
| Landscape Activities | 1.27                                  | N/A                                                | N/A                                                 | 1.27                                    |

**Notes:**<sup>1</sup> Area Source CH<sub>4</sub> and N<sub>2</sub>O emissions unavailable.<sup>2</sup> Wood burning fireplaces and stoves will not be included in the development.

Source: URBEMIS2007; Rey pers. comm.

## **High Global Warming Potential Gases**

The CEC estimates that California emissions HGWPGs are largely the result of refrigerants and, to a lesser extent, electric utility transmission and distribution equipment (California Energy Commission 2006a). According to the EIA, HGWPG emissions for 2007 accounted for 2.4% of total emissions (Energy Information Administration 2008). HGWPGs are also emitted during semiconductor manufacturing processes. HGWPG emissions in the project area are predominantly associated with refrigerants and transmission lines. Emissions of SF<sub>6</sub> from transmission lines resulting from electricity transmission and distribution are included in the electricity emissions analysis below.

The primary emission sources of HGWPGs associated with Silva Estates include refrigerants and air conditioning (AC), which are sources of HFCs. HCFs are used as substitute refrigerants for chlorofluorocarbons (CFCs) that have been phased out of use under the Montreal Protocol. GHG emissions from refrigerants and AC were calculated for Silva Estates from recent studies of HFC sources and GHG inventories of HFCs from refrigeration and AC equipment, as well as documented refrigerant types, GWPs, charge sizes, and leak rates (Intergovernmental Panel on Climate Change/Technology & Economic Assessment Panel 2005; World Bank 2007).

Table 12 presents the assumptions regarding HFC usage and emissions. Emissions for each dwelling unit were calculated by multiplying the number of refrigeration and AC units by the charge size, leak rate, and GWP of the associated HFC refrigerant installed in both refrigeration and AC units (Intergovernmental Panel on Climate Change/Technology & Economic Assessment Panel 2005; World Bank 2007). It was assumed that all dwelling units would have the same number of refrigerators and AC units. Total CO<sub>2</sub>e emissions from refrigeration and AC usage are presented in Table 12. As Table 12 indicates, estimated emissions of HFCs associated with the project operation in 2015 are 36.686 metric tons of CO<sub>2</sub>e per year.

**Table 12.** Assumptions and Annual (2015) Project-Related Emissions of HFCs from Refrigeration and Air Conditioning

| <u>Building Type</u> | <u>Number of Equipment Units</u> | <u>Equipment Unit Type</u> | <u>Unit (per...)</u> | <u>Refrigerant</u> | <u>GWP</u> | <u>Charge Size (kg)</u> | <u>Leak Rate</u> | <u>Emissions per Unit (metric tons CO<sub>2</sub>e)</u> | <u>Silva Estates Emissions (metric tons CO<sub>2</sub>e)</u> |
|----------------------|----------------------------------|----------------------------|----------------------|--------------------|------------|-------------------------|------------------|---------------------------------------------------------|--------------------------------------------------------------|
| Dwelling             | 1.6                              | Refrigerators/freezers     | House                | R-134a             | 1430       | 0.1                     | 0.9%             | 0.002                                                   | 0.447                                                        |
| Dwelling             | 1                                | Residential AC             | House                | R-410A             | 2087.5     | 2                       | 4.0%             | 0.167                                                   | 36.239                                                       |
| <b>Total</b>         |                                  |                            |                      |                    |            |                         |                  |                                                         | <b>36.686</b>                                                |

Calculations: Annual Emissions per Unit = number \* GWP \* charge size \* leak rate/1000

Silva Estates Emissions = Emission per Unit \* 217

<sup>1</sup> All dwellings (single-family housing) have the same assumptions regarding HFCs.

Sources: Intergovernmental Panel on Climate Change/Technology & Economic Assessment Panel 2005; World Bank 2007

Implementation of AB 32 has the potential to reduce HFC and other HGWPG emissions across the state. Estimates of HFC emissions presented in this analysis do not include the potential effects of any currently proposed or future GHG reduction measures or regulations resulting from implementation of AB 32 and other legislative requirements discussed above. These regulations will likely reduce HFC emissions from the Silva Estates at full buildout significantly. Thus, the inventory of HFC emissions produced by the project in this analysis is considered a conservative estimate.

## **Residential Electricity and Natural Gas Use**

GHG emissions from residential electricity and natural gas usage were estimated using a variety of resources and methodologies, which are described below. Average household electricity consumption rates were obtained from PG&E, as well as a CO<sub>2</sub> emission factor for electricity generation (Pacific Gas and Electric Company n.d & 2007). According to PG&E, the monthly average electrical use per household is 540 kilowatt hours (kWh). Assuming that 217 single-family homes will be developed, this equates to an annual usage rate of 1,406,160 kWh for the Silva Estates. It was assumed that electrical usage would remain constant through project buildout.

The 2007 PG&E CO<sub>2</sub> emission factor of 635.67 pounds of CO<sub>2</sub> per megawatt hour (MWh) was used to calculate CO<sub>2</sub> emissions based on anticipated annual electricity usage at Silva Estates (Pacific Gas and Electric Company 2007). Using the 2007 emission factor is conservative considering that AB 1078 requires all electric utilities increase their renewable energy resources by 1% per year until 20% of retail sales are procured from renewable energy. Consequently, GHG emissions associated with electricity use reported in this analysis are most likely an overestimate of actual emissions.

State-specific emission factors for CH<sub>4</sub> and N<sub>2</sub>O in 2007 were obtained from the CCAR as PG&E currently does not calculate these emission factors (California



Climate Action Registry 2009). Since data regarding the change in the rate of emissions for CH<sub>4</sub> and N<sub>2</sub>O with respect to CO<sub>2</sub> reduction efforts is unclear, CH<sub>4</sub> and N<sub>2</sub>O emissions per kWh of electricity generated were assumed to remain constant through 2015. It is likely that CH<sub>4</sub> and N<sub>2</sub>O emission will decline as CO<sub>2</sub> emissions decline; however, because the direct relation is unclear, a worst-case scenario in which efficiencies of these emissions do not improve was assumed.

Electricity transmission lines release SF<sub>6</sub> over time. Statewide SF<sub>6</sub> emissions in 2007 were used to identify an emission factor on a per-MWh basis by dividing total SF<sub>6</sub> emissions by the total electricity generation in California (California Air Resources Board 2009i; California Energy Commission 2009). Once the per-unit emission factor of 0.00032 pounds of SF<sub>6</sub> per MWh was obtained, it was multiplied by the projected electricity consumption at Silva Estates to obtain total SF<sub>6</sub> emissions associated with electricity delivery to the project. Though PG&E is taking action to reduce SF<sub>6</sub> emissions from transmission lines, the emission factor was assumed to remain constant over time to represent a worst-case scenario.

Total GHG emissions resulting from electricity consumption in 2015 are listed in Table 13. Annual GHG emissions from electricity use amount to 405.470 metric tons of CO<sub>2</sub>e.

**Table 13.** Total Emissions Associated with Annual (2015) Electricity Consumption

| <u>Use</u><br><u>(kWh/yr)<sup>1</sup></u> | <u>CO<sub>2</sub></u><br><u>(metric tons/yr)<sup>2</sup></u> | <u>CH<sub>4</sub></u><br><u>(metric tons/yr)<sup>3</sup></u> | <u>N<sub>2</sub>O</u><br><u>(metric tons/yr)<sup>4</sup></u> | <u>SF<sub>6</sub></u><br><u>(metric tons/yr)<sup>5</sup></u> | <u>CO<sub>2</sub>e</u><br><u>(metric tons/yr)</u> |
|-------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------|
| <u>1,406,160</u>                          | <u>405</u>                                                   | <u>0.019</u>                                                 | <u>0.005</u>                                                 | <u>0.000</u>                                                 | <u>405.470</u>                                    |

Notes:

<sup>1</sup> Based on PG&E's average monthly electricity use of 540 kWh per household \* 217 homes at the Silva Estates.

<sup>2</sup> Based on PG&E's 2007 emission factor of 635.67 lbs CO<sub>2</sub> per MWh.

<sup>3</sup> Based on Climate Action Registry's emission factor of 0.0302 lbs CH<sub>4</sub> per MWh for Los Angeles power generation (California Climate Action Registry 2009 pg. 40).

<sup>4</sup> Based on Climate Action Registry's emission factor of 0.0081 lbs N<sub>2</sub>O per MWh for Los Angeles power generation (California Climate Action Registry 2009 pg. 40).

<sup>5</sup> SF<sub>6</sub> emissions were calculated by dividing overall SF<sub>6</sub> emissions for the State of California in 2007 (0.99 million metric tons of CO<sub>2</sub>e) (California Air Resources Board 2009i pg 19) by total California electricity consumption in 2007 (281,200 million kWh) (California Energy Commissions 2009) and multiplying the resulting emissions factor of 0.00032 lbs SF<sub>6</sub>/MWh by the projected electricity consumption for the Silva Estates.

Sources: California Energy Commissions 2009; Climate Action Registry 2009; California Air Resources Board 2009i; PG&E n.d.; PG&E 2007.

Average household natural gas usage rates were obtained from PG&E and were assumed to be 45 therms per month per dwelling unit (PG&E n.d.). Natural gas emission factors for CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O were obtained the Climate Action Registry and are listed in Table 14. It was assumed that these factors would remain constant over time to represent a worst-case scenario.

**Table 14.** GHG Emission Factors for Residential Natural Gas Combustion

| GHG              | Natural Gas Emissions Factor (kg/MMBtu) |
|------------------|-----------------------------------------|
| CO <sub>2</sub>  | 53.06                                   |
| CH <sub>4</sub>  | .005                                    |
| N <sub>2</sub> O | .0001                                   |

Sources: California Climate Action Registry 2009 pg. 101 and 103; Energy Information Administration 2009.

Annual GHG emissions were calculated by multiplying the emissions factors presented above by the average natural gas usage per household provided by PG&E. Once GHG emissions on a dwelling unit basis were obtained, these values were multiplied by 217 to obtain total emissions for Silva Estates. Table 15 summarizes total annual GHG emissions from natural gas use, and indicates that emissions from natural gas combustion equate to 622.436 metric tons CO<sub>2</sub>e.

**Table 15.** Total Emissions Associated with Annual (2015) Natural Gas Consumption

| Usage (ft <sup>3</sup> /year) <sup>1,2</sup> | CO <sub>2</sub><br>(metric tons/year) | CH <sub>4</sub><br>(metric tons/year) | N <sub>2</sub> O<br>(metric tons/year) | CO <sub>2</sub> e<br>(metric tons/ year) |
|----------------------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|------------------------------------------|
| 11,398,833                                   | 622                                   | 0.059                                 | 0.001                                  | 622.436                                  |

Notes:

<sup>1</sup> Based on PG&E's average monthly natural gas usage of 45 therms per dwelling unit.

<sup>2</sup> Usage converted assuming 1 therm/100,000 Btu and 1,028 Btu/ft<sup>3</sup>.

Source: PG&E n.d.; Energy Information Administration 2009.

## **Water Supply and Distribution**

Considerable quantities of energy are required to treat and deliver water across California. Currently, the City of Manteca provides water service for the existing community and will supply water to the proposed project. According to the project applicant, it is estimated that the daily per capita water usage at Silva Estates will be 225 gallons, and an average of 2.98 people will occupy each dwelling unit (Rey pers. comm.). Assuming a population of 2.98 people per dwelling unit and a total of 217 dwelling units, it is anticipated that Silva Estates will use approximately 145,498.5 gallons of water per day. Statistics on water delivery were not provided and were therefore not quantified in this analysis.

The estimated water-energy proxy for water supplied by the San Joaquin River and Central Coast is 896 kWh/million gallons (MG) (California Energy Commission 2006b). Indirect GHG emissions associated with water supply were calculated by multiplying the expected water demand by the estimated water-energy proxy for the San Joaquin River/Center Coast. These values were then multiplied by the same emissions factors for electricity generation described in the "Residential Electricity and Natural Gas Use" section above. It was assumed that water demand would remain constant through project buildout.

Table 16 details expected water demand, associated energy use, and indirect GHG emissions resulting from the supply of water to Silva Estates. Based on Table 16, it estimated that annual (2015) GHG emissions associated with water supply amount to 13.721 metric tons of CO<sub>2</sub>e.

**Table 16.** Annual (2015) Water Supply Intensity and Resulting GHG emissions at Silva Estates

| <u>Energy Intensity</u><br>(kWh/MG) | <u>Energy Use</u><br>(kWh/year) <sup>1</sup> | <u>CO<sub>2</sub></u><br>(metric tons/year) | <u>CH<sub>4</sub></u><br>(metric tons/year) | <u>N<sub>2</sub>O</u><br>(metric tons/year) | <u>SF<sub>6</sub></u><br>(metric tons/year) | <u>CO<sub>2</sub>e</u><br>(metric tons/year) |
|-------------------------------------|----------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|----------------------------------------------|
| 896                                 | 47,584                                       | 14                                          | 0.001                                       | 0.000                                       | 0.000                                       | 13.721                                       |

Notes

<sup>1</sup> Based on estimated water usage of 225 gallons per person per day, a household population of 2.98, and 217 single-family homes at Silva Estates.

Sources: Rey pers. comm.; California Energy Commission 2006b.

## Wastewater Treatment

Wastewater from Silva Estates will be treated by the City's wastewater treatment plan (WWTP), which serves Manteca, Lathrop, and Raymus Village in San Joaquin County. Wastewater can produce CH<sub>4</sub> and N<sub>2</sub>O when treated anaerobically. CO<sub>2</sub> emissions from wastewater are considered biogenic in origin and therefore are not included in estimates of anthropogenic emissions (Intergovernmental Panel on Climate Change 2006). Wastewater will break down under anaerobic conditions in the WWTP systems and during the wastewater treatment process, which will produce CH<sub>4</sub> as a byproduct. Tertiary treatment will remove some nitrogen from the reclaimed water and dried solids produced for reuse on the project site.

Emissions from wastewater treatment were calculated using ARB emissions rates for CH<sub>4</sub> and N<sub>2</sub>O, as well as population data provided by the project applicant. The ARB estimates 2006 yearly emissions resulting from domestic wastewater treatment in the state of California were 522 g of CH<sub>4</sub> and 85.6 g of N<sub>2</sub>O per person (California Air Resources Board 2009 j-k). Resulting per capita emissions of CH<sub>4</sub> and N<sub>2</sub>O for the Silva Estates population were calculated by multiplying the expected population by the ARB emission factors for both CH<sub>4</sub> and N<sub>2</sub>O. The expected Silva Estates population was calculated assuming that 217 single-family homes would be developed, and the population per household would be 2.98 (Rey pers. comm.). It was assumed the population would remain constant through project buildout. The total annual (2015) wastewater GHG emissions associated with the Silva Estates are presented in Table 17.

**Table 17. Annual (2015) GHG Emissions from Wastewater Treatment**

| GHG                          | Metric Tons/Yr |
|------------------------------|----------------|
| CO <sub>2</sub> <sup>1</sup> | =              |
| CH <sub>4</sub>              | 0.338          |
| N <sub>2</sub> O             | 0.055          |
| CO <sub>2</sub> e            | 24.261         |

Notes:

<sup>1</sup> CO<sub>2</sub> emissions considered biogenic

<sup>2</sup> Based on Silva Estates population of 646.66

Source: ARB 2009j-k; Rey pers. comm.

## **GHG Emissions Not Analyzed**

Emissions from land use change, waste generation, and embodied emissions were not included in the Silva Estates GHG impacts analysis. The following discussion provides a rational for omission of these sectors.

There is no doubt that GHG emissions from land use change would occur as a result of the project's development. The land is currently used primarily for agriculture, which serves as both a source and sink of GHGs. Heavy-duty agricultural equipment can release CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O as vehicle exhaust. The application of nitrogen fertilizers also generates a substantial amount of N<sub>2</sub>O. In fact, in 2004, agricultural soils were the largest source of statewide N<sub>2</sub>O emissions (California Air Resources Board 2009l). However, removing existing vegetation can reduce the carbon sequestration capacity of the land, which would remove a sink from the regional GHG budget. Estimating emissions of these sources is far more uncertain and speculative than for other classes of emissions discussed above. Consequently, emissions resulting from land use change were not included in the project's inventory data.

The deposition of soil waste generated by the Silva Estates into landfills will result in the production of CH<sub>4</sub> and CO<sub>2</sub> when anaerobic bacteria degrade the material (U.S. Environmental Protection Agency 2006b). Since CO<sub>2</sub> is produced during the natural degradation process, it is generally not considered in waste stream analyses. Rather, emissions of CH<sub>4</sub> are considered the primary result of land filling waste. An analysis of CH<sub>4</sub> emissions from Silva Estates would require a detailed waste stream profile, which is beyond the scope of this document. Consequently, GHG emissions associated with waste generation were not estimated.

Embodied, or lifecycle, GHG emissions are created during the extraction, processing, transportation, construction, and disposal of building materials and during landscape disturbance or alteration of biomass (King County Department of Development and Environmental Services 2007). There is a large uncertainty involved in estimating the magnitude, sources, and signs (whether they are positive or negative; i.e., sources or sinks) of embodied emissions associated with

all aspects of a project. The California Air Pollution Control Officers Association (CAPCOA) recommends against including certain types of embodied emissions in GHG inventories due to the speculative nature of such analysis (California Air Pollution Control Officers Association 2008). For this reason, embodied GHG emissions were not included in the Silva Estates GHG emissions inventory.

## **Significance Criteria**

### **Office of Planning and Research Advisory on CEQA and Climate Change**

In June 2008, the OPR published a technical advisory entitled “CEQA and Climate Change: Addressing Climate Change through CEQA” (OPR Advisory) (Governor’s Office of Planning and Research 2008). This guidance, which is purely advisory, proposes a three-step analysis of GHG emissions.

1. **Mandatory Quantification of GHG Project Emissions.** The environmental impact analysis must include quantitative estimates of a project’s GHG emissions from different types of air emission sources. These estimates should include both construction-phase emissions, as well as completed operational emissions, using one of a variety of available modeling tools.
2. **Continued Uncertainty Regarding “Significance” of Project-Specific GHG Emissions.** Each EIR document should assess the significance of the project’s impacts on climate change. The OPR Advisory recognizes uncertainty regarding what GHG impacts should be determined to be significant and encourages agencies to rely on the evolving guidance being developed in this area. According to the OPR Advisory, the environmental analysis should describe a “baseline” of existing (preproject) environmental conditions and then add project GHG emissions on to this baseline to evaluate if impacts are significant.
3. **Mitigation Measures.** According to the OPR Advisory, “all feasible” mitigation measures or project alternatives should be adopted if an impact is significant (feasibility is defined in relation to scientific, technical, and economic factors). If mitigation measures cannot sufficiently reduce project impacts, the agency should adopt whatever measures are feasible and include a fact-based statement of overriding concerns explaining why additional mitigation is not feasible. OPR also identifies a menu of GHG emission mitigation measures, ranging from balanced “mixed use” master-planned project designs to construction equipment and material selection criteria and practices.

In addition to this three-step process, the OPR Advisory contains more general policy-level guidance and encourages agencies to develop standard GHG emission reduction and mitigation measures. The OPR Advisory directs the ARB to recommend a method for setting the GHG emission threshold of significance, including both qualitative and quantitative options (Governor’s Office of Planning and Research 2008).

## **Draft ARB Thresholds**

On October 24, 2008, the ARB released a draft staff proposal entitled “Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act” (Draft ARB Thresholds) (California Air Resources Board 2008b). The Draft ARB Thresholds provide a framework for developing CEQA significance thresholds for industrial, commercial, and residential projects. While a threshold of 7,000 tons per year has been proposed for industrial projects, a numerical threshold for commercial and residential projects was not proposed and is still currently under development. The Draft ARB Thresholds incorporate SB 375 by providing that commercial and residential projects that comply with a previously approved regional transportation plan meet the requirements of SB 375. Lastly, the Draft ARB Thresholds presume that commercial and residential projects for which a certified final CEQA document has been prepared have a less-than-significant impact with respect to climate change.

No federal or state agency has adopted quantitative emission thresholds to evaluate the significance of project impacts from GHG emissions. SB 97 requires the ORP and the California Resources Agency to adopt guidance for mitigating GHG emissions. As discussed above, the OPR’s Proposed Amendments indicate that projects should be evaluated based on their cumulative contribution to climate change impacts.

While project emissions would amount to a small fraction of statewide, national, and global GHG emissions, AB 32’s assessment that global warming as posing a “serious threat” warrants consideration of project’s cumulative impacts on climate change. It is not anticipated that a single development project would have an individually discernable effect on global climate change (i.e., that any increase in global temperature or sea level could be attributed to the emissions resulting from a single project). Rather, it is more appropriate to conclude the proposed project GHG emissions will combine with emissions across California, the U.S., and the globe to cumulatively contribute to global climate change.

## **Local Regulations**

The project is located within the San Joaquin Valley Air Basin (SJVAB), which is within the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). In September 2009, the SJVAPCD published a draft GHG guidance document entitled “Climate Action Plan: Addressing Greenhouse Gas Emissions under the California Environmental Quality Act (Climate Action Plan).” The Climate Action Plan summarizes the District’s proposed methodology for addressing GHG emissions in CEQA documents. Specifically, it authorizes the air pollution control officer (APCO) to develop guidance and procedures for assessing the significance of GHG emissions on a project-specific basis, including development of a voluntary carbon exchange program and greenhouse gas mitigation agreements. The SJVAPCD plans to hold a public hearing in the

fall of 2009 to discuss the above guidance (San Joaquin Valley Air Pollution Control District 2009a).

In September 2009, the SJVAPCD published a subsequent document to the Climate Action Plan. In it, the District acknowledges that assessing the significance of individual project GHG emissions has inherent difficulties—most notably, whether project-specific emissions, which are emitted at micro-scale level, will result in a cumulatively incremental contribution to global climate change. Given this, the Climate Action Plan analyzes the pros and cons associated with various methods of GHG analysis including zero thresholds, quantitative thresholds, and best performance standards (BPS). The District concludes that the effects of project specific GHG emissions are cumulative and without mitigation could result in a significant impact. Further, the District recommends that all permitted sources implement BPS. The District will establish BPS, as well as emissions reductions measures for their achievement. Projects complying with the GHG emissions reduction measures would have a less-than-significant impact, while projects failing to comply would need to demonstrate that GHG emissions will be mitigated by 29% or more from BAU conditions (San Joaquin Valley Air Pollution Control District 2009b).

As described by the ORP technical advisory, in absence of regulatory guidance or standards for the evaluation of GHG impacts, lead agencies must undertake a project-by-project analysis, consistent with available guidance and current CEQA practice. Scientific studies (as best represented by the IPCC's periodic reports) demonstrate that climate change is already occurring due to past GHG emissions. Forecasting of future growth and related GHG emissions under BAU conditions indicates that large increases in those GHG emissions are accompanied by an increasing severity of changes in the global climate.

For purposes of analysis, BAU conditions are defined as the current existing conditions at the project location. BAU conditions neither presume improvements in energy efficiency, fuel efficiency or renewable energy generation, nor do they include currently adopted (AB 1493, SB 1078/SB107) mandates or the GHG reduction measures specified in the ARB Scoping Plan. This is consistent with the methodology used by the ARB to estimate BAU emissions from the 2002-2004 emissions inventory. Thus, the best scientific evidence concludes that global emissions must be reduced below current levels. Since existing and future no-project GHG emissions are considered net zero, using this significance criteria means that any increase in GHG would result in the project having a significant and unavoidable cumulative impact.

## **Impacts and Mitigation**

The cause of global climate change is generally accepted to be the increased production of GHGs resulting from, among other things, human activities worldwide. Estimated Silva Estates GHG emissions are minuscule in comparison to current and projected future global GHG emissions. Attributing any observed climate change to Silva Estates emissions would, therefore, be highly

speculative. However, no scientific or regulatory consensus exists regarding when project GHG emissions are not significant for CEQA purposes. Therefore, the following discussion describes total project-specific GHG emissions, as well as project GHG emissions in a cumulative context. In addition, the section identifies corresponding mitigation measures when necessary.

### **Impact CC-1: Increase in Greenhouse Gas Emissions (Less-than-significant)**

As indicated by Table 8, project construction will result in GHG emissions from the following construction-related sources: (1) construction equipment emissions and (2) emissions from workers' vehicles traveling to and from the construction sites. The primary emissions occur as CO<sub>2</sub> from gasoline and diesel combustion, with more limited vehicle tailpipe emissions of N<sub>2</sub>O and CH<sub>4</sub>. In addition, GHG emissions would occur from embodied emissions and from land use changes associated with converting the project site from its current agricultural state to a single-family housing complex. As discussed above, quantification of GHG emissions from these sectors is highly speculative and was therefore not included in the emissions estimates.

It is anticipated that construction will take place in four phases over a period of eight months. Based on this construction timeline, equipment assumptions, and project characteristics, it is estimated that GHG emissions from construction activities amount to 423 metric tons of CO<sub>2</sub>e. Because construction emissions are a one-time event, these emissions are considered short-term in comparison to ongoing GHG emissions associated with project operations.

Operation of the proposed project would result in long-term GHG emissions from area sources (landscaping and building energy use), transportation, HGWPGs, electricity consumption, natural gas consumption, water supply, and wastewater treatment. Each of these sources was taken into account in calculating the project's annual operational emissions. In addition, CH<sub>4</sub> emissions would occur as a result of waste generated by the population at Silva Estates. However, these emissions were not included in the GHG emissions inventory due to lack of appropriate information.

As discussed above, the URBEMIS2007 and EMFAC2007 models, as well as several other literature sources, were used to estimate long-term emissions from project operations. It was assumed that 217 single-family homes would be constructed on approximately 59.9 acres. Assumptions for the trip generation rate, project buildout year, and the frequency of bus transit stops within ¼ mile of the Silva Estates were obtained from the Air Quality and Traffic chapters. Estimated water consumption and expected population per household were provided by the project applicant (Rey pers. comm.). Natural gas and electricity consumption were obtained from PG&E and were based on an average household's monthly usage (PG&E n.d). The CCAR, World Bank, IPCC/TEAP, ARB, CEC, EPA, EIA, and PG&E were consulted for appropriate emissions factors to calculate emissions from project operations (California Climate Action Registry 2009; World Bank 2007; IPCC/TEAP 2005; ARB 2008b-k; CEC 2006b; EPA 2005; EIA 2009; PG&E 2007).



Table 18 lists the total emissions from the Silva Estates associated with construction and project operations. As discussed above, emissions from transportation and electricity usage reflect extremely conservative assumptions and likely substantially overestimate CO<sub>2</sub>e from these sources.

**Table 18.** Total Estimated GHG Emissions from Construction and Operation of the Silva Estates

| <u>Source Type</u>           | <u>Source</u>                   | <u>CO<sub>2</sub>e (metric tons/year)</u> |
|------------------------------|---------------------------------|-------------------------------------------|
| <u>Short-term</u>            | <u>Construction<sup>1</sup></u> | <u>423</u>                                |
| <u>Long-term<sup>3</sup></u> | <u>Transportation</u>           | <u>2,443</u>                              |
|                              | <u>Area Source<sup>2</sup></u>  | <u>1</u>                                  |
|                              | <u>Refrigeration/AC</u>         | <u>37</u>                                 |
|                              | <u>Electricity Usage</u>        | <u>405</u>                                |
|                              | <u>Natural Gas Combustion</u>   | <u>622</u>                                |
|                              | <u>Water Supply</u>             | <u>14</u>                                 |
|                              | <u>Wastewater Treatment</u>     | <u>24</u>                                 |
|                              | <b><u>Total</u></b>             | <b><u>3,969</u></b>                       |

Notes

<sup>1</sup> Includes on-road and off-road construction emissions. Construction year assumed to be 2008.

<sup>2</sup> Includes emissions of CO<sub>2</sub> produced from landscaping activities. Wood-burning stoves and fireplaces are not included in the proposed development.

<sup>3</sup> Full buildout year assumed to be 2015.

Source: See discussion preceding discussion, "Silva Estates GHG Impacts Analysis."

Implementation of the proposed project would result in a net increase in local GHG emissions above existing conditions, which are assumed to be zero. Based on Table 18, it is anticipated that total GHG emissions from Silva Estates amount to 3,969 metric tons of CO<sub>2</sub>e. However, as previously noted, greenhouse gas contaminant emissions tend to accumulate in the atmosphere because of their relatively long lifespan. As a result, their impact on the atmosphere is mostly independent of the point of emission. In other words, greenhouse gas contaminant emissions are more appropriately evaluated on a regional, state, or even national scale than on an individual project level. Further, it is unlikely that the 3,969 metric tons of CO<sub>2</sub>e emitted as part of the project would have an individually discernable effect on global climate change. Consequently, this impact is considered *less-than-significant*.

## **Impact CC-2: Cumulative Increase in Greenhouse Gas Emissions (Significant and Unavoidable)**

Unlike criteria pollutant impacts, which are local and regional in nature, climate change impacts occur at a global level. The relatively long lifespan and persistence of GHGs (Table 1) require that climate change be considered a cumulative and global impact. As stated above, it is unlikely that that any increase in global temperature or sea level could be attributed to the emissions

resulting from a single project. Rather, it is more appropriate to conclude the proposed project GHG emissions will combine with emissions across California, the U.S., and the globe to cumulatively contribute to global climate change.

To put the project in perspective, total estimated GHG emissions were compared to the most recent global, national, and state greenhouse gas inventories (Table 19). Total Silva Estates GHG emissions are approximately 0.00082% of 2006 statewide emissions, and approximately 0.00005% of 2007 United States emissions. In the global context, Silva Estates emissions represent 0.00001% of 2004 worldwide GHG emissions. Based on these estimates, the Silva Estates would have only a miniscule impact on state, federal, and international emissions of GHGs.

**Table 19.** Annual Silva Estates GHG Emissions in California, U.S., and Global Context

| <u>Emissions Type</u>                            | <u>CO<sub>2</sub>e (metric tons)</u> | <u>Silva Estates %</u> |
|--------------------------------------------------|--------------------------------------|------------------------|
| <u>Total Annual Silva Estates GHG Emissions</u>  | <u>3,969</u>                         | <u>=</u>               |
| <u>2006 ARB Statewide GHG Emissions</u>          | <u>483,900,000</u>                   | <u>0.00082</u>         |
| <u>2007 EPA National GHG Emissions</u>           | <u>7,510,100,000</u>                 | <u>0.00005</u>         |
| <u>2004 IPCC Global GHG Emissions</u>            | <u>49,000,000,000</u>                | <u>0.00001</u>         |
| <u>Sources: IPCC 2006c; EPA 2009a; ARB 2009a</u> |                                      |                        |

While GHG emissions from the proposed project may be negligible relative to total state, national, and global emissions, scientific consensus concludes that given the seriousness of climate change, small contributions of GHGs may be cumulatively considerable. When compared to BAU (existing) emissions, construction of the Silva Estates would result in an increase of 3,969 metric tons of CO<sub>2</sub>e. While this impact is small, it would be a **cumulatively considerable contribution** to the cumulative impact on GHG emissions.

Implementation of the “Additional Measures to Reduce Air Quality Impacts,” which are outlined in Chapter 3.2 Air Quality, would help reduce project-specific GHG emissions. In addition, the SJVAPCD recently released a final draft staff report that considers a number of alternatives for GHG significance thresholds. The report concludes that the most appropriate option for assessing project-level GHG significance is the implementation of Best Performance Standards (BPS). The SJVAPCD’s guidance is intended to streamline CEQA review by pre-quantifying emissions reductions that would be achieved by the BPS. Development projects must implement BPS or demonstrate a 29% reduction in project-specific GHG emissions to reduce impacts on climate change to a less than significant level. It is recommended that the project applicant implement the SJVAPCD’s BPS, as appropriate (Appendix E).

The California Climate Action Team (CAT), the CAPCOA, and the California Attorney General’s Office have also recommended strategies to reduce project-related climate change impacts and meet the goals of AB 32. A recent report by the California Attorney General’s office entitled *The California Environmental*

Quality Act: Addressing Global Warming at the Local Agency Level identifies various example measures to reduce GHG emissions at the project level (State of California Department of Justice 2008). The following mitigation measures and project design features were compiled from the California Attorney General's Office report. They are not meant to be exhaustive, but to provide a sample list of measures that could be incorporated into future project design.

### **Mitigation Measure CC-1: Implement Project Design Features to Reduce Project Contribution to Climate Change**

#### **Energy Efficiency**

- Design buildings to be energy efficient.
- Install efficient lighting and lighting control systems. Site and design building to take advantage of daylight.
- Use trees, landscaping and sun screens on west and south exterior building walls to reduce energy use.
- Install "cool" roofs.
- Provide information on energy management services for large energy users.
- Install energy efficient heating and cooling systems, appliances and equipment, and control systems.
- Install light emitting diodes (LEDs) for traffic, street and other outdoor lighting.
- Limit the hours of operation of outdoor lighting.
- Use solar heating, automatic covers, and efficient pumps and motors for pools and spas.
- Provide education on energy efficiency.

#### **Renewable Energy**

- Install solar or wind power systems and solar hot water heaters. Educate consumers about existing incentives.
- Install solar panels on carports and over parking areas.

#### **Water Conservation and Efficiency**

- Create water-efficient landscapes.
- Install water-efficient irrigation systems and devices.
- Use reclaimed water for landscape irrigation in new developments and on public property. Install the infrastructure to deliver and use reclaimed water.
- Design buildings to be water-efficient. Install water-efficient fixtures and appliances.

- Restrict watering methods (e.g., prohibit systems that apply water to non-vegetated surfaces) and control runoff.
- Restrict the use of water for cleaning outdoor surfaces and vehicles.
- Implement low-impact development practices that maintain the existing hydrologic character of the site to manage storm water and protect the environment. (Retaining storm water runoff on-site can drastically reduce the need for energy-intensive imported water at the site).
- Devise a comprehensive water conservation strategy appropriate for the project and location. The strategy may include many of the specific items listed above, plus other innovative measures that are appropriate to the specific project.
- Provide education about water conservation and available programs and incentives, such as in water bills.

### **Solid Waste Measures**

- Reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).
- Provide exterior storage areas for recyclables and green waste and adequate recycling containers located in public areas.
- Provide education and publicity about reducing waste and available recycling services.

### **Transportation and Motor Vehicles**

- Limit idling time for commercial vehicles, including delivery and construction vehicles.
- Encourage use of low or zero-emission vehicles, including construction vehicles.
- Create local “light vehicle” networks, such as neighborhood electric vehicle (NEV) systems.
- Provide the necessary facilities and infrastructure to encourage the use of low or zero-emission vehicles (e.g., electric vehicle charging facilities and conveniently located alternative fueling stations).
- Institute a low-carbon fuel vehicle incentive program.
- Provide shuttle service to public transit.
- Provide public transit incentives such as free or low-cost monthly transit passes.
- Promote “least polluting” ways to connect people and goods to their destinations.
- Incorporate bicycle lanes and routes into street systems, new subdivisions, and large developments.

- Incorporate bicycle-friendly intersections into street design.
- For commercial projects, provide adequate bicycle parking near building entrances to promote cyclist safety, security, and convenience. For large employers, provide facilities that encourage bicycle commuting, including, e.g., locked bicycle storage or covered or indoor bicycle parking.
- Create bicycle lanes and walking paths directed to the location of schools, parks and other destination points.
- Work with the school district to restore or expand school bus services.
- Institute a telecommute and/or flexible work hours program. Provide information, training, and incentives to encourage participation. Provide incentives for equipment purchases to allow high-quality teleconferences.
- Provide information on all options for individuals and businesses to reduce transportation-related emissions. Provide education and information about public transportation.

**Impact after Mitigation:** While the above measures will not eliminate project GHG emissions, their inclusion in project design will result in lower GHG emissions levels than had they not been incorporated. Of particular efficacy, the requirements for energy-efficient buildings are likely to be the largest source of GHG emissions reductions of all the measures described above. It is also important to note that future state actions taken pursuant to AB 32 including requirements for lower carbon-content in motor vehicle fuels, improved vehicle mileage standards (provided California is not barred due to federal action), and an increased share of renewable energy in electricity generation will also serve, in time, to further reduce GHG emissions related to this project. However, since the mitigation measures will not eliminate the project's contribution to less than cumulatively considerable, the project's cumulative impact to climate change after mitigation is considered *significant and unavoidable*.

*The following references are added to the draft EIR:*

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## **Personal Communications**

Rey, Lantz. Senior Planner. City of Manteca, Manteca, CA. September 23, 2009—Email messages to Laura Smith.

## **Section 3.5—Hazards and Hazardous Materials**

*The following changes are made to the third and fourth full paragraphs on page 3.5-5 of the draft EIR:*

### **Offsite Hazards and Hazardous Materials**

The Antigua development is under construction to the north of the project site. The land northwest of the project site has been approved by the Manteca City Council and is awaiting action by LAFCo ~~is in the application stage for the Union Crossing Commercial development.~~ The land west of the project site is the site of the proposed Oleander Estates development. A parcel of land adjacent to the project site, directly north of the proposed Oleander Estates site, is currently in agricultural use. This land is proposed for annexation as a part of the annexation of the Silva Estates project site in compliance with LAFCO policy requiring contiguous annexation and prohibiting the creation of islands of unincorporated land, although no subdivision or development of the adjacent annexation land is proposed at this time. The parcel is surrounded on four sides by land for which development applications are in process, and the eventual conversion of this parcel of land to residential use is likely. The eastern and southern sides of the project site are currently bordered by agricultural land.

A 150-gallon AST is located on the southeast corner of the western adjoining property, on the adjacent annexation land. While the tank is no longer in use, any historical release could affect the project site. In addition, 20405 South Tinnin Road, approximately 1,400 feet east of the project site, has an approximate 500-gallon underground farm tank that once contained leaded petroleum product. This tank has not been in use for more than 20 years, and due to the distance from the project site, this location does not pose a risk to the proposed project (Condor Earth Technologies 2005). Irrigation piping, standpipes, a well, and a 5-gallon container labeled “drip oil” were observed on the adjoining southern property (Condor Earth Technologies 2005). The potential for pesticides and other agricultural chemicals, as well as the likelihood of lead-based paints or asbestos, on these properties is the same as described above.

*The following changes are made to the discussion of Impact HAZ-4 on pages 3.5-13 and 3.5-14 of the draft EIR:*

#### **Impact HAZ-4: Significant Hazard from Location on a Site that is Included on a List of Hazardous Materials Sites (Less than Significant with Mitigation)**

As determined by the Phase I ESA and stated previously under “Environmental Setting,” the project site has been used for agricultural purposes since 1957 and was likely treated with pesticides. The surface soils may still contain these substances. Additionally, it is possible that lead-based paints or asbestos may have been used in the construction of buildings that previously existed on the project site and that chemicals may have been applied for weed/insect control. Therefore, these buildings could have residual concentrations of lead or asbestos or pesticides/herbicides in the soil around their former perimeters. The former presence of a small dairy on the site could have contributed to excessive accumulations of nitrate, methane gas, and salt residuals in the soil. Other hazards onsite include stained soil, drums and containers of hazardous substances, and debris such as burn piles. These impacts would be significant. Mitigation Measures HAZ-2a to HAZ-2f reduce these impacts to a less-than-significant level.

~~Offsite~~ An additional hazards include on the adjacent annexation land is a 150-gallon AST. At the time any development is proposed on the adjacent annexation land, this tank would be removed.

Also, and 500-gallon UST is located off-site. However, according to the Phase I ESA, due to the distance from the project site, the UST does not appear to pose a risk to the site. Furthermore, the San Joaquin County Office of Emergency Services (SJCOES) indicated that there are no hazardous materials incidents reported within 0.25 mile of the project site (Condor Earth Technologies 2005). Therefore, this impact is considered less than significant. No mitigation is required.

## Section 3.7—Noise

*Figure 3.7-1 has been revised to show the adjacent annexation area.*

## Chapter 4—Other CEQA Considerations

*The following changes are made to the discussion of Impact GI-2 on page 4-2 of the draft EIR:*

### **Impact GI-2: Removal of a Potential Obstacle to Growth (Less than Significant)**

The proposed project would ~~extend~~ involve annexation of 88 acres of unincorporated land to the City of Manteca, including 59.9 acres proposed for subdivision and development. The proposed project would also extend public services, including sewer and water service, to the previously unserved project site. It would also construct new roadways to serve the proposed development. These improvements would remove an existing obstacle to growth at the project site. To the extent that new major roadways serving the site would serve other development areas, these roadways, as planned in the General Plan 2023, would serve development projects for which the environmental impacts are assessed in the EIRs for those specific projects. Services and facilities constructed to serve the proposed project would be proportionate to the level necessary to accommodate the project and would not, in themselves, increase the development potential of properties outside of the project site that were not planned for development in the project description or the general plan. The project site and the adjacent annexation area are within the City's SOI and Urban Service Boundary, and urban development of these lands has been planned. Therefore, this impact is considered less than significant. No mitigation is required.

*The following is added to the list of cumulative impacts on page 4-4 of the draft EIR. The mitigation measures for this impact are described above:*

### **Impact CC-2: Cumulative Increase in Greenhouse Gas Emissions (Significant and Unavoidable)**

Unlike criteria pollutant impacts, which are local and regional in nature, climate change impacts occur at a global level. The relatively long lifespan and persistence of GHGs (Table 1) require that climate change be considered a cumulative and global impact. As stated above, it is unlikely that that any increase in global temperature or sea level could be attributed to the emissions resulting from a single project. Rather, it is more appropriate to conclude the proposed project GHG emissions will combine with emissions across California, the U.S., and the globe to cumulatively contribute to global climate change.

To put the project in perspective, total estimated GHG emissions were compared to the most recent global, national, and state greenhouse gas inventories (Table 19). Total Silva Estates GHG emissions are approximately 0.00082% of 2006 statewide emissions, and approximately 0.00005% of 2007 United States emissions. In the global context, Silva Estates emissions represent 0.00001% of 2004 worldwide GHG emissions. Based on these estimates, the Silva Estates would have only a miniscule impact on state, federal, and international emissions of GHGs.

**Table 19.** Annual Silva Estates GHG Emissions in California, U.S., and Global Context

| <u>Emissions Type</u>                            | <u>CO<sub>2</sub>e (metric tons)</u> | <u>Silva Estates %</u> |
|--------------------------------------------------|--------------------------------------|------------------------|
| <u>Total Annual Silva Estates GHG Emissions</u>  | <u>3,969</u>                         | <u>=</u>               |
| <u>2006 ARB Statewide GHG Emissions</u>          | <u>483,900,000</u>                   | <u>0.00082</u>         |
| <u>2007 EPA National GHG Emissions</u>           | <u>7,510,100,000</u>                 | <u>0.00005</u>         |
| <u>2004 IPCC Global GHG Emissions</u>            | <u>49,000,000,000</u>                | <u>0.00001</u>         |
| <u>Sources: IPCC 2006c; EPA 2009a; ARB 2009a</u> |                                      |                        |

While GHG emissions from the proposed project may be negligible relative to total state, national, and global emissions, scientific consensus concludes that given the seriousness of climate change, small contributions of GHGs may be cumulatively considerable. When compared to BAU (existing) emissions, construction of the Silva Estates would result in an increase of 3,969 metric tons of CO<sub>2</sub>e. While this impact is small, it would be a **cumulatively considerable contribution** to the cumulative impact on GHG emissions.

Implementation of the “Additional Measures to Reduce Air Quality Impacts,” which are outlined in Chapter 3.2 Air Quality, would help reduce project-specific GHG emissions. In addition, the SJVAPCD recently released a final draft staff report that considers a number of alternatives for GHG significance thresholds. The report concludes that the most appropriate option for assessing project-level GHG significance is the implementation of Best Performance Standards (BPS). The SJVAPCD’s guidance is intended to streamline CEQA review by pre-quantifying emissions reductions that would be achieved by the BPS. Development projects must implement BPS or demonstrate a 29% reduction in project-specific GHG emissions to reduce impacts on climate change to a less than significant level. It is recommended that the project applicant implement the SJVAPCD’s BPS, as appropriate (Appendix E).

The California Climate Action Team (CAT), the CAPCOA, and the California Attorney General’s Office have also recommended strategies to reduce project-related climate change impacts and meet the goals of AB 32. A recent report by the California Attorney General’s office entitled *The California Environmental Quality Act: Addressing Global Warming at the Local Agency Level* identifies various example measures to reduce GHG emissions at the project level (State of California Department of Justice 2008). The following mitigation measures and project design features were compiled from the California Attorney General’s





**Figure 3.7-1**  
**Noise Measurement Locations**

Office report. They are not meant to be exhaustive, but to provide a sample list of measures that could be incorporated into future project design.

*The following changes are made to the appendices of the draft EIR:*

Appendix C is replaced with the attached Revised Appendix C.

A new Appendix H is added as attached.



Appendix C

## **URBEMIS Model Output (Revised)**

Urbemis 2007 Version 9.2.4

Detail Report for Annual Construction Unmitigated Emissions (Tons/Year)

File Name: G:\Sacramento\LGT-Air&Noise\Air\Silva-Milner Estates EIR 06362.06 (SJVAPCD)\GHG Analysis 09-2009\URBEMIS 2007\Silva Estates Construction Emissions.urb924

Project Name: Silva Estates Construction

Project Location: San Joaquin County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

|  | <u>ROG</u> | <u>NOx</u> | <u>CO</u> | <u>SO2</u> | <u>PM10 Dust</u> | <u>PM10 Exhaust</u> | <u>PM10 Total</u> | <u>PM2.5 Dust</u> | <u>PM2.5 Exhaust</u> | <u>PM2.5 Total</u> | <u>CO2</u> |
|--|------------|------------|-----------|------------|------------------|---------------------|-------------------|-------------------|----------------------|--------------------|------------|
|--|------------|------------|-----------|------------|------------------|---------------------|-------------------|-------------------|----------------------|--------------------|------------|

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|                                    |      |      |      |      |      |      |      |      |      |      |        |
|------------------------------------|------|------|------|------|------|------|------|------|------|------|--------|
| 2008                               | 3.49 | 2.84 | 4.16 | 0.00 | 1.66 | 0.20 | 1.86 | 0.35 | 0.18 | 0.53 | 451.16 |
| Fine Grading 03/03/2008-03/17/2008 | 0.05 | 0.46 | 0.23 | 0.00 | 1.65 | 0.02 | 1.67 | 0.34 | 0.02 | 0.36 | 39.49  |
| Fine Grading Dust                  | 0.00 | 0.00 | 0.00 | 0.00 | 1.65 | 0.00 | 1.65 | 0.34 | 0.00 | 0.34 | 0.00   |
| Fine Grading Off Road Diesel       | 0.05 | 0.46 | 0.22 | 0.00 | 0.00 | 0.02 | 0.02 | 0.00 | 0.02 | 0.02 | 38.79  |
| Fine Grading On Road Diesel        | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00   |
| Fine Grading Worker Trips          | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.70   |
| Building 03/18/2008-09/03/2008     | 0.42 | 1.86 | 3.61 | 0.00 | 0.01 | 0.15 | 0.16 | 0.00 | 0.14 | 0.14 | 358.35 |
| Building Off Road Diesel           | 0.31 | 1.41 | 0.94 | 0.00 | 0.00 | 0.13 | 0.13 | 0.00 | 0.12 | 0.12 | 114.43 |
| Building Vendor Trips              | 0.02 | 0.31 | 0.25 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 49.00  |
| Building Worker Trips              | 0.08 | 0.13 | 2.41 | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 194.92 |
| Asphalt 07/07/2008-07/21/2008      | 0.08 | 0.52 | 0.24 | 0.00 | 0.00 | 0.03 | 0.03 | 0.00 | 0.03 | 0.03 | 46.58  |
| Paving Off-Gas                     | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00   |
| Paving Off Road Diesel             | 0.06 | 0.46 | 0.20 | 0.00 | 0.00 | 0.03 | 0.03 | 0.00 | 0.03 | 0.03 | 38.33  |
| Paving On Road Diesel              | 0.00 | 0.06 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.56   |
| Paving Worker Trips                | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.69   |
| Coating 08/04/2008-09/11/2008      | 2.94 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.74   |
| Architectural Coating              | 2.94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00   |
| Coating Worker Trips               | 0.00 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.74   |

Phase Assumptions

Phase: Fine Grading 3/3/2008 - 3/17/2008 - Default Fine Site Grading Description

Total Acres Disturbed: 59.9

Maximum Daily Acreage Disturbed: 15

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

4 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day

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Phase: Paving 7/7/2008 - 7/21/2008 - Default Building Construction Description

Acres to be Paved: 11

Off-Road Equipment:

- 2 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day
- 2 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 8 hours per day
- 2 Pavers (100 hp) operating at a 0.62 load factor for 8 hours per day
- 2 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day
- 4 Rollers (95 hp) operating at a 0.56 load factor for 8 hours per day

Phase: Building Construction 3/18/2008 - 9/3/2008 - Default Paving Description

Off-Road Equipment:

- 4 Rough Terrain Forklifts (93 hp) operating at a 0.6 load factor for 8 hours per day
- 4 Skid Steer Loaders (44 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Architectural Coating 8/4/2008 - 9/11/2008 - Default Architectural Coating Description

- Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 130
- Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 130
- Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
- Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Urbemis 2007 Version 9.2.4

Detail Report for Annual Construction Mitigated Emissions (Tons/Year)

File Name: G:\Sacramento\LGT-Air&Noise\Air\Silva-Milner Estates EIR 06362.06 (SJVAPCD)\GHG Analysis 09-2009\URBEMIS 2007\Silva Estates Construction Emissions.urb924

Project Name: Silva Estates Construction

Project Location: San Joaquin County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Annual Tons Per Year, Mitigated)

| <u>ROG</u> | <u>NOx</u> | <u>CO</u> | <u>SO2</u> | <u>PM10 Dust</u> | <u>PM10 Exhaust</u> | <u>PM10 Total</u> | <u>PM2.5 Dust</u> | <u>PM2.5 Exhaust</u> | <u>PM2.5 Total</u> | <u>CO2</u> |
|------------|------------|-----------|------------|------------------|---------------------|-------------------|-------------------|----------------------|--------------------|------------|
|------------|------------|-----------|------------|------------------|---------------------|-------------------|-------------------|----------------------|--------------------|------------|

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|                                    |      |      |      |      |      |      |      |      |      |      |        |
|------------------------------------|------|------|------|------|------|------|------|------|------|------|--------|
| 2008                               | 3.49 | 2.10 | 4.16 | 0.00 | 0.45 | 0.03 | 0.48 | 0.10 | 0.03 | 0.13 | 451.16 |
| Fine Grading 03/03/2008-03/17/2008 | 0.05 | 0.31 | 0.23 | 0.00 | 0.44 | 0.00 | 0.44 | 0.09 | 0.00 | 0.09 | 39.49  |
| Fine Grading Dust                  | 0.00 | 0.00 | 0.00 | 0.00 | 0.44 | 0.00 | 0.44 | 0.09 | 0.00 | 0.09 | 0.00   |
| Fine Grading Off Road Diesel       | 0.05 | 0.31 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 38.79  |
| Fine Grading On Road Diesel        | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00   |
| Fine Grading Worker Trips          | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.70   |
| Building 03/18/2008-09/03/2008     | 0.42 | 1.41 | 3.61 | 0.00 | 0.01 | 0.03 | 0.04 | 0.00 | 0.03 | 0.03 | 358.35 |
| Building Off Road Diesel           | 0.31 | 0.96 | 0.94 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 114.43 |
| Building Vendor Trips              | 0.02 | 0.31 | 0.25 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 49.00  |
| Building Worker Trips              | 0.08 | 0.13 | 2.41 | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 194.92 |
| Asphalt 07/07/2008-07/21/2008      | 0.08 | 0.37 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 46.58  |
| Paving Off-Gas                     | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00   |
| Paving Off Road Diesel             | 0.06 | 0.31 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 38.33  |
| Paving On Road Diesel              | 0.00 | 0.06 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.56   |
| Paving Worker Trips                | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.69   |
| Coating 08/04/2008-09/11/2008      | 2.94 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.74   |
| Architectural Coating              | 2.94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00   |
| Coating Worker Trips               | 0.00 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.74   |

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 3/3/2008 - 3/17/2008 - Default Fine Site Grading Description

For Soil Stabilizing Measures, the Apply soil stabilizers to inactive areas mitigation reduces emissions by:

PM10: 84% PM25: 84%

For Soil Stabilizing Measures, the Replace ground cover in disturbed areas quickly mitigation reduces emissions by:

PM10: 5% PM25: 5%

For Soil Stabilizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Excavators, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Excavators, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

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PM10: 85% PM25: 85%

For Excavators, the Diesel Oxidation Catalyst 20% mitigation reduces emissions by:

NOX: 20%

For Scrapers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Scrapers, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Scrapers, the Diesel Oxidation Catalyst 20% mitigation reduces emissions by:

NOX: 20%

The following mitigation measures apply to Phase: Paving 7/7/2008 - 7/21/2008 - Default Building Construction Description

For Pavers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Pavers, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Pavers, the Diesel Oxidation Catalyst 20% mitigation reduces emissions by:

NOX: 20%

For Paving Equipment, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Paving Equipment, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Paving Equipment, the Diesel Oxidation Catalyst 20% mitigation reduces emissions by:

NOX: 20%

For Rollers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Rollers, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Rollers, the Diesel Oxidation Catalyst 20% mitigation reduces emissions by:

NOX: 20%

For Graders, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Graders, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Graders, the Diesel Oxidation Catalyst 20% mitigation reduces emissions by:

NOX: 20%

For Off Highway Trucks, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

9/22/2009 5:37:12 PM

NOX: 15% PM10: 50% PM25: 50%

For Off Highway Trucks, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Off Highway Trucks, the Diesel Oxidation Catalyst 20% mitigation reduces emissions by:

NOX: 20%

The following mitigation measures apply to Phase: Building Construction 3/18/2008 - 9/3/2008 - Default Paving Description

For Skid Steer Loaders, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Skid Steer Loaders, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Skid Steer Loaders, the Diesel Oxidation Catalyst 20% mitigation reduces emissions by:

NOX: 20%

For Rough Terrain Forklifts, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Rough Terrain Forklifts, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Rough Terrain Forklifts, the Diesel Oxidation Catalyst 20% mitigation reduces emissions by:

NOX: 20%

The following mitigation measures apply to Phase: Architectural Coating 8/4/2008 - 9/11/2008 - Default Architectural Coating Description

For Residential Architectural Coating Measures, the Residential Exterior: Use Low VOC Coatings mitigation reduces emissions by:

For Residential Architectural Coating Measures, the Residential Interior: Use Low VOC Coatings mitigation reduces emissions by:

For Nonresidential Architectural Coating Measures, the Nonresidential Exterior: Use Low VOC Coatings mitigation reduces emissions by:

ROG: 45.6%

For Nonresidential Architectural Coating Measures, the Nonresidential Interior: Use Low VOC Coatings mitigation reduces emissions by:

ROG: 45.6%

Phase Assumptions

Phase: Fine Grading 3/3/2008 - 3/17/2008 - Default Fine Site Grading Description

Total Acres Disturbed: 59.9

Maximum Daily Acreage Disturbed: 15

Fugitive Dust Level of Detail: Default



**9/22/2009 5:37:12 PM**

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

4 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day

Phase: Paving 7/7/2008 - 7/21/2008 - Default Building Construction Description

Acres to be Paved: 11

Off-Road Equipment:

2 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

2 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 8 hours per day

2 Pavers (100 hp) operating at a 0.62 load factor for 8 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day

4 Rollers (95 hp) operating at a 0.56 load factor for 8 hours per day

Phase: Building Construction 3/18/2008 - 9/3/2008 - Default Paving Description

Off-Road Equipment:

4 Rough Terrain Forklifts (93 hp) operating at a 0.6 load factor for 8 hours per day

4 Skid Steer Loaders (44 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Architectural Coating 8/4/2008 - 9/11/2008 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 130

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 130

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

9/24/2009 1:36:30 PM

Urbemis 2007 Version 9.2.4

Detail Report for Annual Operational Mitigated Emissions (Tons/Year)

File Name: G:\Sacramento\LGT-Air&Noise\Air\Silva-Milner Estates EIR 06362.06 (SJVAPCD)\GHG Analysis 09-2009\URBEMIS 2007\Silva Estates Operational Emissions.urb924

Project Name: Silva Estates Operational Emissions

Project Location: San Joaquin County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Annual Tons Per Year, Mitigated)

| <u>Source</u>                 | ROG  | NOX  | CO    | SO2  | PM10 | PM25 | CO2      |
|-------------------------------|------|------|-------|------|------|------|----------|
| Single family housing         | 1.76 | 2.27 | 21.54 | 0.03 | 2.37 | 0.51 | 2,631.77 |
| TOTALS (tons/year, mitigated) | 1.76 | 2.27 | 21.54 | 0.03 | 2.37 | 0.51 | 2,631.77 |

Includes correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2015 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Operational Mitigation Options Selected

Residential Mitigation Measures

Residential Local-Serving Retail Mitigation

Percent Reduction in Trips is 0% (calculated as a % of 9.57 trips/day)))

Note that the above percent is applied to a baseline of 9.57 and that product is subtracted from the Unmitigated Trips

Page: 2

9/24/2009 1:36:30 PM

Operational Mitigation Options Selected

Residential Mitigation Measures

Inputs Selected:

The Presence of Local-Serving Retail checkbox was NOT selected.

Residential Transit Service Mitigation

-----  
Percent Reduction in Trips is 0.13% (calculated as a % of 9.57 trips/day)

Note that the above percent is applied to a baseline of 9.57 and that product is subtracted from the Unmitigated Trips

Inputs Selected:

The Number of Daily Weekday Buses Stopping Within 1/4 Mile of Site is 13

The Number of Daily Rail or Bus Rapid Transit Stops Within 1/2 Mile of Site is 0

The Number of Dedicated Daily Shuttle Trips is 0

Residential Pedestrian/Bicycle Friendliness Mitigation

-----  
Percent Reduction in Trips is 1.54% (calculated as a % of 9.57 trips/day)

Note that the above percent is applied to a baseline of 9.57 and that product is subtracted from the Unmitigated Trips

Inputs Selected:

The Number of Intersections per Square Mile is 17

The Percent of Streets with Sidewalks on One Side is 0%

The Percent of Streets with Sidewalks on Both Sides is 50%

9/24/2009 1:36:30 PM

Operational Mitigation Options SelectedResidential Mitigation Measures

The Percent of Arterials/Collectors with Bike Lanes or where Suitable,

Direct Parallel Routes Exist is 0%

Nonresidential Mitigation MeasuresSummary of Land Uses

| Land Use Type         | Acreage | Trip Rate | Unit Type      | No. Units | Total Trips | Total VMT |
|-----------------------|---------|-----------|----------------|-----------|-------------|-----------|
| Single family housing | 59.90   | 9.41      | dwelling units | 217.00    | 2,042.09    | 15,285.58 |
|                       |         |           |                |           | 2,042.09    | 15,285.58 |

Vehicle Fleet Mix

| Vehicle Type                        | Percent Type | Non-Catalyst | Catalyst | Diesel |
|-------------------------------------|--------------|--------------|----------|--------|
| Light Auto                          | 51.1         | 0.2          | 99.6     | 0.2    |
| Light Truck < 3750 lbs              | 22.5         | 0.9          | 94.8     | 4.3    |
| Light Truck 3751-5750 lbs           | 16.4         | 0.5          | 99.5     | 0.0    |
| Med Truck 5751-8500 lbs             | 6.4          | 0.9          | 99.1     | 0.0    |
| Lite-Heavy Truck 8501-10,000 lbs    | 0.2          | 0.0          | 76.2     | 23.8   |
| Lite-Heavy Truck 10,001-14,000 lbs  | 0.1          | 0.0          | 42.9     | 57.1   |
| Med-Heavy Truck 14,001-33,000 lbs   | 0.7          | 0.0          | 18.2     | 81.8   |
| Heavy-Heavy Truck 33,001-60,000 lbs | 0.5          | 0.0          | 0.0      | 100.0  |
| Other Bus                           | 0.0          | 0.0          | 0.0      | 0.0    |
| Urban Bus                           | 0.1          | 0.0          | 0.0      | 100.0  |
| Motorcycle                          | 1.2          | 50.0         | 50.0     | 0.0    |
| School Bus                          | 0.1          | 0.0          | 0.0      | 100.0  |

9/24/2009 1:36:30 PM

Vehicle Fleet Mix

| Vehicle Type | Percent Type | Non-Catalyst | Catalyst | Diesel |
|--------------|--------------|--------------|----------|--------|
| Motor Home   | 0.7          | 0.0          | 90.0     | 10.0   |

Travel Conditions

|                           | Residential |           |            | Commercial |          |          |
|---------------------------|-------------|-----------|------------|------------|----------|----------|
|                           | Home-Work   | Home-Shop | Home-Other | Commute    | Non-Work | Customer |
| Urban Trip Length (miles) | 10.8        | 7.3       | 7.5        | 9.5        | 7.4      | 2.0      |
| Rural Trip Length (miles) | 16.8        | 7.1       | 7.9        | 14.7       | 6.6      | 6.6      |
| Trip speeds (mph)         | 35.0        | 35.0      | 35.0       | 35.0       | 35.0     | 35.0     |
| % of Trips - Residential  | 32.9        | 18.0      | 49.1       |            |          |          |

% of Trips - Commercial (by land use)

Operational Changes to Defaults

Commercial-based customer urban trip length changed from 7.35 miles to 2 miles

## Urbemis 2007 Version 9.2.4

## Detail Report for Annual Area Source Mitigated Emissions (Tons/Year)

File Name: G:\Sacramento\LGT-Air&Noise\Air\Silva-Milner Estates EIR 06362.06 (SJVAPCD)\GHG Analysis 09-2009\URBEMIS 2007\Silva Estates Operational Emissions.urb924

Project Name: Silva Estates Operational Emissions

Project Location: San Joaquin County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

## AREA SOURCE EMISSION ESTIMATES (Annual Tons Per Year, Mitigated)

| <u>Source</u>                 | <u>ROG</u> | <u>NOx</u> | <u>CO</u> | <u>SO2</u> | <u>PM10</u> | <u>PM2.5</u> | <u>CO2</u> |
|-------------------------------|------------|------------|-----------|------------|-------------|--------------|------------|
| Natural Gas                   | 0.02       | 0.30       | 0.13      | 0.00       | 0.00        | 0.00         | 389.13     |
| Hearth                        | 0.00       | 0.00       | 0.00      | 0.00       | 0.00        | 0.00         | 0.00       |
| Landscape                     | 0.15       | 0.01       | 0.85      | 0.00       | 0.00        | 0.00         | 1.40       |
| Consumer Products             | 1.40       |            |           |            |             |              |            |
| Architectural Coatings        | 0.29       |            |           |            |             |              |            |
| TOTALS (tons/year, mitigated) | 1.86       | 0.31       | 0.98      | 0.00       | 0.00        | 0.00         | 390.53     |

Area Source Mitigation Measures Selected

| <u>Mitigation Description</u>                                                                                                                | <u>Percent Reduction</u> |
|----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Percent of Wood Stoves changed from: 56% to: 0%                                                                                              |                          |
| Percent of Gas Fireplaces changed from: 44% to: 0%                                                                                           |                          |
| Percent of No Hearth changed from: 0% to: 100%                                                                                               |                          |
| Percent of Residential Landscape Equipment that are Electrically Powered and have Electrical Outlets at the the Front and Rear of Residences | 3.00                     |

Page: 2

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|                                                                                                                              |       |
|------------------------------------------------------------------------------------------------------------------------------|-------|
| Percent of Commercial and Industrial Landscape Equipment that are Electrically Powered and have Electrical Outlets Available | 3.00  |
| For Residential Interior Use Low VOC Coating                                                                                 | 0.00  |
| For Residential Exterior Use Low VOC Coating                                                                                 | 0.00  |
| For Nonresidential Interior Use Low VOC Coating                                                                              | 45.60 |
| For Nonresidential Exterior Use Low VOC Coating                                                                              | 45.60 |

Area Source Changes to Defaults

Percentage of residences with wood stoves changed from 0% to 56%

Percentage of residences with natural gas fireplaces changed from 0% to 44%

Appendix H

## **Greenhouse Gas Model Output**



Urbemis 2007 Version 9.2.4

Detail Report for Annual Construction Mitigated Emissions (Tons/Year)

File Name: G:\Sacramento\LGT-Air&Noise\Air\Silva-Milner Estates EIR 06362.06 (SJVAPCD)\GHG Analysis 09-2009\URBEMIS 2007\Silva Estates Construction Emissions.urb924

Project Name: Silva Estates Construction

Project Location: San Joaquin County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Annual Tons Per Year, Mitigated)

| <u>ROG</u> | <u>NOx</u> | <u>CO</u> | <u>SO2</u> | <u>PM10 Dust</u> | <u>PM10 Exhaust</u> | <u>PM10 Total</u> | <u>PM2.5 Dust</u> | <u>PM2.5 Exhaust</u> | <u>PM2.5 Total</u> | <u>CO2</u> |
|------------|------------|-----------|------------|------------------|---------------------|-------------------|-------------------|----------------------|--------------------|------------|
|------------|------------|-----------|------------|------------------|---------------------|-------------------|-------------------|----------------------|--------------------|------------|

9/22/2009 5:37:12 PM

|                                    |      |      |      |      |      |      |      |      |      |      |        |
|------------------------------------|------|------|------|------|------|------|------|------|------|------|--------|
| 2008                               | 3.49 | 2.10 | 4.16 | 0.00 | 0.45 | 0.03 | 0.48 | 0.10 | 0.03 | 0.13 | 451.16 |
| Fine Grading 03/03/2008-03/17/2008 | 0.05 | 0.31 | 0.23 | 0.00 | 0.44 | 0.00 | 0.44 | 0.09 | 0.00 | 0.09 | 39.49  |
| Fine Grading Dust                  | 0.00 | 0.00 | 0.00 | 0.00 | 0.44 | 0.00 | 0.44 | 0.09 | 0.00 | 0.09 | 0.00   |
| Fine Grading Off Road Diesel       | 0.05 | 0.31 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 38.79  |
| Fine Grading On Road Diesel        | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00   |
| Fine Grading Worker Trips          | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.70   |
| Building 03/18/2008-09/03/2008     | 0.42 | 1.41 | 3.61 | 0.00 | 0.01 | 0.03 | 0.04 | 0.00 | 0.03 | 0.03 | 358.35 |
| Building Off Road Diesel           | 0.31 | 0.96 | 0.94 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 114.43 |
| Building Vendor Trips              | 0.02 | 0.31 | 0.25 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 49.00  |
| Building Worker Trips              | 0.08 | 0.13 | 2.41 | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 194.92 |
| Asphalt 07/07/2008-07/21/2008      | 0.08 | 0.37 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 46.58  |
| Paving Off-Gas                     | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00   |
| Paving Off Road Diesel             | 0.06 | 0.31 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 38.33  |
| Paving On Road Diesel              | 0.00 | 0.06 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.56   |
| Paving Worker Trips                | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.69   |
| Coating 08/04/2008-09/11/2008      | 2.94 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.74   |
| Architectural Coating              | 2.94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00   |
| Coating Worker Trips               | 0.00 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.74   |

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 3/3/2008 - 3/17/2008 - Default Fine Site Grading Description

For Soil Stabilizing Measures, the Apply soil stabilizers to inactive areas mitigation reduces emissions by:

PM10: 84% PM25: 84%

For Soil Stabilizing Measures, the Replace ground cover in disturbed areas quickly mitigation reduces emissions by:

PM10: 5% PM25: 5%

For Soil Stabilizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Excavators, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Excavators, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

**9/22/2009 5:37:12 PM**

PM10: 85% PM25: 85%

For Excavators, the Diesel Oxidation Catalyst 20% mitigation reduces emissions by:

NOX: 20%

For Scrapers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Scrapers, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Scrapers, the Diesel Oxidation Catalyst 20% mitigation reduces emissions by:

NOX: 20%

The following mitigation measures apply to Phase: Paving 7/7/2008 - 7/21/2008 - Default Building Construction Description

For Pavers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Pavers, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Pavers, the Diesel Oxidation Catalyst 20% mitigation reduces emissions by:

NOX: 20%

For Paving Equipment, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Paving Equipment, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Paving Equipment, the Diesel Oxidation Catalyst 20% mitigation reduces emissions by:

NOX: 20%

For Rollers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Rollers, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Rollers, the Diesel Oxidation Catalyst 20% mitigation reduces emissions by:

NOX: 20%

For Graders, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Graders, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Graders, the Diesel Oxidation Catalyst 20% mitigation reduces emissions by:

NOX: 20%

For Off Highway Trucks, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

9/22/2009 5:37:12 PM

NOX: 15% PM10: 50% PM25: 50%

For Off Highway Trucks, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Off Highway Trucks, the Diesel Oxidation Catalyst 20% mitigation reduces emissions by:

NOX: 20%

The following mitigation measures apply to Phase: Building Construction 3/18/2008 - 9/3/2008 - Default Paving Description

For Skid Steer Loaders, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Skid Steer Loaders, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Skid Steer Loaders, the Diesel Oxidation Catalyst 20% mitigation reduces emissions by:

NOX: 20%

For Rough Terrain Forklifts, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

For Rough Terrain Forklifts, the Diesel Particulate Filter (DPF) 1st Tier mitigation reduces emissions by:

PM10: 85% PM25: 85%

For Rough Terrain Forklifts, the Diesel Oxidation Catalyst 20% mitigation reduces emissions by:

NOX: 20%

The following mitigation measures apply to Phase: Architectural Coating 8/4/2008 - 9/11/2008 - Default Architectural Coating Description

For Residential Architectural Coating Measures, the Residential Exterior: Use Low VOC Coatings mitigation reduces emissions by:

For Residential Architectural Coating Measures, the Residential Interior: Use Low VOC Coatings mitigation reduces emissions by:

For Nonresidential Architectural Coating Measures, the Nonresidential Exterior: Use Low VOC Coatings mitigation reduces emissions by:

ROG: 45.6%

For Nonresidential Architectural Coating Measures, the Nonresidential Interior: Use Low VOC Coatings mitigation reduces emissions by:

ROG: 45.6%

Phase Assumptions

Phase: Fine Grading 3/3/2008 - 3/17/2008 - Default Fine Site Grading Description

Total Acres Disturbed: 59.9

Maximum Daily Acreage Disturbed: 15

Fugitive Dust Level of Detail: Default

**9/22/2009 5:37:12 PM**

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

4 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day

Phase: Paving 7/7/2008 - 7/21/2008 - Default Building Construction Description

Acres to be Paved: 11

Off-Road Equipment:

2 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

2 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 8 hours per day

2 Pavers (100 hp) operating at a 0.62 load factor for 8 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day

4 Rollers (95 hp) operating at a 0.56 load factor for 8 hours per day

Phase: Building Construction 3/18/2008 - 9/3/2008 - Default Paving Description

Off-Road Equipment:

4 Rough Terrain Forklifts (93 hp) operating at a 0.6 load factor for 8 hours per day

4 Skid Steer Loaders (44 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Architectural Coating 8/4/2008 - 9/11/2008 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 130

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 130

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Urbemis 2007 Version 9.2.4

Detail Report for Annual Construction Unmitigated Emissions (Tons/Year)

File Name: G:\Sacramento\LGT-Air&Noise\Air\Silva-Milner Estates EIR 06362.06 (SJVAPCD)\GHG Analysis 09-2009\URBEMIS 2007\Silva Estates Construction Emissions.urb924

Project Name: Silva Estates Construction

Project Location: San Joaquin County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

|  | <u>ROG</u> | <u>NOx</u> | <u>CO</u> | <u>SO2</u> | <u>PM10 Dust</u> | <u>PM10 Exhaust</u> | <u>PM10 Total</u> | <u>PM2.5 Dust</u> | <u>PM2.5 Exhaust</u> | <u>PM2.5 Total</u> | <u>CO2</u> |
|--|------------|------------|-----------|------------|------------------|---------------------|-------------------|-------------------|----------------------|--------------------|------------|
|--|------------|------------|-----------|------------|------------------|---------------------|-------------------|-------------------|----------------------|--------------------|------------|

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|                                    |      |      |      |      |      |      |      |      |      |      |        |
|------------------------------------|------|------|------|------|------|------|------|------|------|------|--------|
| 2008                               | 3.49 | 2.84 | 4.16 | 0.00 | 1.66 | 0.20 | 1.86 | 0.35 | 0.18 | 0.53 | 451.16 |
| Fine Grading 03/03/2008-03/17/2008 | 0.05 | 0.46 | 0.23 | 0.00 | 1.65 | 0.02 | 1.67 | 0.34 | 0.02 | 0.36 | 39.49  |
| Fine Grading Dust                  | 0.00 | 0.00 | 0.00 | 0.00 | 1.65 | 0.00 | 1.65 | 0.34 | 0.00 | 0.34 | 0.00   |
| Fine Grading Off Road Diesel       | 0.05 | 0.46 | 0.22 | 0.00 | 0.00 | 0.02 | 0.02 | 0.00 | 0.02 | 0.02 | 38.79  |
| Fine Grading On Road Diesel        | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00   |
| Fine Grading Worker Trips          | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.70   |
| Building 03/18/2008-09/03/2008     | 0.42 | 1.86 | 3.61 | 0.00 | 0.01 | 0.15 | 0.16 | 0.00 | 0.14 | 0.14 | 358.35 |
| Building Off Road Diesel           | 0.31 | 1.41 | 0.94 | 0.00 | 0.00 | 0.13 | 0.13 | 0.00 | 0.12 | 0.12 | 114.43 |
| Building Vendor Trips              | 0.02 | 0.31 | 0.25 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.01 | 49.00  |
| Building Worker Trips              | 0.08 | 0.13 | 2.41 | 0.00 | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 | 0.01 | 194.92 |
| Asphalt 07/07/2008-07/21/2008      | 0.08 | 0.52 | 0.24 | 0.00 | 0.00 | 0.03 | 0.03 | 0.00 | 0.03 | 0.03 | 46.58  |
| Paving Off-Gas                     | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00   |
| Paving Off Road Diesel             | 0.06 | 0.46 | 0.20 | 0.00 | 0.00 | 0.03 | 0.03 | 0.00 | 0.03 | 0.03 | 38.33  |
| Paving On Road Diesel              | 0.00 | 0.06 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.56   |
| Paving Worker Trips                | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.69   |
| Coating 08/04/2008-09/11/2008      | 2.94 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.74   |
| Architectural Coating              | 2.94 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00   |
| Coating Worker Trips               | 0.00 | 0.00 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.74   |

Phase Assumptions

Phase: Fine Grading 3/3/2008 - 3/17/2008 - Default Fine Site Grading Description

Total Acres Disturbed: 59.9

Maximum Daily Acreage Disturbed: 15

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

4 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day

9/22/2009 5:37:02 PM

Phase: Paving 7/7/2008 - 7/21/2008 - Default Building Construction Description

Acres to be Paved: 11

Off-Road Equipment:

- 2 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day
- 2 Off Highway Trucks (479 hp) operating at a 0.57 load factor for 8 hours per day
- 2 Pavers (100 hp) operating at a 0.62 load factor for 8 hours per day
- 2 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day
- 4 Rollers (95 hp) operating at a 0.56 load factor for 8 hours per day

Phase: Building Construction 3/18/2008 - 9/3/2008 - Default Paving Description

Off-Road Equipment:

- 4 Rough Terrain Forklifts (93 hp) operating at a 0.6 load factor for 8 hours per day
- 4 Skid Steer Loaders (44 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Architectural Coating 8/4/2008 - 9/11/2008 - Default Architectural Coating Description

- Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 130
- Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 130
- Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
- Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250



9/24/2009 1:36:30 PM

Urbemis 2007 Version 9.2.4

Detail Report for Annual Operational Mitigated Emissions (Tons/Year)

File Name: G:\Sacramento\LGT-Air&Noise\Air\Silva-Milner Estates EIR 06362.06 (SJVAPCD)\GHG Analysis 09-2009\URBEMIS 2007\Silva Estates Operational Emissions.urb924

Project Name: Silva Estates Operational Emissions

Project Location: San Joaquin County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Annual Tons Per Year, Mitigated)

| <u>Source</u>                 | ROG  | NOX  | CO    | SO2  | PM10 | PM25 | CO2      |
|-------------------------------|------|------|-------|------|------|------|----------|
| Single family housing         | 1.76 | 2.27 | 21.54 | 0.03 | 2.37 | 0.51 | 2,631.77 |
| TOTALS (tons/year, mitigated) | 1.76 | 2.27 | 21.54 | 0.03 | 2.37 | 0.51 | 2,631.77 |

Includes correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2015 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Operational Mitigation Options Selected

Residential Mitigation Measures

Residential Local-Serving Retail Mitigation

Percent Reduction in Trips is 0% (calculated as a % of 9.57 trips/day)))

Note that the above percent is applied to a baseline of 9.57 and that product is subtracted from the Unmitigated Trips

Page: 2

9/24/2009 1:36:30 PM

Operational Mitigation Options Selected

Residential Mitigation Measures

Inputs Selected:

The Presence of Local-Serving Retail checkbox was NOT selected.

Residential Transit Service Mitigation

-----  
Percent Reduction in Trips is 0.13% (calculated as a % of 9.57 trips/day)

Note that the above percent is applied to a baseline of 9.57 and that product is subtracted from the Unmitigated Trips

Inputs Selected:

The Number of Daily Weekday Buses Stopping Within 1/4 Mile of Site is 13

The Number of Daily Rail or Bus Rapid Transit Stops Within 1/2 Mile of Site is 0

The Number of Dedicated Daily Shuttle Trips is 0

Residential Pedestrian/Bicycle Friendliness Mitigation

-----  
Percent Reduction in Trips is 1.54% (calculated as a % of 9.57 trips/day)

Note that the above percent is applied to a baseline of 9.57 and that product is subtracted from the Unmitigated Trips

Inputs Selected:

The Number of Intersections per Square Mile is 17

The Percent of Streets with Sidewalks on One Side is 0%

The Percent of Streets with Sidewalks on Both Sides is 50%

9/24/2009 1:36:30 PM

Operational Mitigation Options SelectedResidential Mitigation Measures

The Percent of Arterials/Collectors with Bike Lanes or where Suitable,

Direct Parallel Routes Exist is 0%

Nonresidential Mitigation MeasuresSummary of Land Uses

| Land Use Type         | Acreage | Trip Rate | Unit Type         | No. Units | Total Trips | Total VMT |
|-----------------------|---------|-----------|-------------------|-----------|-------------|-----------|
| Single family housing | 59.90   | 9.41      | dwelling<br>units | 217.00    | 2,042.09    | 15,285.58 |
|                       |         |           |                   |           | 2,042.09    | 15,285.58 |

Vehicle Fleet Mix

| Vehicle Type                        | Percent Type | Non-Catalyst | Catalyst | Diesel |
|-------------------------------------|--------------|--------------|----------|--------|
| Light Auto                          | 51.1         | 0.2          | 99.6     | 0.2    |
| Light Truck < 3750 lbs              | 22.5         | 0.9          | 94.8     | 4.3    |
| Light Truck 3751-5750 lbs           | 16.4         | 0.5          | 99.5     | 0.0    |
| Med Truck 5751-8500 lbs             | 6.4          | 0.9          | 99.1     | 0.0    |
| Lite-Heavy Truck 8501-10,000 lbs    | 0.2          | 0.0          | 76.2     | 23.8   |
| Lite-Heavy Truck 10,001-14,000 lbs  | 0.1          | 0.0          | 42.9     | 57.1   |
| Med-Heavy Truck 14,001-33,000 lbs   | 0.7          | 0.0          | 18.2     | 81.8   |
| Heavy-Heavy Truck 33,001-60,000 lbs | 0.5          | 0.0          | 0.0      | 100.0  |
| Other Bus                           | 0.0          | 0.0          | 0.0      | 0.0    |
| Urban Bus                           | 0.1          | 0.0          | 0.0      | 100.0  |
| Motorcycle                          | 1.2          | 50.0         | 50.0     | 0.0    |
| School Bus                          | 0.1          | 0.0          | 0.0      | 100.0  |

9/24/2009 1:36:30 PM

Vehicle Fleet Mix

| Vehicle Type | Percent Type | Non-Catalyst | Catalyst | Diesel |
|--------------|--------------|--------------|----------|--------|
| Motor Home   | 0.7          | 0.0          | 90.0     | 10.0   |

Travel Conditions

|                           | Residential |           |            | Commercial |          |          |
|---------------------------|-------------|-----------|------------|------------|----------|----------|
|                           | Home-Work   | Home-Shop | Home-Other | Commute    | Non-Work | Customer |
| Urban Trip Length (miles) | 10.8        | 7.3       | 7.5        | 9.5        | 7.4      | 2.0      |
| Rural Trip Length (miles) | 16.8        | 7.1       | 7.9        | 14.7       | 6.6      | 6.6      |
| Trip speeds (mph)         | 35.0        | 35.0      | 35.0       | 35.0       | 35.0     | 35.0     |
| % of Trips - Residential  | 32.9        | 18.0      | 49.1       |            |          |          |

% of Trips - Commercial (by land use)

Operational Changes to Defaults

Commercial-based customer urban trip length changed from 7.35 miles to 2 miles

Title : Silva Estates N20 and Ch4  
 Version : Emfac2007 V2.3 Nov 1 2006  
 Run Date : ##### 14:49:38  
 Scen Year: 2015 -- All model years in the  
 Season : Annual  
 Area : San Joaquin

\*\*\*\*\*

Year: 2015 -- Model Years 1971 to 2015  
 Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average San Joaquin County Average

Table 1:00 Running Exhaust Emissions (grams/mile)

Pollutant Name: Methane Temperatu 63F Relative Humidity: 30%

Speed

| MPH | LDA   | LDT  | MDT   | HDT   | UBUS  | MCY   | ALL  |
|-----|-------|------|-------|-------|-------|-------|------|
| 35  | 0.014 | 0.02 | 0.025 | 0.027 | 0.049 | 0.186 | 0.02 |

Pollutant Name: Carbon Monoxide Temperatu 63F Relative Humidity:

Speed

| MPH | LDA   | LDT   | MDT   | HDT   | UBUS | MCY   | ALL   |
|-----|-------|-------|-------|-------|------|-------|-------|
| 35  | 1.434 | 2.172 | 2.336 | 3.231 | 7.37 | 17.79 | 2.108 |

Pollutant Name: Oxides of Nitrogen Temperatu 63F Relative

Speed

| MPH | LDA   | LDT   | MDT   | HDT   | UBUS   | MCY   | ALL   |
|-----|-------|-------|-------|-------|--------|-------|-------|
| 35  | 0.136 | 0.274 | 0.572 | 8.504 | 15.405 | 1.246 | 0.998 |

Pollutant Name: Carbon Dioxide Temperatu 63F Relative Humidity:

Speed

| MPH | LDA     | LDT     | MDT    | HDT      | UBUS     | MCY     | ALL     |
|-----|---------|---------|--------|----------|----------|---------|---------|
| 35  | 306.223 | 385.277 | 522.79 | 1666.113 | 2200.938 | 133.682 | 479.612 |

|           |       |        |         |           |       |          |           |  |
|-----------|-------|--------|---------|-----------|-------|----------|-----------|--|
| Pollutant | Name: | Sulfur | Dioxide | Temperatu | 63F   | Relative | Humidity: |  |
| Speed     |       |        |         |           |       |          |           |  |
| MPH       | LDA   | LDT    | MDT     | HDT       | UBUS  | MCY      | ALL       |  |
| 35        | 0.003 | 0.004  | 0.005   | 0.016     | 0.021 | 0.002    | 0.005     |  |

|           |       |       |           |       |          |           |       |
|-----------|-------|-------|-----------|-------|----------|-----------|-------|
| Pollutant | Name: | PM10  | Temperatu | 63F   | Relative | Humidity: | 30%   |
| Speed     |       |       |           |       |          |           |       |
| MPH       | LDA   | LDT   | MDT       | HDT   | UBUS     | MCY       | ALL   |
| 35        | 0.01  | 0.019 | 0.022     | 0.273 | 0.206    | 0.018     | 0.037 |

|           |       |       |       |      |       |           |      |
|-----------|-------|-------|-------|------|-------|-----------|------|
| Pollutant | Name: | PM10  | -     | Tire | Wear  | Temperatu | 63F  |
| Speed     |       |       |       |      |       |           |      |
| MPH       | LDA   | LDT   | MDT   | HDT  | UBUS  | MCY       | ALL  |
| 35        | 0.008 | 0.008 | 0.009 | 0.03 | 0.009 | 0.004     | 0.01 |

|           |       |       |       |       |       |           |       |
|-----------|-------|-------|-------|-------|-------|-----------|-------|
| Pollutant | Name: | PM10  | -     | Brake | Wear  | Temperatu | 63F   |
| Speed     |       |       |       |       |       |           |       |
| MPH       | LDA   | LDT   | MDT   | HDT   | UBUS  | MCY       | ALL   |
| 35        | 0.013 | 0.013 | 0.013 | 0.024 | 0.013 | 0.006     | 0.013 |

|           |        |          |        |        |           |        |          |
|-----------|--------|----------|--------|--------|-----------|--------|----------|
| Pollutant | Name:  | Gasoline | -      | mi/gal | Temperatu | 63F    | Relative |
| Speed     |        |          |        |        |           |        |          |
| MPH       | LDA    | LDT      | MDT    | HDT    | UBUS      | MCY    | ALL      |
| 35        | 28.728 | 22.76    | 16.819 | 17.307 | 15.859    | 52.663 | 25.16    |

|           |       |        |        |        |           |       |          |
|-----------|-------|--------|--------|--------|-----------|-------|----------|
| Pollutant | Name: | Diesel | -      | mi/gal | Temperatu | 63F   | Relative |
| Speed     |       |        |        |        |           |       |          |
| MPH       | LDA   | LDT    | MDT    | HDT    | UBUS      | MCY   | ALL      |
|           | 35    | 28.427 | 29.053 | 19.527 | 5.755     | 3.955 | 0 8.137  |

Title : Silva Estates N20 and Ch4  
 Version : Emfac2007 V2.3 Nov 1 2006  
 Run Date : ##### 14:49:38  
 Scen Year: 2015 -- All model years in the  
 Season : Annual  
 Area : San Joaquin  
 \*\*\*\*\*

|                    |          |       |       |         |      |
|--------------------|----------|-------|-------|---------|------|
| Year:              | 2015 --  | Model | Years | 1971 to | 2015 |
| Emfac2007 Emission | Factors: | V2.3  | Nov   | 1       | 2006 |

|        |         |     |         |        |         |
|--------|---------|-----|---------|--------|---------|
| County | Average | San | Joaquin | County | Average |
|--------|---------|-----|---------|--------|---------|

|       |               |           |              |
|-------|---------------|-----------|--------------|
| Table | 2:00 Starting | Emissions | (grams/trip) |
|-------|---------------|-----------|--------------|

|           |       |         |           |     |          |           |     |
|-----------|-------|---------|-----------|-----|----------|-----------|-----|
| Pollutant | Name: | Methane | Temperatu | 63F | Relative | Humidity: | ALL |
| Time      |       |         |           |     |          |           |     |
| min       | LDA   | LDT     | MDT       | HDT | UBUS     | MCY       | ALL |

|     |       |       |       |       |       |       |       |
|-----|-------|-------|-------|-------|-------|-------|-------|
| 5   | 0.003 | 0.004 | 0.007 | 0.022 | 0.025 | 0.073 | 0.006 |
| 10  | 0.005 | 0.006 | 0.012 | 0.03  | 0.038 | 0.081 | 0.009 |
| 20  | 0.008 | 0.011 | 0.022 | 0.044 | 0.062 | 0.096 | 0.015 |
| 30  | 0.012 | 0.015 | 0.031 | 0.058 | 0.084 | 0.112 | 0.021 |
| 40  | 0.015 | 0.019 | 0.039 | 0.07  | 0.103 | 0.129 | 0.026 |
| 50  | 0.017 | 0.023 | 0.047 | 0.081 | 0.12  | 0.146 | 0.03  |
| 60  | 0.02  | 0.026 | 0.053 | 0.089 | 0.133 | 0.157 | 0.034 |
| 120 | 0.026 | 0.033 | 0.066 | 0.082 | 0.13  | 0.151 | 0.041 |
| 180 | 0.022 | 0.029 | 0.062 | 0.088 | 0.139 | 0.149 | 0.038 |
| 240 | 0.023 | 0.03  | 0.066 | 0.093 | 0.147 | 0.16  | 0.04  |
| 300 | 0.025 | 0.032 | 0.07  | 0.098 | 0.155 | 0.17  | 0.042 |
| 360 | 0.026 | 0.034 | 0.073 | 0.103 | 0.162 | 0.18  | 0.045 |
| 420 | 0.027 | 0.035 | 0.077 | 0.108 | 0.17  | 0.19  | 0.047 |
| 480 | 0.028 | 0.037 | 0.08  | 0.113 | 0.177 | 0.2   | 0.049 |

|     |       |       |       |       |       |       |       |
|-----|-------|-------|-------|-------|-------|-------|-------|
| 540 | 0.029 | 0.038 | 0.084 | 0.118 | 0.184 | 0.209 | 0.051 |
| 600 | 0.031 | 0.04  | 0.087 | 0.122 | 0.19  | 0.219 | 0.053 |
| 660 | 0.032 | 0.041 | 0.09  | 0.127 | 0.197 | 0.228 | 0.055 |
| 720 | 0.033 | 0.043 | 0.094 | 0.131 | 0.203 | 0.237 | 0.057 |

Pollutant Name: Carbon Monoxide Temperature 63F Relative Humidity:

Time

| min | LDA   | LDT   | MDT    | HDT    | UBUS   | MCY    | ALL    |
|-----|-------|-------|--------|--------|--------|--------|--------|
| 5   | 0.487 | 0.701 | 1.34   | 3.93   | 4.744  | 4.069  | 0.991  |
| 10  | 0.912 | 1.286 | 2.485  | 6.109  | 8.262  | 4.565  | 1.727  |
| 20  | 1.72  | 2.399 | 4.657  | 10.21  | 14.862 | 5.535  | 3.124  |
| 30  | 2.474 | 3.436 | 6.673  | 13.966 | 20.882 | 6.474  | 4.421  |
| 40  | 3.174 | 4.396 | 8.532  | 17.378 | 26.322 | 7.381  | 5.617  |
| 50  | 3.819 | 5.28  | 10.235 | 20.445 | 31.182 | 8.256  | 6.712  |
| 60  | 4.41  | 6.087 | 11.781 | 23.167 | 35.463 | 9.1    | 7.706  |
| 120 | 6.299 | 8.402 | 14.367 | 21.13  | 33.325 | 12.248 | 9.617  |
| 180 | 4.899 | 6.7   | 12.442 | 22.342 | 34.686 | 11.104 | 8.196  |
| 240 | 5.228 | 7.143 | 13.208 | 23.507 | 36.035 | 12.522 | 8.715  |
| 300 | 5.526 | 7.545 | 13.911 | 24.626 | 37.372 | 13.804 | 9.191  |
| 360 | 5.794 | 7.908 | 14.549 | 25.697 | 38.697 | 14.951 | 9.625  |
| 420 | 6.031 | 8.23  | 15.124 | 26.721 | 40.011 | 15.963 | 10.017 |
| 480 | 6.237 | 8.513 | 15.634 | 27.698 | 41.313 | 16.84  | 10.366 |
| 540 | 6.412 | 8.755 | 16.081 | 28.628 | 42.604 | 17.582 | 10.673 |
| 600 | 6.556 | 8.958 | 16.464 | 29.511 | 43.883 | 18.188 | 10.937 |
| 660 | 6.67  | 9.12  | 16.782 | 30.347 | 45.15  | 18.66  | 11.158 |
| 720 | 6.753 | 9.242 | 17.037 | 31.136 | 46.405 | 18.996 | 11.338 |

Pollutant Name: Oxides of Nitrogen Temperature 63F Relative

Time

| min | LDA   | LDT   | MDT   | HDT   | UBUS  | MCY   | ALL   |
|-----|-------|-------|-------|-------|-------|-------|-------|
| 5   | 0.167 | 0.279 | 0.805 | 0.448 | 1.074 | 0.188 | 0.35  |
| 10  | 0.187 | 0.312 | 0.912 | 0.666 | 1.612 | 0.224 | 0.405 |
| 20  | 0.223 | 0.371 | 1.102 | 1.05  | 2.557 | 0.287 | 0.503 |
| 30  | 0.254 | 0.42  | 1.261 | 1.363 | 3.327 | 0.34  | 0.584 |
| 40  | 0.278 | 0.46  | 1.387 | 1.606 | 3.923 | 0.382 | 0.648 |
| 50  | 0.296 | 0.489 | 1.48  | 1.777 | 4.343 | 0.413 | 0.696 |
| 60  | 0.308 | 0.509 | 1.542 | 1.877 | 4.589 | 0.434 | 0.726 |
| 120 | 0.326 | 0.541 | 1.633 | 1.901 | 4.647 | 0.44  | 0.763 |
| 180 | 0.334 | 0.553 | 1.643 | 1.894 | 4.63  | 0.435 | 0.772 |



|     |       |       |       |       |       |       |       |
|-----|-------|-------|-------|-------|-------|-------|-------|
| 240 | 0.332 | 0.549 | 1.631 | 1.882 | 4.603 | 0.426 | 0.766 |
| 300 | 0.328 | 0.543 | 1.613 | 1.867 | 4.567 | 0.415 | 0.758 |
| 360 | 0.323 | 0.534 | 1.589 | 1.847 | 4.522 | 0.402 | 0.747 |
| 420 | 0.317 | 0.524 | 1.559 | 1.824 | 4.468 | 0.386 | 0.734 |
| 480 | 0.309 | 0.511 | 1.523 | 1.797 | 4.404 | 0.368 | 0.717 |
| 540 | 0.3   | 0.496 | 1.48  | 1.766 | 4.332 | 0.348 | 0.698 |
| 600 | 0.29  | 0.479 | 1.431 | 1.731 | 4.25  | 0.326 | 0.676 |
| 660 | 0.278 | 0.459 | 1.376 | 1.693 | 4.159 | 0.301 | 0.651 |
| 720 | 0.265 | 0.438 | 1.315 | 1.65  | 4.059 | 0.275 | 0.624 |

Pollutant Name: Carbon Dioxide Temperatu 63F Relative Humidity:

Time

| min | LDA     | LDT     | MDT     | HDT     | UBUS   | MCY    | ALL     |
|-----|---------|---------|---------|---------|--------|--------|---------|
| 5   | 11.425  | 14.145  | 19.179  | 5.739   | 3.782  | 18.542 | 13.512  |
| 10  | 13.309  | 16.519  | 22.95   | 8.387   | 5.458  | 20.926 | 15.982  |
| 20  | 17.502  | 21.786  | 31.159  | 13.628  | 8.775  | 25.592 | 21.387  |
| 30  | 22.263  | 27.743  | 40.259  | 18.794  | 12.043 | 30.12  | 27.412  |
| 40  | 27.593  | 34.391  | 50.251  | 23.884  | 15.262 | 34.509 | 34.057  |
| 50  | 33.491  | 41.729  | 61.134  | 28.9    | 18.433 | 38.761 | 41.323  |
| 60  | 39.957  | 49.758  | 72.908  | 33.84   | 21.556 | 42.874 | 49.209  |
| 120 | 88.622  | 109.737 | 156.954 | 55.399  | 35.193 | 61.601 | 106.329 |
| 180 | 101.041 | 125.117 | 179.505 | 63.933  | 40.544 | 64.817 | 121.337 |
| 240 | 113.324 | 140.318 | 201.68  | 71.964  | 45.58  | 67.845 | 136.122 |
| 300 | 125.471 | 155.339 | 223.48  | 79.492  | 50.3   | 70.685 | 150.685 |
| 360 | 137.482 | 170.181 | 244.904 | 86.517  | 54.704 | 73.338 | 165.025 |
| 420 | 149.358 | 184.844 | 265.953 | 93.038  | 58.793 | 75.803 | 179.143 |
| 480 | 161.098 | 199.327 | 286.626 | 99.055  | 62.567 | 78.08  | 193.039 |
| 540 | 172.703 | 213.632 | 306.923 | 104.57  | 66.024 | 80.17  | 206.712 |
| 600 | 184.172 | 227.757 | 326.844 | 109.581 | 69.167 | 82.071 | 220.162 |
| 660 | 195.505 | 241.703 | 346.39  | 114.089 | 71.993 | 83.785 | 233.39  |
| 720 | 206.702 | 255.469 | 365.561 | 118.093 | 74.504 | 85.311 | 246.395 |

Pollutant Name: Sulfur Dioxide Temperatu 63F Relative Humidity:

Time

| min | LDA | LDT | MDT   | HDT | UBUS | MCY | ALL |
|-----|-----|-----|-------|-----|------|-----|-----|
| 5   | 0   | 0   | 0     | 0   | 0    | 0   | 0   |
| 10  | 0   | 0   | 0     | 0   | 0    | 0   | 0   |
| 20  | 0   | 0   | 0     | 0   | 0    | 0   | 0   |
| 30  | 0   | 0   | 0.001 | 0   | 0    | 0   | 0   |

|     |       |       |       |       |       |       |       |
|-----|-------|-------|-------|-------|-------|-------|-------|
| 40  | 0     | 0     | 0.001 | 0.001 | 0.001 | 0.001 | 0     |
| 50  | 0     | 0     | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| 60  | 0     | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| 120 | 0.001 | 0.001 | 0.002 | 0.001 | 0.001 | 0.001 | 0.001 |
| 180 | 0.001 | 0.001 | 0.002 | 0.001 | 0.001 | 0.001 | 0.001 |
| 240 | 0.001 | 0.001 | 0.002 | 0.001 | 0.001 | 0.001 | 0.001 |
| 300 | 0.001 | 0.002 | 0.002 | 0.001 | 0.001 | 0.001 | 0.002 |
| 360 | 0.001 | 0.002 | 0.003 | 0.001 | 0.001 | 0.001 | 0.002 |
| 420 | 0.002 | 0.002 | 0.003 | 0.001 | 0.001 | 0.001 | 0.002 |
| 480 | 0.002 | 0.002 | 0.003 | 0.001 | 0.001 | 0.001 | 0.002 |
| 540 | 0.002 | 0.002 | 0.003 | 0.001 | 0.001 | 0.001 | 0.002 |
| 600 | 0.002 | 0.002 | 0.003 | 0.002 | 0.001 | 0.001 | 0.002 |
| 660 | 0.002 | 0.002 | 0.004 | 0.002 | 0.001 | 0.001 | 0.002 |
| 720 | 0.002 | 0.003 | 0.004 | 0.002 | 0.002 | 0.001 | 0.003 |

Pollutant Name: PM10 Temperatur 63F Relative Humidity: ALL

| Time<br>min | LDA   | LDT   | MDT   | HDT   | UBUS  | MCY   | ALL   |
|-------------|-------|-------|-------|-------|-------|-------|-------|
| 5           | 0.001 | 0.001 | 0.001 | 0.001 | 0     | 0.01  | 0.001 |
| 10          | 0.001 | 0.003 | 0.002 | 0.001 | 0.001 | 0.009 | 0.002 |
| 20          | 0.003 | 0.005 | 0.004 | 0.001 | 0.001 | 0.007 | 0.004 |
| 30          | 0.004 | 0.007 | 0.006 | 0.002 | 0.002 | 0.006 | 0.005 |
| 40          | 0.005 | 0.009 | 0.008 | 0.002 | 0.002 | 0.004 | 0.007 |
| 50          | 0.006 | 0.011 | 0.01  | 0.003 | 0.002 | 0.004 | 0.008 |
| 60          | 0.007 | 0.013 | 0.011 | 0.003 | 0.003 | 0.003 | 0.009 |
| 120         | 0.011 | 0.021 | 0.017 | 0.004 | 0.004 | 0.007 | 0.015 |
| 180         | 0.012 | 0.023 | 0.019 | 0.005 | 0.004 | 0.011 | 0.016 |
| 240         | 0.013 | 0.025 | 0.02  | 0.005 | 0.004 | 0.014 | 0.017 |
| 300         | 0.014 | 0.026 | 0.021 | 0.005 | 0.004 | 0.017 | 0.018 |
| 360         | 0.015 | 0.028 | 0.022 | 0.005 | 0.004 | 0.02  | 0.019 |
| 420         | 0.015 | 0.029 | 0.023 | 0.005 | 0.004 | 0.022 | 0.02  |
| 480         | 0.016 | 0.03  | 0.024 | 0.006 | 0.004 | 0.024 | 0.021 |
| 540         | 0.016 | 0.031 | 0.024 | 0.006 | 0.005 | 0.025 | 0.021 |
| 600         | 0.017 | 0.031 | 0.025 | 0.006 | 0.005 | 0.026 | 0.022 |
| 660         | 0.017 | 0.032 | 0.025 | 0.006 | 0.005 | 0.027 | 0.022 |
| 720         | 0.017 | 0.032 | 0.026 | 0.006 | 0.005 | 0.027 | 0.022 |

Title : Silva Estates N20 and Ch4  
 Version : Emfac2007 V2.3 Nov 1 2006  
 Run Date : ##### 14:49:38  
 Scen Year: 2015 -- All model years in the  
 Season : Annual  
 Area : San Joaquin

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Year: 2015 -- Model Years 1971 to 2015  
 Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average San Joaquin County Average

Table 4:00 Hot Soak Emissions (grams/trip)

Pollutant Name: Methane Temperature 63F Relative Humidity: ALL

| Time min | LDA | LDT | MDT | HDT | UBUS | MCY | ALL |
|----------|-----|-----|-----|-----|------|-----|-----|
| 5        | 0   | 0   | 0   | 0   | 0    | 0   | 0   |
| 10       | 0   | 0   | 0   | 0   | 0    | 0   | 0   |
| 20       | 0   | 0   | 0   | 0   | 0    | 0   | 0   |
| 30       | 0   | 0   | 0   | 0   | 0    | 0   | 0   |
| 40       | 0   | 0   | 0   | 0   | 0    | 0   | 0   |

Hot soak results are scaled to reflect zero emissions

Title : Silva Estates N20 and Ch4  
 Version : Emfac2007 V2.3 Nov 1 2006  
 Run Date : ##### 14:49:38  
 Scen Year: 2015 -- All model years in the  
 Season : Annual  
 Area : San Joaquin

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Year: 2015 -- Model Years 1971 to 2015  
 Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average San Joaquin County Average

Table 5a: Partial Day Diurnal Loss Emissions (grams/hour)

|           |       |         |           |     |          |           |     |
|-----------|-------|---------|-----------|-----|----------|-----------|-----|
| Pollutant | Name: | Methane | Temperatu | ALL | Relative | Humidity: | ALL |
| Temp      |       |         |           |     |          |           |     |
| degF      | LDA   | LDT     | MDT       | HDT | UBUS     | MCY       | ALL |
|           | 63    | 0       | 0         | 0   | 0        | 0         | 0   |

Title : Silva Estates N20 and Ch4  
 Version : Emfac2007 V2.3 Nov 1 2006  
 Run Date : ##### 14:49:38  
 Scen Year: 2015 -- All model years in the  
 Season : Annual  
 Area : San Joaquin

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Year: 2015 -- Model Years 1971 to 2015  
 Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average San Joaquin County Average

Table 5b: Multi-Day Diurnal Loss Emissions (grams/hour)

|           |       |         |           |     |          |           |     |
|-----------|-------|---------|-----------|-----|----------|-----------|-----|
| Pollutant | Name: | Methane | Temperatu | ALL | Relative | Humidity: | ALL |
| Temp      |       |         |           |     |          |           |     |
| degF      | LDA   | LDT     | MDT       | HDT | UBUS     | MCY       | ALL |
|           | 63    | 0       | 0         | 0   | 0        | 0         | 0   |

Title : Silva Estates N20 and Ch4  
 Version : Emfac2007 V2.3 Nov 1 2006  
 Run Date : ##### 14:49:38  
 Scen Year: 2015 -- All model years in the  
 Season : Annual  
 Area : San Joaquin

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Year: 2015 -- Model Years 1971 to 2015  
 Emfac2007 Emission Factors: V2.3 Nov 1 2006  
  
 County Average San Joaquin County Average  
  
 Table 6a: Partial Day Resting Loss Emissions (grams/hour)  
  
 Pollutant Name: Methane Temperature ALL Relative Humidity: ALL  
  
 Temp  
 degF LDA LDT MDT HDT UBUS MCY ALL  
  
 63 0 0 0 0 0 0 0

Title : Silva Estates N20 and CH4  
 Version : Emfac2007 V2.3 Nov 1 2006  
 Run Date : ##### 14:49:38  
 Scen Year: 2015 -- All model years in the  
 Season : Annual  
 Area : San Joaquin

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Year: 2015 -- Model Years 1971 to 2015  
 Emfac2007 Emission Factors: V2.3 Nov 1 2006  
  
 County Average San Joaquin County Average  
  
 Table 6b: Multi-Day Resting Loss Emissions (grams/hour)  
  
 Pollutant Name: Methane Temperature ALL Relative Humidity: ALL  
  
 Temp  
 degF LDA LDT MDT HDT UBUS MCY ALL  
  
 63 0 0 0 0 0 0 0

Title : Silva Estates N20 and Ch4  
 Version : Emfac2007 V2.3 Nov 1 2006  
 Run Date : ##### 14:49:38  
 Scen Year: 2015 -- All model years in the  
 Season : Annual  
 Area : San Joaquin

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Year: 2015 -- Model Years 1971 to 2015  
 Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average San Joaquin County Average

Table 7:00 Estimated Travel Fractions

Pollutant Name: Temperatu ALL Relative Humidity: ALL

|       | LDA | LDT   | MDT   | HDT   | UBUS  | MCY   | ALL   |   |
|-------|-----|-------|-------|-------|-------|-------|-------|---|
| %VMT  |     | 0.451 | 0.315 | 0.136 | 0.086 | 0.002 | 0.009 | 1 |
| %TRIP |     | 0.427 | 0.291 | 0.206 | 0.066 | 0     | 0.011 | 1 |
| %VEH  |     | 0.468 | 0.321 | 0.137 | 0.037 | 0.001 | 0.037 | 1 |

Title : Silva Estates N20 and Ch4  
 Version : Emfac2007 V2.3 Nov 1 2006  
 Run Date : ##### 14:49:38  
 Scen Year: 2015 -- All model years in the  
 Season : Annual  
 Area : San Joaquin

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Year: 2015 -- Model Years 1971 to 2015  
 Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average San Joaquin County Average

Table 8:00 Evaporative Running Loss Emissions (grams/minute)

Pollutant Name: Methane Temperatu 63F Relative Humidity: ALL

| Time min | LDA | LDT | MDT | HDT | UBUS | MCY | ALL |
|----------|-----|-----|-----|-----|------|-----|-----|
|----------|-----|-----|-----|-----|------|-----|-----|

|    |   |   |   |   |   |   |   |
|----|---|---|---|---|---|---|---|
| 1  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5  | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 55 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

range                    1971 to                    2015 selected

\*\*\*\*\*

Inclusive    --                    Annual

30%

Humidity:                    30%

30%



30%

Relative Humidity: 30%

Relative Humidity: 30%

Humidity: 30%

Humidity: 30%

range 1971 to 2015 selected

\*\*\*\*\*

Inclusive -- Annual

ALL

Humidity: ALL

ALL

ALL

range 1971 to 2015 selected

\*\*\*\*\*

Inclusive -- Annual

for trip lengths of less than 5 minutes (about

range 1971 to 2015 selected

\*\*\*\*\*

Inclusive -- Annual

ir)

range            1971 to            2015 selected

\*\*\*\*\*

Inclusive    --            Annual

range            1971 to            2015 selected

\*\*\*\*\*

Inclusive -- Annual

ir)

range 1971 to 2015 selected

\*\*\*\*\*

Inclusive -- Annual

range            1971 to            2015 selected

\*\*\*\*\*

Inclusive    --            Annual

range            1971 to            2015 selected

\*\*\*\*\*

Inclusive    --            Annual



25% of in-use trips).

Title : Silva Estates (CH4 and N2O)

Version : Emfac2007 V2.3 Nov 1 2006

Run Date : 2009/09/23 14:23:17

Scen Year: 2015 -- All model years in the range 1971 to 2015 selected

Season : Annual

Area : San Joaquin

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Year: 2015 -- Model Years 1971 to 2015 Inclusive --  
Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average

San Joaquin

Table 1: Running Exhaust Emissions (grams/mile)

Pollutant Name: Methane

Temperature: 63F

Relative Humidity: 30%

| Speed<br>MPH | LDA<br>NCAT | LDA<br>CAT | LDA<br>DSL | LDA<br>ALL | LDT1<br>NCAT | LDT1<br>CAT | LDT1<br>DSL | LDT1<br>ALL |
|--------------|-------------|------------|------------|------------|--------------|-------------|-------------|-------------|
| 35           | 0.307       | 0.014      | 0.005      | 0.014      | 0.316        | 0.017       | 0.003       | 0.018       |

Pollutant Name: Carbon Monoxide

Temperature: 63F

Relative Humidity: 30%

| Speed<br>MPH | LDA<br>NCAT | LDA<br>CAT | LDA<br>DSL | LDA<br>ALL | LDT1<br>NCAT | LDT1<br>CAT | LDT1<br>DSL | LDT1<br>ALL |
|--------------|-------------|------------|------------|------------|--------------|-------------|-------------|-------------|
| 35           | 52.263      | 1.376      | 0.547      | 1.434      | 54.203       | 1.879       | 0.466       | 2.051       |

Pollutant Name: Oxides of Nitrogen

Temperature: 63F

Relative Humidity: 30%

| Speed<br>MPH | LDA<br>NCAT | LDA<br>CAT | LDA<br>DSL | LDA<br>ALL | LDT1<br>NCAT | LDT1<br>CAT | LDT1<br>DSL | LDT1<br>ALL |
|--------------|-------------|------------|------------|------------|--------------|-------------|-------------|-------------|
| 35           | 4.697       | 0.129      | 1.218      | 0.136      | 4.708        | 0.18        | 1.224       | 0.234       |

Pollutant Name: Carbon Dioxide

Temperature: 63F

Relative Humidity: 30%

| Speed<br>MPH | LDA<br>NCAT | LDA<br>CAT | LDA<br>DSL | LDA<br>ALL | LDT1<br>NCAT | LDT1<br>CAT | LDT1<br>DSL | LDT1<br>ALL |
|--------------|-------------|------------|------------|------------|--------------|-------------|-------------|-------------|
| 35           | 427.432     | 306.034    | 354.583    | 306.223    | 428.357      | 383.832     | 346.636     | 382.771     |

Pollutant Name: Sulfur Dioxide

Temperature: 63F

Relative Humidity: 30%

|       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Speed | LDA   | LDA   | LDA   | LDA   | LDT1  | LDT1  | LDT1  | LDT1  |
| MPH   | NCAT  | CAT   | DSL   | ALL   | NCAT  | CAT   | DSL   | ALL   |
| 35    | 0.005 | 0.003 | 0.003 | 0.003 | 0.005 | 0.004 | 0.003 | 0.004 |

Pollutant Name: PM10                      Temperature: 63F                      Relative Humidity: 30%

|       |       |      |       |      |       |       |       |       |
|-------|-------|------|-------|------|-------|-------|-------|-------|
| Speed | LDA   | LDA  | LDA   | LDA  | LDT1  | LDT1  | LDT1  | LDT1  |
| MPH   | NCAT  | CAT  | DSL   | ALL  | NCAT  | CAT   | DSL   | ALL   |
| 35    | 0.027 | 0.01 | 0.085 | 0.01 | 0.026 | 0.011 | 0.044 | 0.012 |

Pollutant Name: PM10 - Tire Wear                      Temperature: 63F                      Relative Humidity: 30%

|       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Speed | LDA   | LDA   | LDA   | LDA   | LDT1  | LDT1  | LDT1  | LDT1  |
| MPH   | NCAT  | CAT   | DSL   | ALL   | NCAT  | CAT   | DSL   | ALL   |
| 35    | 0.008 | 0.008 | 0.008 | 0.008 | 0.008 | 0.008 | 0.008 | 0.008 |

Pollutant Name: PM10 - Brake Wear                      Temperature: 63F                      Relative Humidity: 30%

|       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Speed | LDA   | LDA   | LDA   | LDA   | LDT1  | LDT1  | LDT1  | LDT1  |
| MPH   | NCAT  | CAT   | DSL   | ALL   | NCAT  | CAT   | DSL   | ALL   |
| 35    | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 |

Pollutant Name: Gasoline - mi/gal                      Temperature: 63F                      Relative Humidity: 30%

|       |        |        |     |        |        |        |      |        |
|-------|--------|--------|-----|--------|--------|--------|------|--------|
| Speed | LDA    | LDA    | LDA | LDA    | LDT1   | LDT1   | LDT1 | LDT1   |
| MPH   | NCAT   | CAT    | DSL | ALL    | NCAT   | CAT    | DSL  | ALL    |
| 35    | 16.846 | 28.742 | 0   | 28.728 | 16.695 | 22.901 | 0    | 22.875 |

Pollutant Name: Diesel - mi/gal                      Temperature: 63F                      Relative Humidity: 30%

|       |      |     |        |        |      |      |        |        |
|-------|------|-----|--------|--------|------|------|--------|--------|
| Speed | LDA  | LDA | LDA    | LDA    | LDT1 | LDT1 | LDT1   | LDT1   |
| MPH   | NCAT | CAT | DSL    | ALL    | NCAT | CAT  | DSL    | ALL    |
| 35    | 0    | 0   | 28.427 | 28.427 | 0    | 0    | 29.079 | 29.079 |

Title : Silva Estates (CH4 and N2O)

Version : Emfac2007 V2.3 Nov 1 2006

Run Date : 2009/09/23 14:23:17

Scen Year: 2015 -- All model years in the range 1971 to 2015 selected

Season : Annual

Area : San Joaquin

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Year: 2015 -- Model Years 1971 to 2015 Inclusive --

Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average

San Joaquin

Table 2: Starting Emissions (grams/trip)

Pollutant Name: Methane

Temperature: 63F

Relative Humidity: ALL

| Time<br>min | LDA<br>NCAT | LDA<br>CAT | LDA<br>DSL | LDA<br>ALL | LDT1<br>NCAT | LDT1<br>CAT | LDT1<br>DSL | LDT1<br>ALL |
|-------------|-------------|------------|------------|------------|--------------|-------------|-------------|-------------|
| 5           | 0.283       | 0.002      | 0          | 0.003      | 0.292        | 0.002       | 0           | 0.004       |
| 10          | 0.281       | 0.004      | 0          | 0.005      | 0.29         | 0.005       | 0           | 0.006       |
| 20          | 0.283       | 0.008      | 0          | 0.008      | 0.292        | 0.009       | 0           | 0.01        |
| 30          | 0.296       | 0.011      | 0          | 0.012      | 0.306        | 0.012       | 0           | 0.014       |
| 40          | 0.319       | 0.014      | 0          | 0.015      | 0.329        | 0.016       | 0           | 0.017       |
| 50          | 0.352       | 0.017      | 0          | 0.017      | 0.363        | 0.019       | 0           | 0.02        |
| 60          | 0.366       | 0.019      | 0          | 0.02       | 0.377        | 0.021       | 0           | 0.022       |
| 120         | 0.313       | 0.025      | 0          | 0.026      | 0.323        | 0.028       | 0           | 0.028       |
| 180         | 0.34        | 0.021      | 0          | 0.022      | 0.351        | 0.024       | 0           | 0.025       |
| 240         | 0.368       | 0.023      | 0          | 0.023      | 0.38         | 0.025       | 0           | 0.026       |
| 300         | 0.396       | 0.024      | 0          | 0.025      | 0.408        | 0.027       | 0           | 0.028       |
| 360         | 0.423       | 0.025      | 0          | 0.026      | 0.437        | 0.028       | 0           | 0.029       |
| 420         | 0.451       | 0.026      | 0          | 0.027      | 0.466        | 0.029       | 0           | 0.031       |
| 480         | 0.479       | 0.027      | 0          | 0.028      | 0.494        | 0.031       | 0           | 0.032       |
| 540         | 0.506       | 0.029      | 0          | 0.029      | 0.523        | 0.032       | 0           | 0.033       |
| 600         | 0.534       | 0.03       | 0          | 0.031      | 0.551        | 0.033       | 0           | 0.035       |
| 660         | 0.562       | 0.031      | 0          | 0.032      | 0.58         | 0.034       | 0           | 0.036       |
| 720         | 0.589       | 0.032      | 0          | 0.033      | 0.609        | 0.036       | 0           | 0.037       |

Pollutant Name: Carbon Monoxide

Temperature: 63F

Relative Humidity: ALL

| Time<br>min | LDA<br>NCAT | LDA<br>CAT | LDA<br>DSL | LDA<br>ALL | LDT1<br>NCAT | LDT1<br>CAT | LDT1<br>DSL | LDT1<br>ALL |
|-------------|-------------|------------|------------|------------|--------------|-------------|-------------|-------------|
|-------------|-------------|------------|------------|------------|--------------|-------------|-------------|-------------|

|     |        |       |   |       |        |       |   |       |
|-----|--------|-------|---|-------|--------|-------|---|-------|
| 5   | 23.726 | 0.445 | 0 | 0.487 | 24.669 | 0.579 | 0 | 0.69  |
| 10  | 21.01  | 0.876 | 0 | 0.912 | 21.845 | 1.139 | 0 | 1.207 |
| 20  | 16.218 | 1.696 | 0 | 1.72  | 16.863 | 2.202 | 0 | 2.192 |
| 30  | 12.281 | 2.459 | 0 | 2.474 | 12.769 | 3.19  | 0 | 3.109 |
| 40  | 9.198  | 3.167 | 0 | 3.174 | 9.564  | 4.102 | 0 | 3.959 |
| 50  | 6.969  | 3.818 | 0 | 3.819 | 7.247  | 4.938 | 0 | 4.742 |
| 60  | 5.595  | 4.414 | 0 | 4.41  | 5.817  | 5.698 | 0 | 5.457 |
| 120 | 17.289 | 6.288 | 0 | 6.299 | 17.976 | 7.69  | 0 | 7.422 |
| 180 | 27.318 | 4.864 | 0 | 4.899 | 28.404 | 6.148 | 0 | 6.013 |
| 240 | 36.284 | 5.178 | 0 | 5.228 | 37.726 | 6.522 | 0 | 6.421 |
| 300 | 44.187 | 5.463 | 0 | 5.526 | 45.944 | 6.864 | 0 | 6.793 |
| 360 | 51.027 | 5.718 | 0 | 5.794 | 53.056 | 7.174 | 0 | 7.128 |
| 420 | 56.805 | 5.945 | 0 | 6.031 | 59.063 | 7.451 | 0 | 7.426 |
| 480 | 61.519 | 6.143 | 0 | 6.237 | 63.965 | 7.697 | 0 | 7.687 |
| 540 | 65.171 | 6.313 | 0 | 6.412 | 67.761 | 7.91  | 0 | 7.912 |
| 600 | 67.759 | 6.453 | 0 | 6.556 | 70.453 | 8.091 | 0 | 8.099 |
| 660 | 69.285 | 6.564 | 0 | 6.67  | 72.039 | 8.24  | 0 | 8.25  |
| 720 | 69.748 | 6.646 | 0 | 6.753 | 72.521 | 8.356 | 0 | 8.364 |

Pollutant Name: Oxides of Nitrogen

Temperature: 63F

Relative Humidity: ALL

| Time<br>min | LDA<br>NCAT | LDA<br>CAT | LDA<br>DSL | LDA<br>ALL | LDT1<br>NCAT | LDT1<br>CAT | LDT1<br>DSL | LDT1<br>ALL |       |
|-------------|-------------|------------|------------|------------|--------------|-------------|-------------|-------------|-------|
| 5           | 1.144       | 0.165      |            | 0          | 0.167        | 1.148       | 0.189       | 0           | 0.186 |
| 10          | 1.244       | 0.186      |            | 0          | 0.187        | 1.248       | 0.211       | 0           | 0.208 |
| 20          | 1.425       | 0.222      |            | 0          | 0.223        | 1.43        | 0.252       | 0           | 0.248 |
| 30          | 1.582       | 0.252      |            | 0          | 0.254        | 1.587       | 0.285       | 0           | 0.281 |
| 40          | 1.715       | 0.276      |            | 0          | 0.278        | 1.721       | 0.312       | 0           | 0.307 |
| 50          | 1.823       | 0.293      |            | 0          | 0.296        | 1.829       | 0.333       | 0           | 0.327 |
| 60          | 1.908       | 0.305      |            | 0          | 0.308        | 1.914       | 0.346       | 0           | 0.34  |
| 120         | 1.944       | 0.324      |            | 0          | 0.326        | 1.951       | 0.368       | 0           | 0.361 |
| 180         | 1.898       | 0.332      |            | 0          | 0.334        | 1.904       | 0.376       | 0           | 0.369 |
| 240         | 1.836       | 0.329      |            | 0          | 0.332        | 1.843       | 0.373       | 0           | 0.366 |
| 300         | 1.76        | 0.326      |            | 0          | 0.328        | 1.766       | 0.369       | 0           | 0.362 |
| 360         | 1.668       | 0.321      |            | 0          | 0.323        | 1.674       | 0.364       | 0           | 0.356 |
| 420         | 1.562       | 0.315      |            | 0          | 0.317        | 1.567       | 0.357       | 0           | 0.348 |
| 480         | 1.44        | 0.307      |            | 0          | 0.309        | 1.445       | 0.348       | 0           | 0.34  |
| 540         | 1.303       | 0.299      |            | 0          | 0.3          | 1.308       | 0.338       | 0           | 0.329 |
| 600         | 1.152       | 0.288      |            | 0          | 0.29         | 1.156       | 0.327       | 0           | 0.318 |
| 660         | 0.985       | 0.277      |            | 0          | 0.278        | 0.988       | 0.314       | 0           | 0.304 |
| 720         | 0.803       | 0.265      |            | 0          | 0.265        | 0.806       | 0.299       | 0           | 0.29  |

Pollutant Name: Carbon Dioxide

Temperature: 63F

Relative Humidity: ALL

| Time<br>min | LDA<br>NCAT | LDA<br>CAT | LDA<br>DSL | LDA<br>ALL | LDT1<br>NCAT | LDT1<br>CAT | LDT1<br>DSL | LDT1<br>ALL |         |
|-------------|-------------|------------|------------|------------|--------------|-------------|-------------|-------------|---------|
| 5           | 111.902     | 11.256     |            | 0          | 11.425       | 112.142     | 13.995      | 0           | 13.955  |
| 10          | 121.432     | 13.128     |            | 0          | 13.309       | 121.692     | 16.367      | 0           | 16.267  |
| 20          | 139.927     | 17.3       |            | 0          | 17.502       | 140.227     | 21.642      | 0           | 21.393  |
| 30          | 157.671     | 22.044     |            | 0          | 22.263       | 158.009     | 27.624      | 0           | 27.188  |
| 40          | 174.663     | 27.36      |            | 0          | 27.593       | 175.038     | 34.311      | 0           | 33.651  |
| 50          | 190.904     | 33.247     |            | 0          | 33.491       | 191.313     | 41.706      | 0           | 40.782  |
| 60          | 206.393     | 39.705     |            | 0          | 39.957       | 206.835     | 49.807      | 0           | 48.582  |
| 120         | 279.289     | 88.393     |            | 0          | 88.622       | 279.888     | 110.551     | 0           | 106.825 |
| 180         | 279.509     | 100.851    |            | 0          | 101.041      | 280.108     | 126.176     | 0           | 121.702 |
| 240         | 279.728     | 113.173    |            | 0          | 113.324      | 280.328     | 141.62      | 0           | 136.407 |
| 300         | 279.948     | 125.359    |            | 0          | 125.471      | 280.548     | 156.884     | 0           | 150.94  |
| 360         | 280.167     | 137.409    |            | 0          | 137.482      | 280.768     | 171.969     | 0           | 165.303 |
| 420         | 280.387     | 149.322    |            | 0          | 149.358      | 280.988     | 186.873     | 0           | 179.494 |
| 480         | 280.606     | 161.1      |            | 0          | 161.098      | 281.208     | 201.597     | 0           | 193.513 |
| 540         | 280.826     | 172.741    |            | 0          | 172.703      | 281.428     | 216.141     | 0           | 207.361 |
| 600         | 281.045     | 184.247    |            | 0          | 184.172      | 281.648     | 230.505     | 0           | 221.038 |
| 660         | 281.265     | 195.616    |            | 0          | 195.505      | 281.868     | 244.689     | 0           | 234.543 |
| 720         | 281.484     | 206.849    |            | 0          | 206.702      | 282.088     | 258.693     | 0           | 247.876 |

Pollutant Name: Sulfur Dioxide

Temperature: 63F

Relative Humidity: ALL

| Time<br>min | LDA<br>NCAT | LDA<br>CAT | LDA<br>DSL | LDA<br>ALL | LDT1<br>NCAT | LDT1<br>CAT | LDT1<br>DSL | LDT1<br>ALL |
|-------------|-------------|------------|------------|------------|--------------|-------------|-------------|-------------|
| 5           | 0.002       |            | 0          | 0          | 0            | 0.002       | 0           | 0           |
| 10          | 0.002       |            | 0          | 0          | 0            | 0.002       | 0           | 0           |
| 20          | 0.002       |            | 0          | 0          | 0            | 0.002       | 0           | 0           |
| 30          | 0.002       |            | 0          | 0          | 0            | 0.002       | 0           | 0           |
| 40          | 0.002       |            | 0          | 0          | 0            | 0.002       | 0           | 0           |
| 50          | 0.002       |            | 0          | 0          | 0            | 0.002       | 0           | 0           |
| 60          | 0.002       |            | 0          | 0          | 0            | 0.002       | 0.001       | 0           |
| 120         | 0.003       | 0.001      |            | 0          | 0.001        | 0.003       | 0.001       | 0           |
| 180         | 0.003       | 0.001      |            | 0          | 0.001        | 0.003       | 0.001       | 0           |
| 240         | 0.003       | 0.001      |            | 0          | 0.001        | 0.003       | 0.001       | 0           |
| 300         | 0.004       | 0.001      |            | 0          | 0.001        | 0.004       | 0.002       | 0           |
| 360         | 0.004       | 0.001      |            | 0          | 0.001        | 0.004       | 0.002       | 0           |
| 420         | 0.004       | 0.002      |            | 0          | 0.002        | 0.004       | 0.002       | 0           |
| 480         | 0.004       | 0.002      |            | 0          | 0.002        | 0.004       | 0.002       | 0           |
| 540         | 0.004       | 0.002      |            | 0          | 0.002        | 0.004       | 0.002       | 0           |
| 600         | 0.004       | 0.002      |            | 0          | 0.002        | 0.004       | 0.002       | 0           |
| 660         | 0.004       | 0.002      |            | 0          | 0.002        | 0.004       | 0.002       | 0           |
| 720         | 0.004       | 0.002      |            | 0          | 0.002        | 0.004       | 0.003       | 0           |

Pollutant Name: PM10

Temperature: 63F

Relative Humidity: ALL

| Time<br>min | LDA<br>NCAT | LDA<br>CAT | LDA<br>DSL | LDA<br>ALL | LDT1<br>NCAT | LDT1<br>CAT | LDT1<br>DSL | LDT1<br>ALL |
|-------------|-------------|------------|------------|------------|--------------|-------------|-------------|-------------|
| 5           | 0.011       | 0.001      | 0          | 0.001      | 0.011        | 0.001       | 0           | 0.001       |
| 10          | 0.01        | 0.001      | 0          | 0.001      | 0.01         | 0.002       | 0           | 0.002       |
| 20          | 0.008       | 0.003      | 0          | 0.003      | 0.008        | 0.003       | 0           | 0.003       |
| 30          | 0.006       | 0.004      | 0          | 0.004      | 0.006        | 0.004       | 0           | 0.004       |
| 40          | 0.004       | 0.005      | 0          | 0.005      | 0.004        | 0.006       | 0           | 0.005       |
| 50          | 0.003       | 0.006      | 0          | 0.006      | 0.003        | 0.007       | 0           | 0.006       |
| 60          | 0.003       | 0.007      | 0          | 0.007      | 0.003        | 0.008       | 0           | 0.008       |
| 120         | 0.007       | 0.011      | 0          | 0.011      | 0.007        | 0.012       | 0           | 0.012       |
| 180         | 0.011       | 0.012      | 0          | 0.012      | 0.011        | 0.014       | 0           | 0.013       |
| 240         | 0.015       | 0.013      | 0          | 0.013      | 0.015        | 0.015       | 0           | 0.014       |
| 300         | 0.018       | 0.014      | 0          | 0.014      | 0.018        | 0.015       | 0           | 0.015       |
| 360         | 0.021       | 0.015      | 0          | 0.015      | 0.021        | 0.016       | 0           | 0.016       |
| 420         | 0.023       | 0.015      | 0          | 0.015      | 0.023        | 0.017       | 0           | 0.016       |
| 480         | 0.025       | 0.016      | 0          | 0.016      | 0.025        | 0.018       | 0           | 0.017       |
| 540         | 0.027       | 0.016      | 0          | 0.016      | 0.026        | 0.018       | 0           | 0.017       |
| 600         | 0.028       | 0.017      | 0          | 0.017      | 0.027        | 0.018       | 0           | 0.018       |
| 660         | 0.029       | 0.017      | 0          | 0.017      | 0.028        | 0.019       | 0           | 0.018       |
| 720         | 0.029       | 0.017      | 0          | 0.017      | 0.028        | 0.019       | 0           | 0.018       |

Title : Silva Estates (CH4 and N20)

Version : Emfac2007 V2.3 Nov 1 2006

Run Date : 2009/09/23 14:23:17

Scen Year: 2015 -- All model years in the range 1971 to 2015 selected

Season : Annual

Area : San Joaquin

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Year: 2015 -- Model Years 1971 to 2015 Inclusive --

Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average

San Joaquin

Table 4: Hot Soak Emissions (grams/trip)

Pollutant Name: Methane

Temperature: 63F

Relative Humidity: ALL

| Time<br>min | LDA<br>NCAT | LDA<br>CAT | LDA<br>DSL | LDA<br>ALL | LDT1<br>NCAT | LDT1<br>CAT | LDT1<br>DSL | LDT1<br>ALL |
|-------------|-------------|------------|------------|------------|--------------|-------------|-------------|-------------|
| 5           | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |
| 10          | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |
| 20          | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |
| 30          | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |
| 40          | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |

Hot soak results are scaled to reflect zero emissions for trip lengths of less than 5 minutes (about 25% c

Title : Silva Estates (CH4 and N20)

Version : Emfac2007 V2.3 Nov 1 2006

Run Date : 2009/09/23 14:23:17

Scen Year: 2015 -- All model years in the range 1971 to 2015 selected

Season : Annual

Area : San Joaquin

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Year: 2015 -- Model Years 1971 to 2015 Inclusive --  
Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average

San Joaquin

Table 5a: Partial Day Diurnal Loss Emissions (grams/hour

Pollutant Name: Methane

Temperature: ALL

Relative Humidity: ALL

| Temp<br>degF | LDA<br>NCAT | LDA<br>CAT | LDA<br>DSL | LDA<br>ALL | LDT1<br>NCAT | LDT1<br>CAT | LDT1<br>DSL | LDT1<br>ALL |
|--------------|-------------|------------|------------|------------|--------------|-------------|-------------|-------------|
| 63           | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |

Title : Silva Estates (CH4 and N20)

Version : Emfac2007 V2.3 Nov 1 2006

Run Date : 2009/09/23 14:23:17

Scen Year: 2015 -- All model years in the range 1971 to 2015 selected

Season : Annual



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## San Joaquin

Relative Humidity: ALL

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San Joaquin

Relative Humidity: ALL

| Temp<br>degF | LDA<br>NCAT | LDA<br>CAT | LDA<br>DSL | LDA<br>ALL | LDT1<br>NCAT | LDT1<br>CAT | LDT1<br>DSL | LDT1<br>ALL |
|--------------|-------------|------------|------------|------------|--------------|-------------|-------------|-------------|
| 63           | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |

Title : Silva Estates (CH4 and N20)

Version : Emfac2007 V2.3 Nov 1 2006

Run Date : 2009/09/23 14:23:17

Scen Year: 2015 -- All model years in the range 1971 to 2015 selected

Season : Annual

Area : San Joaquin

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Year: 2015 -- Model Years 1971 to 2015 Inclusive --  
Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average

San Joaquin

Table 6b: Multi-Day Resting Loss Emissions (grams/hour)

Pollutant Name: Methane

Temperature: ALL

Relative Humidity: ALL

| Temp<br>degF | LDA<br>NCAT | LDA<br>CAT | LDA<br>DSL | LDA<br>ALL | LDT1<br>NCAT | LDT1<br>CAT | LDT1<br>DSL | LDT1<br>ALL |
|--------------|-------------|------------|------------|------------|--------------|-------------|-------------|-------------|
| 63           | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |

Title : Silva Estates (CH4 and N20)

Version : Emfac2007 V2.3 Nov 1 2006

Run Date : 2009/09/23 14:23:17

Scen Year: 2015 -- All model years in the range 1971 to 2015 selected

Season : Annual

Area : San Joaquin

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Year: 2015 -- Model Years 1971 to 2015 Inclusive --  
Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average

San Joaquin

Table 7: Estimated Travel Fractions

Pollutant Name:

Temperature: ALL

Relative Humidity: ALL

|       | LDA<br>NCAT | LDA<br>CAT | LDA<br>DSL | LDA<br>ALL | LDT1<br>NCAT | LDT1<br>CAT | LDT1<br>DSL | LDT1<br>ALL |
|-------|-------------|------------|------------|------------|--------------|-------------|-------------|-------------|
| %VMT  | 0.001       | 0.45       | 0          | 0.451      | 0            | 0.11        | 0.004       | 0.114       |
| %TRIP | 0.001       | 0.426      | 0.001      | 0.427      | 0.001        | 0.1         | 0.004       | 0.105       |

|      |       |       |       |       |       |       |       |       |
|------|-------|-------|-------|-------|-------|-------|-------|-------|
| %VEH | 0.001 | 0.466 | 0.001 | 0.468 | 0.001 | 0.111 | 0.005 | 0.117 |
|------|-------|-------|-------|-------|-------|-------|-------|-------|

Title : Silva Estates (CH4 and N2O)

Version : Emfac2007 V2.3 Nov 1 2006

Run Date : 2009/09/23 14:23:17

Scen Year: 2015 -- All model years in the range 1971 to 2015 selected

Season : Annual

Area : San Joaquin

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Year: 2015 -- Model Years 1971 to 2015 Inclusive --  
 Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average

San Joaquin

Table 8: Evaporative Running Loss Emissions (grams/mir

Pollutant Name: Methane

Temperature: 63F

Relative Humidity: ALL

| Time<br>min | LDA<br>NCAT | LDA<br>CAT | LDA<br>DSL | LDA<br>ALL | LDT1<br>NCAT | LDT1<br>CAT | LDT1<br>DSL | LDT1<br>ALL |
|-------------|-------------|------------|------------|------------|--------------|-------------|-------------|-------------|
| 1           | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |
| 2           | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |
| 3           | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |
| 4           | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |
| 5           | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |
| 10          | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |
| 15          | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |
| 20          | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |
| 25          | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |
| 30          | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |
| 35          | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |
| 40          | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |
| 45          | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |
| 50          | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |
| 55          | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |
| 60          | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0           |

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Annual

County Average

| LDT2<br>NCAT | LDT2<br>CAT | LDT2<br>DSL | LDT2<br>ALL | MDV<br>NCAT | MDV<br>CAT | MDV<br>DSL | MDV<br>ALL | LHD1<br>NCAT |
|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|--------------|
| 0.312        | 0.021       | 0.005       | 0.021       | 0.378       | 0.027      | 0.003      | 0.028      | 0.214        |

| LDT2<br>NCAT | LDT2<br>CAT | LDT2<br>DSL | LDT2<br>ALL | MDV<br>NCAT | MDV<br>CAT | MDV<br>DSL | MDV<br>ALL | LHD1<br>NCAT |
|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|--------------|
| 52.996       | 2.154       | 0.569       | 2.241       | 98.963      | 2.38       | 0.439      | 2.65       | 68.647       |

| LDT2<br>NCAT | LDT2<br>CAT | LDT2<br>DSL | LDT2<br>ALL | MDV<br>NCAT | MDV<br>CAT | MDV<br>DSL | MDV<br>ALL | LHD1<br>NCAT |
|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|--------------|
| 4.636        | 0.288       | 1.179       | 0.296       | 7.975       | 0.355      | 1.242      | 0.378      | 2.269        |

| LDT2<br>NCAT | LDT2<br>CAT | LDT2<br>DSL | LDT2<br>ALL | MDV<br>NCAT | MDV<br>CAT | MDV<br>DSL | MDV<br>ALL | LHD1<br>NCAT |
|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|--------------|
| 428.835      | 386.663     | 352.549     | 386.699     | 547.91      | 527.856    | 346.943    | 527.556    | 497.421      |

|              |             |             |             |             |            |            |            |              |
|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|--------------|
| LDT2<br>NCAT | LDT2<br>CAT | LDT2<br>DSL | LDT2<br>ALL | MDV<br>NCAT | MDV<br>CAT | MDV<br>DSL | MDV<br>ALL | LHD1<br>NCAT |
| 0.005        | 0.004       | 0.003       | 0.004       | 0.007       | 0.005      | 0.003      | 0.005      | 0.006        |

|              |             |             |             |             |            |            |            |              |
|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|--------------|
| LDT2<br>NCAT | LDT2<br>CAT | LDT2<br>DSL | LDT2<br>ALL | MDV<br>NCAT | MDV<br>CAT | MDV<br>DSL | MDV<br>ALL | LHD1<br>NCAT |
| 0.027        | 0.024       | 0.08        | 0.024       | 0.028       | 0.023      | 0.039      | 0.023      | 0.015        |

|              |             |             |             |             |            |            |            |              |
|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|--------------|
| LDT2<br>NCAT | LDT2<br>CAT | LDT2<br>DSL | LDT2<br>ALL | MDV<br>NCAT | MDV<br>CAT | MDV<br>DSL | MDV<br>ALL | LHD1<br>NCAT |
| 0.008        | 0.008       | 0.008       | 0.008       | 0.008       | 0.008      | 0.008      | 0.008      | 0.012        |

|              |             |             |             |             |            |            |            |              |
|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|--------------|
| LDT2<br>NCAT | LDT2<br>CAT | LDT2<br>DSL | LDT2<br>ALL | MDV<br>NCAT | MDV<br>CAT | MDV<br>DSL | MDV<br>ALL | LHD1<br>NCAT |
| 0.013        | 0.013       | 0.013       | 0.013       | 0.013       | 0.013      | 0.013      | 0.013      | 0.013        |

|              |             |             |             |             |            |            |            |              |
|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|--------------|
| LDT2<br>NCAT | LDT2<br>CAT | LDT2<br>DSL | LDT2<br>ALL | MDV<br>NCAT | MDV<br>CAT | MDV<br>DSL | MDV<br>ALL | LHD1<br>NCAT |
| 16.75        | 22.708      | 0           | 22.698      | 12.209      | 16.662     | 0          | 16.649     | 14.43        |

|              |             |             |             |             |            |            |            |              |
|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|--------------|
| LDT2<br>NCAT | LDT2<br>CAT | LDT2<br>DSL | LDT2<br>ALL | MDV<br>NCAT | MDV<br>CAT | MDV<br>DSL | MDV<br>ALL | LHD1<br>NCAT |
| 0            | 0           | 28.591      | 28.591      | 0           | 0          | 29.053     | 29.053     | 0            |

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Annual

County Average

| LDT2<br>NCAT | LDT2<br>CAT | LDT2<br>DSL | LDT2<br>ALL | MDV<br>NCAT | MDV<br>CAT | MDV<br>DSL | MDV<br>ALL | LHD1<br>NCAT |
|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|--------------|
| 0.282        | 0.003       | 0           | 0.004       | 0.363       | 0.004      | 0          | 0.005      | 0.435        |
| 0.279        | 0.006       | 0           | 0.006       | 0.359       | 0.007      | 0          | 0.008      | 0.431        |
| 0.282        | 0.011       | 0           | 0.011       | 0.363       | 0.013      | 0          | 0.015      | 0.435        |
| 0.295        | 0.015       | 0           | 0.016       | 0.379       | 0.019      | 0          | 0.02       | 0.455        |
| 0.317        | 0.02        | 0           | 0.02        | 0.408       | 0.025      | 0          | 0.026      | 0.49         |
| 0.35         | 0.023       | 0           | 0.024       | 0.45        | 0.029      | 0          | 0.031      | 0.54         |
| 0.364        | 0.027       | 0           | 0.027       | 0.468       | 0.034      | 0          | 0.035      | 0.562        |
| 0.311        | 0.035       | 0           | 0.036       | 0.4         | 0.046      | 0          | 0.047      | 0.48         |
| 0.339        | 0.03        | 0           | 0.031       | 0.436       | 0.039      | 0          | 0.04       | 0.523        |
| 0.366        | 0.032       | 0           | 0.033       | 0.471       | 0.041      | 0          | 0.043      | 0.565        |
| 0.394        | 0.034       | 0           | 0.034       | 0.507       | 0.044      | 0          | 0.045      | 0.608        |
| 0.421        | 0.035       | 0           | 0.036       | 0.542       | 0.046      | 0          | 0.048      | 0.65         |
| 0.449        | 0.037       | 0           | 0.038       | 0.578       | 0.048      | 0          | 0.05       | 0.693        |
| 0.476        | 0.039       | 0           | 0.04        | 0.613       | 0.05       | 0          | 0.052      | 0.735        |
| 0.504        | 0.04        | 0           | 0.041       | 0.649       | 0.053      | 0          | 0.054      | 0.778        |
| 0.532        | 0.042       | 0           | 0.043       | 0.684       | 0.055      | 0          | 0.057      | 0.82         |
| 0.559        | 0.043       | 0           | 0.045       | 0.72        | 0.057      | 0          | 0.059      | 0.863        |
| 0.587        | 0.045       | 0           | 0.046       | 0.755       | 0.059      | 0          | 0.061      | 0.905        |

| LDT2<br>NCAT | LDT2<br>CAT | LDT2<br>DSL | LDT2<br>ALL | MDV<br>NCAT | MDV<br>CAT | MDV<br>DSL | MDV<br>ALL | LHD1<br>NCAT |
|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|--------------|
|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|--------------|

|        |       |   |       |         |        |   |        |         |
|--------|-------|---|-------|---------|--------|---|--------|---------|
| 24.172 | 0.653 | 0 | 0.708 | 48.749  | 0.749  | 0 | 0.904  | 40.669  |
| 21.405 | 1.286 | 0 | 1.331 | 43.168  | 1.473  | 0 | 1.607  | 36.014  |
| 16.524 | 2.488 | 0 | 2.517 | 33.324  | 2.85   | 0 | 2.944  | 27.8    |
| 12.512 | 3.606 | 0 | 3.622 | 25.234  | 4.131  | 0 | 4.191  | 21.051  |
| 9.371  | 4.64  | 0 | 4.645 | 18.899  | 5.315  | 0 | 5.347  | 15.767  |
| 7.101  | 5.59  | 0 | 5.586 | 14.32   | 6.403  | 0 | 6.414  | 11.947  |
| 5.7    | 6.457 | 0 | 6.446 | 11.496  | 7.394  | 0 | 7.39   | 9.591   |
| 17.614 | 8.953 | 0 | 8.961 | 35.523  | 10.289 | 0 | 10.348 | 29.636  |
| 27.832 | 7.053 | 0 | 7.092 | 56.13   | 8.053  | 0 | 8.192  | 46.827  |
| 36.967 | 7.495 | 0 | 7.554 | 74.552  | 8.556  | 0 | 8.753  | 62.196  |
| 45.019 | 7.898 | 0 | 7.974 | 90.791  | 9.014  | 0 | 9.261  | 75.743  |
| 51.988 | 8.261 | 0 | 8.352 | 104.845 | 9.428  | 0 | 9.719  | 87.468  |
| 57.874 | 8.585 | 0 | 8.689 | 116.716 | 9.797  | 0 | 10.125 | 97.371  |
| 62.677 | 8.869 | 0 | 8.983 | 126.403 | 10.121 | 0 | 10.479 | 105.452 |
| 66.398 | 9.114 | 0 | 9.236 | 133.906 | 10.4   | 0 | 10.781 | 111.712 |
| 69.035 | 9.32  | 0 | 9.447 | 139.224 | 10.635 | 0 | 11.032 | 116.149 |
| 70.589 | 9.486 | 0 | 9.616 | 142.359 | 10.826 | 0 | 11.232 | 118.764 |
| 71.061 | 9.612 | 0 | 9.743 | 143.31  | 10.971 | 0 | 11.38  | 119.558 |

| LDT2<br>NCAT | LDT2<br>CAT | LDT2<br>DSL | LDT2<br>ALL | MDV<br>NCAT | MDV<br>CAT | MDV<br>DSL | MDV<br>ALL | LHD1<br>NCAT |
|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|--------------|
| 1.135        | 0.331       | 0           | 0.332       | 1.956       | 0.396      | 0          | 0.4        | 0.546        |
| 1.234        | 0.37        | 0           | 0.372       | 2.126       | 0.44       | 0          | 0.445      | 0.594        |
| 1.413        | 0.44        | 0           | 0.442       | 2.435       | 0.518      | 0          | 0.523      | 0.68         |
| 1.569        | 0.498       | 0           | 0.5         | 2.703       | 0.583      | 0          | 0.589      | 0.755        |
| 1.7          | 0.545       | 0           | 0.547       | 2.93        | 0.636      | 0          | 0.642      | 0.818        |
| 1.808        | 0.58        | 0           | 0.582       | 3.115       | 0.675      | 0          | 0.682      | 0.87         |
| 1.892        | 0.603       | 0           | 0.605       | 3.259       | 0.702      | 0          | 0.709      | 0.91         |
| 1.928        | 0.641       | 0           | 0.643       | 3.322       | 0.748      | 0          | 0.755      | 0.928        |
| 1.882        | 0.656       | 0           | 0.658       | 3.242       | 0.766      | 0          | 0.772      | 0.906        |
| 1.821        | 0.651       | 0           | 0.653       | 3.137       | 0.76       | 0          | 0.766      | 0.876        |
| 1.745        | 0.644       | 0           | 0.646       | 3.007       | 0.752      | 0          | 0.757      | 0.84         |
| 1.654        | 0.635       | 0           | 0.636       | 2.85        | 0.74       | 0          | 0.745      | 0.796        |
| 1.548        | 0.622       | 0           | 0.623       | 2.668       | 0.726      | 0          | 0.73       | 0.745        |
| 1.428        | 0.607       | 0           | 0.608       | 2.46        | 0.708      | 0          | 0.712      | 0.687        |
| 1.292        | 0.59        | 0           | 0.591       | 2.227       | 0.687      | 0          | 0.69       | 0.622        |
| 1.142        | 0.57        | 0           | 0.57        | 1.968       | 0.663      | 0          | 0.666      | 0.55         |
| 0.977        | 0.547       | 0           | 0.547       | 1.683       | 0.636      | 0          | 0.638      | 0.47         |
| 0.796        | 0.522       | 0           | 0.522       | 1.372       | 0.606      | 0          | 0.607      | 0.383        |

| LDT2<br>NCAT | LDT2<br>CAT | LDT2<br>DSL | LDT2<br>ALL | MDV<br>NCAT | MDV<br>CAT | MDV<br>DSL | MDV<br>ALL | LHD1<br>NCAT |
|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|--------------|
| 112.266      | 14.043      | 0           | 14.254      | 143.511     | 19.083     | 0          | 19.447     | 170.667      |
| 121.827      | 16.439      | 0           | 16.663      | 155.733     | 22.398     | 0          | 22.783     | 185.2        |
| 140.382      | 21.762      | 0           | 22.01       | 179.453     | 29.744     | 0          | 30.166     | 213.408      |
| 158.184      | 27.793      | 0           | 28.059      | 202.208     | 38.047     | 0          | 38.497     | 240.47       |
| 175.231      | 34.531      | 0           | 34.812      | 224         | 47.306     | 0          | 47.776     | 266.386      |
| 191.525      | 41.977      | 0           | 42.268      | 244.829     | 57.522     | 0          | 58.003     | 291.155      |
| 207.064      | 50.13       | 0           | 50.428      | 264.693     | 68.694     | 0          | 69.178     | 314.778      |
| 280.198      | 111.155     | 0           | 111.396     | 358.181     | 151.891    | 0          | 152.216    | 425.955      |
| 280.418      | 126.88      | 0           | 127.062     | 358.462     | 173.435    | 0          | 173.641    | 426.29       |
| 280.638      | 142.42      | 0           | 142.545     | 358.744     | 194.714    | 0          | 194.801    | 426.625      |
| 280.859      | 157.776     | 0           | 157.844     | 359.025     | 215.728    | 0          | 215.699    | 426.96       |
| 281.079      | 172.947     | 0           | 172.959     | 359.307     | 236.477    | 0          | 236.333    | 427.294      |
| 281.299      | 187.934     | 0           | 187.891     | 359.588     | 256.962    | 0          | 256.705    | 427.629      |
| 281.519      | 202.737     | 0           | 202.639     | 359.87      | 277.182    | 0          | 276.813    | 427.964      |
| 281.739      | 217.355     | 0           | 217.203     | 360.151     | 297.138    | 0          | 296.657    | 428.299      |
| 281.96       | 231.789     | 0           | 231.583     | 360.433     | 316.828    | 0          | 316.239    | 428.633      |
| 282.18       | 246.038     | 0           | 245.78      | 360.714     | 336.254    | 0          | 335.557    | 428.968      |
| 282.4        | 260.103     | 0           | 259.793     | 360.996     | 355.415    | 0          | 354.612    | 429.303      |

| LDT2<br>NCAT | LDT2<br>CAT | LDT2<br>DSL | LDT2<br>ALL | MDV<br>NCAT | MDV<br>CAT | MDV<br>DSL | MDV<br>ALL | LHD1<br>NCAT |
|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|--------------|
| 0.002        | 0           | 0           | 0           | 0.002       | 0          | 0          | 0          | 0.002        |
| 0.002        | 0           | 0           | 0           | 0.002       | 0          | 0          | 0          | 0.003        |
| 0.002        | 0           | 0           | 0           | 0.002       | 0          | 0          | 0          | 0.003        |
| 0.002        | 0           | 0           | 0           | 0.002       | 0          | 0          | 0          | 0.003        |
| 0.002        | 0           | 0           | 0           | 0.003       | 0.001      | 0          | 0.001      | 0.003        |
| 0.002        | 0           | 0           | 0.001       | 0.003       | 0.001      | 0          | 0.001      | 0.003        |
| 0.002        | 0.001       | 0           | 0.001       | 0.003       | 0.001      | 0          | 0.001      | 0.003        |
| 0.003        | 0.001       | 0           | 0.001       | 0.004       | 0.002      | 0          | 0.002      | 0.005        |
| 0.003        | 0.001       | 0           | 0.001       | 0.004       | 0.002      | 0          | 0.002      | 0.005        |
| 0.003        | 0.001       | 0           | 0.001       | 0.005       | 0.002      | 0          | 0.002      | 0.005        |
| 0.004        | 0.002       | 0           | 0.002       | 0.005       | 0.002      | 0          | 0.002      | 0.006        |
| 0.004        | 0.002       | 0           | 0.002       | 0.005       | 0.002      | 0          | 0.002      | 0.006        |
| 0.004        | 0.002       | 0           | 0.002       | 0.005       | 0.003      | 0          | 0.003      | 0.006        |
| 0.004        | 0.002       | 0           | 0.002       | 0.006       | 0.003      | 0          | 0.003      | 0.006        |
| 0.004        | 0.002       | 0           | 0.002       | 0.006       | 0.003      | 0          | 0.003      | 0.006        |
| 0.004        | 0.002       | 0           | 0.002       | 0.006       | 0.003      | 0          | 0.003      | 0.006        |
| 0.004        | 0.003       | 0           | 0.003       | 0.006       | 0.003      | 0          | 0.003      | 0.006        |
| 0.004        | 0.003       | 0           | 0.003       | 0.006       | 0.004      | 0          | 0.004      | 0.006        |



| LDT2<br>NCAT | LDT2<br>CAT | LDT2<br>DSL | LDT2<br>ALL | MDV<br>NCAT | MDV<br>CAT | MDV<br>DSL | MDV<br>ALL | LHD1<br>NCAT |
|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|--------------|
| 0.011        | 0.002       | 0           | 0.002       | 0.012       | 0.002      | 0          | 0.002      | 0.011        |
| 0.01         | 0.003       | 0           | 0.003       | 0.01        | 0.003      | 0          | 0.003      | 0.01         |
| 0.008        | 0.006       | 0           | 0.006       | 0.008       | 0.006      | 0          | 0.006      | 0.008        |
| 0.006        | 0.009       | 0           | 0.009       | 0.006       | 0.009      | 0          | 0.009      | 0.006        |
| 0.004        | 0.012       | 0           | 0.012       | 0.004       | 0.011      | 0          | 0.011      | 0.004        |
| 0.003        | 0.014       | 0           | 0.014       | 0.003       | 0.014      | 0          | 0.014      | 0.003        |
| 0.003        | 0.017       | 0           | 0.017       | 0.003       | 0.016      | 0          | 0.016      | 0.003        |
| 0.007        | 0.026       | 0           | 0.026       | 0.007       | 0.025      | 0          | 0.025      | 0.007        |
| 0.011        | 0.028       | 0           | 0.028       | 0.012       | 0.027      | 0          | 0.027      | 0.011        |
| 0.015        | 0.031       | 0           | 0.031       | 0.015       | 0.03       | 0          | 0.029      | 0.015        |
| 0.019        | 0.033       | 0           | 0.033       | 0.019       | 0.031      | 0          | 0.031      | 0.018        |
| 0.021        | 0.034       | 0           | 0.034       | 0.022       | 0.033      | 0          | 0.033      | 0.021        |
| 0.024        | 0.036       | 0           | 0.036       | 0.024       | 0.034      | 0          | 0.034      | 0.023        |
| 0.026        | 0.037       | 0           | 0.037       | 0.026       | 0.036      | 0          | 0.036      | 0.025        |
| 0.027        | 0.038       | 0           | 0.038       | 0.028       | 0.037      | 0          | 0.037      | 0.027        |
| 0.028        | 0.039       | 0           | 0.039       | 0.029       | 0.037      | 0          | 0.037      | 0.028        |
| 0.029        | 0.039       | 0           | 0.039       | 0.03        | 0.038      | 0          | 0.038      | 0.029        |
| 0.029        | 0.04        | 0           | 0.04        | 0.03        | 0.038      | 0          | 0.038      | 0.029        |

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Annual

County Average





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Annual

County Average

| LDT2<br>NCAT | LDT2<br>CAT | LDT2<br>DSL | LDT2<br>ALL | MDV<br>NCAT | MDV<br>CAT | MDV<br>DSL | MDV<br>ALL | LHD1<br>NCAT |   |
|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|--------------|---|
|              | 0           | 0           | 0           | 0           | 0          | 0          | 0          | 0            | 0 |

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Annual

County Average

| LDT2<br>NCAT | LDT2<br>CAT | LDT2<br>DSL | LDT2<br>ALL | MDV<br>NCAT | MDV<br>CAT | MDV<br>DSL | MDV<br>ALL | LHD1<br>NCAT |   |
|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|--------------|---|
|              | 0           | 0.201       | 0           | 0.201       | 0          | 0.107      | 0          | 0.108        | 0 |
|              | 0           | 0.184       | 0           | 0.185       | 0          | 0.1        | 0          | 0.1          | 0 |

[illegible]

|             |             |             |              |             |             |             |             |            |
|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|------------|
| LHD1<br>CAT | LHD1<br>DSL | LHD1<br>ALL | LHD2<br>NCAT | LHD2<br>CAT | LHD2<br>DSL | LHD2<br>ALL | MHD<br>NCAT | MHD<br>CAT |
| 0.015       | 0.006       | 0.013       | 0.214        | 0.016       | 0.008       | 0.012       | 0.268       | 0.033      |

|             |             |             |              |             |             |             |             |            |
|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|------------|
| LHD1<br>CAT | LHD1<br>DSL | LHD1<br>ALL | LHD2<br>NCAT | LHD2<br>CAT | LHD2<br>DSL | LHD2<br>ALL | MHD<br>NCAT | MHD<br>CAT |
| 1.264       | 0.684       | 1.211       | 68.647       | 1.204       | 0.703       | 1.013       | 102.971     | 3.542      |

|             |             |             |              |             |             |             |             |            |
|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|------------|
| LHD1<br>CAT | LHD1<br>DSL | LHD1<br>ALL | LHD2<br>NCAT | LHD2<br>CAT | LHD2<br>DSL | LHD2<br>ALL | MHD<br>NCAT | MHD<br>CAT |
| 0.456       | 3.044       | 1.095       | 2.269        | 0.481       | 3.421       | 1.958       | 3.404       | 1.334      |

|             |             |             |              |             |             |             |             |            |
|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|------------|
| LHD1<br>CAT | LHD1<br>DSL | LHD1<br>ALL | LHD2<br>NCAT | LHD2<br>CAT | LHD2<br>DSL | LHD2<br>ALL | MHD<br>NCAT | MHD<br>CAT |
| 497.421     | 519.921     | 502.948     | 497.421      | 497.421     | 526.363     | 511.946     | 497.421     | 497.421    |

|             |             |             |              |             |             |             |             |            |
|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|------------|
| LHD1<br>CAT | LHD1<br>DSL | LHD1<br>ALL | LHD2<br>NCAT | LHD2<br>CAT | LHD2<br>DSL | LHD2<br>ALL | MHD<br>NCAT | MHD<br>CAT |
| 0.005       | 0.005       | 0.005       | 0.006        | 0.005       | 0.005       | 0.005       | 0.006       | 0.005      |

|             |             |             |              |             |             |             |             |            |
|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|------------|
| LHD1<br>CAT | LHD1<br>DSL | LHD1<br>ALL | LHD2<br>NCAT | LHD2<br>CAT | LHD2<br>DSL | LHD2<br>ALL | MHD<br>NCAT | MHD<br>CAT |
| 0.006       | 0.033       | 0.013       | 0.015        | 0.006       | 0.037       | 0.022       | 0.015       | 0.008      |

|             |             |             |              |             |             |             |             |            |
|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|------------|
| LHD1<br>CAT | LHD1<br>DSL | LHD1<br>ALL | LHD2<br>NCAT | LHD2<br>CAT | LHD2<br>DSL | LHD2<br>ALL | MHD<br>NCAT | MHD<br>CAT |
| 0.012       | 0.012       | 0.012       | 0.012        | 0.012       | 0.012       | 0.012       | 0.012       | 0.012      |

|             |             |             |              |             |             |             |             |            |
|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|------------|
| LHD1<br>CAT | LHD1<br>DSL | LHD1<br>ALL | LHD2<br>NCAT | LHD2<br>CAT | LHD2<br>DSL | LHD2<br>ALL | MHD<br>NCAT | MHD<br>CAT |
| 0.013       | 0.013       | 0.013       | 0.013        | 0.013       | 0.013       | 0.013       | 0.013       | 0.013      |

|             |             |             |              |             |             |             |             |            |
|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|------------|
| LHD1<br>CAT | LHD1<br>DSL | LHD1<br>ALL | LHD2<br>NCAT | LHD2<br>CAT | LHD2<br>DSL | LHD2<br>ALL | MHD<br>NCAT | MHD<br>CAT |
| 17.732      | 0           | 17.726      | 14.43        | 17.737      | 0           | 17.731      | 13.178      | 17.591     |

|             |             |             |              |             |             |             |             |            |
|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|------------|
| LHD1<br>CAT | LHD1<br>DSL | LHD1<br>ALL | LHD2<br>NCAT | LHD2<br>CAT | LHD2<br>DSL | LHD2<br>ALL | MHD<br>NCAT | MHD<br>CAT |
| 0           | 19.387      | 19.387      | 0            | 0           | 19.15       | 19.15       | 0           | 0          |

| LHD1<br>CAT | LHD1<br>DSL | LHD1<br>ALL | LHD2<br>NCAT | LHD2<br>CAT | LHD2<br>DSL | LHD2<br>ALL | MHD<br>NCAT | MHD<br>CAT |
|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|------------|
| 0.009       |             | 0           | 0.009        | 0.435       | 0.009       | 0           | 0.008       | 0.652      |
| 0.017       |             | 0           | 0.016        | 0.431       | 0.019       | 0           | 0.014       | 0.647      |
| 0.032       |             | 0           | 0.03         | 0.435       | 0.035       | 0           | 0.026       | 0.653      |
| 0.046       |             | 0           | 0.042        | 0.455       | 0.051       | 0           | 0.037       | 0.682      |
| 0.059       |             | 0           | 0.054        | 0.49        | 0.064       | 0           | 0.047       | 0.735      |
| 0.07        |             | 0           | 0.064        | 0.54        | 0.076       | 0           | 0.055       | 0.81       |
| 0.08        |             | 0           | 0.072        | 0.562       | 0.087       | 0           | 0.063       | 0.842      |
| 0.097       |             | 0           | 0.087        | 0.48        | 0.102       | 0           | 0.073       | 0.72       |
| 0.095       |             | 0           | 0.086        | 0.523       | 0.102       | 0           | 0.073       | 0.784      |
| 0.101       |             | 0           | 0.091        | 0.565       | 0.108       | 0           | 0.077       | 0.848      |
| 0.106       |             | 0           | 0.096        | 0.608       | 0.113       | 0           | 0.082       | 0.912      |
| 0.112       |             | 0           | 0.101        | 0.65        | 0.119       | 0           | 0.086       | 0.975      |
| 0.117       |             | 0           | 0.106        | 0.693       | 0.125       | 0           | 0.09        | 1.039      |
| 0.123       |             | 0           | 0.111        | 0.735       | 0.13        | 0           | 0.094       | 1.103      |
| 0.128       |             | 0           | 0.115        | 0.778       | 0.135       | 0           | 0.098       | 1.167      |
| 0.133       |             | 0           | 0.12         | 0.82        | 0.141       | 0           | 0.101       | 1.231      |
| 0.138       |             | 0           | 0.124        | 0.863       | 0.146       | 0           | 0.105       | 1.294      |
| 0.142       |             | 0           | 0.129        | 0.905       | 0.151       | 0           | 0.109       | 1.358      |

| LHD1<br>CAT | LHD1<br>DSL | LHD1<br>ALL | LHD2<br>NCAT | LHD2<br>CAT | LHD2<br>DSL | LHD2<br>ALL | MHD<br>NCAT | MHD<br>CAT |
|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|------------|
|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|------------|



|        |   |        |         |        |   |        |         |        |
|--------|---|--------|---------|--------|---|--------|---------|--------|
| 1.909  | 0 | 1.811  | 40.669  | 2.008  | 0 | 1.526  | 61.004  | 7.755  |
| 3.753  | 0 | 3.429  | 36.014  | 3.946  | 0 | 2.88   | 54.02   | 15.196 |
| 7.245  | 0 | 6.495  | 27.8    | 7.612  | 0 | 5.443  | 41.701  | 29.131 |
| 10.477 | 0 | 9.335  | 21.051  | 10.997 | 0 | 7.812  | 31.577  | 41.805 |
| 13.449 | 0 | 11.949 | 15.767  | 14.102 | 0 | 9.987  | 23.65   | 53.22  |
| 16.16  | 0 | 14.337 | 11.947  | 16.925 | 0 | 11.968 | 17.92   | 63.373 |
| 18.61  | 0 | 16.499 | 9.591   | 19.468 | 0 | 13.755 | 14.386  | 72.267 |
| 21.192 | 0 | 18.844 | 29.636  | 21.926 | 0 | 15.542 | 44.453  | 62.981 |
| 19.083 | 0 | 17.028 | 46.827  | 20.061 | 0 | 14.273 | 70.24   | 64.822 |
| 20.165 | 0 | 18.032 | 62.196  | 21.13  | 0 | 15.068 | 93.293  | 66.724 |
| 21.163 | 0 | 18.956 | 75.743  | 22.123 | 0 | 15.805 | 113.614 | 68.687 |
| 22.077 | 0 | 19.799 | 87.468  | 23.041 | 0 | 16.484 | 131.202 | 70.71  |
| 22.906 | 0 | 20.562 | 97.371  | 23.884 | 0 | 17.105 | 146.057 | 72.794 |
| 23.65  | 0 | 21.245 | 105.452 | 24.652 | 0 | 17.668 | 158.178 | 74.938 |
| 24.311 | 0 | 21.848 | 111.712 | 25.344 | 0 | 18.173 | 167.567 | 77.143 |
| 24.886 | 0 | 22.371 | 116.149 | 25.962 | 0 | 18.62  | 174.223 | 79.409 |
| 25.378 | 0 | 22.814 | 118.764 | 26.504 | 0 | 19.01  | 178.146 | 81.736 |
| 25.784 | 0 | 23.176 | 119.558 | 26.971 | 0 | 19.341 | 179.336 | 84.123 |

| LHD1<br>CAT | LHD1<br>DSL | LHD1<br>ALL | LHD2<br>NCAT | LHD2<br>CAT | LHD2<br>DSL | LHD2<br>ALL | MHD<br>NCAT | MHD<br>CAT |
|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|------------|
| 1.407       | 0           | 1.247       | 0.546        | 1.353       | 0           | 0.955       | 0.819       | 1.297      |
| 1.595       | 0           | 1.413       | 0.594        | 1.595       | 0           | 1.127       | 0.891       | 1.954      |
| 1.928       | 0           | 1.708       | 0.68         | 2.024       | 0           | 1.429       | 1.02        | 3.109      |
| 2.204       | 0           | 1.953       | 0.755        | 2.378       | 0           | 1.679       | 1.132       | 4.049      |
| 2.425       | 0           | 2.148       | 0.818        | 2.657       | 0           | 1.876       | 1.227       | 4.776      |
| 2.589       | 0           | 2.294       | 0.87         | 2.861       | 0           | 2.02        | 1.305       | 5.289      |
| 2.696       | 0           | 2.389       | 0.91         | 2.99        | 0           | 2.111       | 1.366       | 5.589      |
| 2.856       | 0           | 2.53        | 0.928        | 3.134       | 0           | 2.213       | 1.392       | 5.66       |
| 2.86        | 0           | 2.534       | 0.906        | 3.134       | 0           | 2.213       | 1.358       | 5.64       |
| 2.84        | 0           | 2.516       | 0.876        | 3.114       | 0           | 2.198       | 1.314       | 5.608      |
| 2.81        | 0           | 2.489       | 0.84         | 3.083       | 0           | 2.176       | 1.26        | 5.565      |
| 2.768       | 0           | 2.452       | 0.796        | 3.041       | 0           | 2.147       | 1.194       | 5.511      |
| 2.716       | 0           | 2.406       | 0.745        | 2.989       | 0           | 2.11        | 1.118       | 5.447      |
| 2.653       | 0           | 2.35        | 0.687        | 2.926       | 0           | 2.065       | 1.031       | 5.371      |
| 2.58        | 0           | 2.285       | 0.622        | 2.853       | 0           | 2.013       | 0.933       | 5.284      |
| 2.495       | 0           | 2.21        | 0.55         | 2.769       | 0           | 1.954       | 0.824       | 5.187      |
| 2.4         | 0           | 2.126       | 0.47         | 2.675       | 0           | 1.888       | 0.705       | 5.078      |
| 2.294       | 0           | 2.032       | 0.383        | 2.57        | 0           | 1.813       | 0.575       | 4.958      |

| LHD1<br>CAT | LHD1<br>DSL | LHD1<br>ALL | LHD2<br>NCAT | LHD2<br>CAT | LHD2<br>DSL | LHD2<br>ALL | MHD<br>NCAT | MHD<br>CAT |         |
|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|------------|---------|
| 21.902      |             | 0           | 19.892       | 170.667     | 20.65       | 0           | 15.021      | 170.667    | 9.546   |
| 26.699      |             | 0           | 24.181       | 185.2       | 25.923      | 0           | 18.779      | 185.2      | 19.039  |
| 37.051      |             | 0           | 33.427       | 213.408     | 37.133      | 0           | 26.76       | 213.408    | 37.866  |
| 48.413      |             | 0           | 43.563       | 240.47      | 49.23       | 0           | 35.364      | 240.47     | 56.482  |
| 60.785      |             | 0           | 54.59        | 266.386     | 62.214      | 0           | 44.589      | 266.386    | 74.887  |
| 74.168      |             | 0           | 66.508       | 291.155     | 76.084      | 0           | 54.437      | 291.155    | 93.081  |
| 88.562      |             | 0           | 79.317       | 314.778     | 90.841      | 0           | 64.907      | 314.778    | 111.063 |
| 188.637     |             | 0           | 168.216      | 425.955     | 188.663     | 0           | 134.19      | 425.955    | 188.899 |
| 216.34      |             | 0           | 192.735      | 426.29      | 217.032     | 0           | 154.197     | 426.29     | 223.17  |
| 243.5       |             | 0           | 216.773      | 426.625     | 244.707     | 0           | 173.714     | 426.625    | 255.419 |
| 270.116     |             | 0           | 240.33       | 426.96      | 271.689     | 0           | 192.743     | 426.96     | 285.644 |
| 296.189     |             | 0           | 263.406      | 427.294     | 297.978     | 0           | 211.283     | 427.294    | 313.847 |
| 321.719     |             | 0           | 286.001      | 427.629     | 323.574     | 0           | 229.333     | 427.629    | 340.027 |
| 346.705     |             | 0           | 308.115      | 427.964     | 348.476     | 0           | 246.895     | 427.964    | 364.184 |
| 371.148     |             | 0           | 329.749      | 428.299     | 372.685     | 0           | 263.969     | 428.299    | 386.319 |
| 395.048     |             | 0           | 350.901      | 428.633     | 396.201     | 0           | 280.553     | 428.633    | 406.43  |
| 418.404     |             | 0           | 371.572      | 428.968     | 419.023     | 0           | 296.648     | 428.968    | 424.519 |
| 441.217     |             | 0           | 391.763      | 429.303     | 441.153     | 0           | 312.255     | 429.303    | 440.586 |

| LHD1  | LHD1 | LHD1  | LHD2  | LHD2  | LHD2 | LHD2  | MHD   | MHD   |
|-------|------|-------|-------|-------|------|-------|-------|-------|
| CAT   | DSL  | ALL   | NCAT  | CAT   | DSL  | ALL   | NCAT  | CAT   |
| 0     | 0    | 0     | 0.002 | 0     | 0    | 0     | 0.003 | 0     |
| 0     | 0    | 0     | 0.003 | 0     | 0    | 0     | 0.003 | 0     |
| 0     | 0    | 0     | 0.003 | 0     | 0    | 0     | 0.003 | 0.001 |
| 0.001 | 0    | 0.001 | 0.003 | 0.001 | 0    | 0     | 0.003 | 0.001 |
| 0.001 | 0    | 0.001 | 0.003 | 0.001 | 0    | 0.001 | 0.003 | 0.002 |
| 0.001 | 0    | 0.001 | 0.003 | 0.001 | 0    | 0.001 | 0.003 | 0.002 |
| 0.001 | 0    | 0.001 | 0.003 | 0.001 | 0    | 0.001 | 0.004 | 0.002 |
| 0.002 | 0    | 0.002 | 0.005 | 0.002 | 0    | 0.002 | 0.005 | 0.003 |
| 0.002 | 0    | 0.002 | 0.005 | 0.002 | 0    | 0.002 | 0.005 | 0.003 |
| 0.003 | 0    | 0.002 | 0.005 | 0.003 | 0    | 0.002 | 0.006 | 0.004 |
| 0.003 | 0    | 0.003 | 0.006 | 0.003 | 0    | 0.002 | 0.006 | 0.004 |
| 0.003 | 0    | 0.003 | 0.006 | 0.003 | 0    | 0.002 | 0.007 | 0.004 |
| 0.003 | 0    | 0.003 | 0.006 | 0.004 | 0    | 0.003 | 0.007 | 0.005 |
| 0.004 | 0    | 0.003 | 0.006 | 0.004 | 0    | 0.003 | 0.007 | 0.005 |
| 0.004 | 0    | 0.004 | 0.006 | 0.004 | 0    | 0.003 | 0.007 | 0.005 |
| 0.004 | 0    | 0.004 | 0.006 | 0.004 | 0    | 0.003 | 0.007 | 0.005 |
| 0.004 | 0    | 0.004 | 0.006 | 0.005 | 0    | 0.003 | 0.007 | 0.005 |
| 0.005 | 0    | 0.004 | 0.006 | 0.005 | 0    | 0.003 | 0.007 | 0.006 |

| LHD1<br>CAT | LHD1<br>DSL | LHD1<br>ALL | LHD2<br>NCAT | LHD2<br>CAT | LHD2<br>DSL | LHD2<br>ALL | MHD<br>NCAT | MHD<br>CAT |       |
|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|------------|-------|
| 0.001       |             | 0           | 0.001        | 0.011       | 0.001       | 0           | 0.001       | 0.011      | 0.001 |
| 0.001       |             | 0           | 0.001        | 0.01        | 0.002       | 0           | 0.001       | 0.01       | 0.002 |
| 0.003       |             | 0           | 0.003        | 0.008       | 0.003       | 0           | 0.002       | 0.008      | 0.005 |
| 0.004       |             | 0           | 0.004        | 0.006       | 0.005       | 0           | 0.003       | 0.006      | 0.007 |
| 0.005       |             | 0           | 0.005        | 0.004       | 0.006       | 0           | 0.004       | 0.004      | 0.009 |
| 0.006       |             | 0           | 0.006        | 0.003       | 0.007       | 0           | 0.005       | 0.003      | 0.01  |
| 0.007       |             | 0           | 0.007        | 0.003       | 0.008       | 0           | 0.006       | 0.003      | 0.012 |
| 0.011       |             | 0           | 0.01         | 0.007       | 0.012       | 0           | 0.008       | 0.007      | 0.016 |
| 0.012       |             | 0           | 0.01         | 0.011       | 0.012       | 0           | 0.009       | 0.011      | 0.016 |
| 0.013       |             | 0           | 0.011        | 0.015       | 0.013       | 0           | 0.009       | 0.015      | 0.017 |
| 0.013       |             | 0           | 0.012        | 0.018       | 0.014       | 0           | 0.01        | 0.018      | 0.017 |
| 0.014       |             | 0           | 0.012        | 0.021       | 0.014       | 0           | 0.01        | 0.021      | 0.018 |
| 0.014       |             | 0           | 0.013        | 0.023       | 0.015       | 0           | 0.01        | 0.023      | 0.018 |
| 0.015       |             | 0           | 0.013        | 0.025       | 0.015       | 0           | 0.011       | 0.025      | 0.019 |
| 0.015       |             | 0           | 0.013        | 0.027       | 0.015       | 0           | 0.011       | 0.027      | 0.019 |
| 0.016       |             | 0           | 0.014        | 0.028       | 0.016       | 0           | 0.011       | 0.028      | 0.02  |
| 0.016       |             | 0           | 0.014        | 0.029       | 0.016       | 0           | 0.011       | 0.029      | 0.021 |
| 0.016       |             | 0           | 0.014        | 0.029       | 0.016       | 0           | 0.012       | 0.029      | 0.021 |



|      |      |      |      |      |      |      |      |     |
|------|------|------|------|------|------|------|------|-----|
| LHD1 | LHD1 | LHD1 | LHD2 | LHD2 | LHD2 | LHD2 | MHD  | MHD |
| CAT  | DSL  | ALL  | NCAT | CAT  | DSL  | ALL  | NCAT | CAT |
| 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0   |

|      |      |      |      |      |      |      |      |     |
|------|------|------|------|------|------|------|------|-----|
| LHD1 | LHD1 | LHD1 | LHD2 | LHD2 | LHD2 | LHD2 | MHD  | MHD |
| CAT  | DSL  | ALL  | NCAT | CAT  | DSL  | ALL  | NCAT | CAT |
|      | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0   |

| LHD1<br>CAT | LHD1<br>DSL | LHD1<br>ALL | LHD2<br>NCAT | LHD2<br>CAT | LHD2<br>DSL | LHD2<br>ALL | MHD<br>NCAT | MHD<br>CAT |   |
|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|------------|---|
|             | 0           | 0           | 0            | 0           | 0           | 0           | 0           | 0          | 0 |

| LHD1<br>CAT | LHD1<br>DSL | LHD1<br>ALL | LHD2<br>NCAT | LHD2<br>CAT | LHD2<br>DSL | LHD2<br>ALL | MHD<br>NCAT | MHD<br>CAT |       |
|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|------------|-------|
| 0.017       | 0.005       | 0.022       |              | 0           | 0.003       | 0.003       | 0.007       | 0          | 0.003 |
| 0.075       | 0.009       | 0.085       |              | 0           | 0.015       | 0.006       | 0.021       | 0.001      | 0.013 |



|            |            |             |            |            |            |              |             |             |
|------------|------------|-------------|------------|------------|------------|--------------|-------------|-------------|
| MHD<br>DSL | MHD<br>ALL | HHD<br>NCAT | HHD<br>CAT | HHD<br>DSL | HHD<br>ALL | OBUS<br>NCAT | OBUS<br>CAT | OBUS<br>DSL |
| 0.008      | 0.012      | 0.63        | 0.155      | 0.029      | 0.031      | 0.268        | 0.08        | 0.006       |

|            |            |             |            |            |            |              |             |             |
|------------|------------|-------------|------------|------------|------------|--------------|-------------|-------------|
| MHD<br>DSL | MHD<br>ALL | HHD<br>NCAT | HHD<br>CAT | HHD<br>DSL | HHD<br>ALL | OBUS<br>NCAT | OBUS<br>CAT | OBUS<br>DSL |
| 1.506      | 2.068      | 474.99      | 30.5       | 3.054      | 3.445      | 102.971      | 8.389       | 1.205       |

|            |            |             |            |            |            |              |             |             |
|------------|------------|-------------|------------|------------|------------|--------------|-------------|-------------|
| MHD<br>DSL | MHD<br>ALL | HHD<br>NCAT | HHD<br>CAT | HHD<br>DSL | HHD<br>ALL | OBUS<br>NCAT | OBUS<br>CAT | OBUS<br>DSL |
| 4.536      | 4.045      | 23.572      | 8.79       | 10.049     | 10.033     | 3.404        | 3.899       | 3.187       |

|            |            |             |            |            |            |              |             |             |
|------------|------------|-------------|------------|------------|------------|--------------|-------------|-------------|
| MHD<br>DSL | MHD<br>ALL | HHD<br>NCAT | HHD<br>CAT | HHD<br>DSL | HHD<br>ALL | OBUS<br>NCAT | OBUS<br>CAT | OBUS<br>DSL |
| 1505       | 1349.008   | 497.421     | 497.421    | 1827.808   | 1810.351   | 497.421      | 497.42      | 1505        |



|            |            |             |            |            |            |              |             |             |
|------------|------------|-------------|------------|------------|------------|--------------|-------------|-------------|
| MHD<br>DSL | MHD<br>ALL | HHD<br>NCAT | HHD<br>CAT | HHD<br>DSL | HHD<br>ALL | OBUS<br>NCAT | OBUS<br>CAT | OBUS<br>DSL |
| 0.014      | 0.013      | 0.012       | 0.005      | 0.017      | 0.017      | 0.006        | 0.005       | 0.014       |

|            |            |             |            |            |            |              |             |             |
|------------|------------|-------------|------------|------------|------------|--------------|-------------|-------------|
| MHD<br>DSL | MHD<br>ALL | HHD<br>NCAT | HHD<br>CAT | HHD<br>DSL | HHD<br>ALL | OBUS<br>NCAT | OBUS<br>CAT | OBUS<br>DSL |
| 0.197      | 0.167      | 0.015       | 0.014      | 0.317      | 0.313      | 0.015        | 0.012       | 0.154       |

|            |            |             |            |            |            |              |             |             |
|------------|------------|-------------|------------|------------|------------|--------------|-------------|-------------|
| MHD<br>DSL | MHD<br>ALL | HHD<br>NCAT | HHD<br>CAT | HHD<br>DSL | HHD<br>ALL | OBUS<br>NCAT | OBUS<br>CAT | OBUS<br>DSL |
| 0.012      | 0.012      | 0.012       | 0.012      | 0.036      | 0.036      | 0.012        | 0.012       | 0.012       |

|            |            |             |            |            |            |              |             |             |
|------------|------------|-------------|------------|------------|------------|--------------|-------------|-------------|
| MHD<br>DSL | MHD<br>ALL | HHD<br>NCAT | HHD<br>CAT | HHD<br>DSL | HHD<br>ALL | OBUS<br>NCAT | OBUS<br>CAT | OBUS<br>DSL |
| 0.013      | 0.013      | 0.028       | 0.028      | 0.028      | 0.028      | 0.013        | 0.013       | 0.013       |

|            |            |             |            |            |            |              |             |             |
|------------|------------|-------------|------------|------------|------------|--------------|-------------|-------------|
| MHD<br>DSL | MHD<br>ALL | HHD<br>NCAT | HHD<br>CAT | HHD<br>DSL | HHD<br>ALL | OBUS<br>NCAT | OBUS<br>CAT | OBUS<br>DSL |
| 0          | 17.52      | 6.884       | 16.094     | 0          | 16.046     | 13.178       | 17.299      | 0           |

|            |            |             |            |            |            |              |             |             |
|------------|------------|-------------|------------|------------|------------|--------------|-------------|-------------|
| MHD<br>DSL | MHD<br>ALL | HHD<br>NCAT | HHD<br>CAT | HHD<br>DSL | HHD<br>ALL | OBUS<br>NCAT | OBUS<br>CAT | OBUS<br>DSL |
| 6.698      | 6.698      | 0           | 0          | 5.515      | 5.515      | 0            | 0           | 6.698       |

| MHD | MHD | HHD   | HHD   | HHD   | HHD | OBUS  | OBUS  | OBUS  |   |
|-----|-----|-------|-------|-------|-----|-------|-------|-------|---|
| DSL | ALL | NCAT  | CAT   | DSL   | ALL | NCAT  | CAT   | DSL   |   |
|     | 0   | 0.022 | 1.257 | 0.079 | 0   | 0.019 | 0.652 | 0.035 | 0 |
|     | 0   | 0.028 | 1.246 | 0.155 | 0   | 0.031 | 0.647 | 0.068 | 0 |
|     | 0   | 0.04  | 1.258 | 0.293 | 0   | 0.051 | 0.653 | 0.13  | 0 |
|     | 0   | 0.051 | 1.315 | 0.415 | 0   | 0.07  | 0.682 | 0.184 | 0 |
|     | 0   | 0.062 | 1.416 | 0.522 | 0   | 0.086 | 0.735 | 0.231 | 0 |
|     | 0   | 0.071 | 1.562 | 0.612 | 0   | 0.101 | 0.81  | 0.27  | 0 |
|     | 0   | 0.078 | 1.624 | 0.686 | 0   | 0.112 | 0.842 | 0.303 | 0 |
|     | 0   | 0.071 | 1.388 | 0.654 | 0   | 0.106 | 0.72  | 0.297 | 0 |
|     | 0   | 0.076 | 1.511 | 0.694 | 0   | 0.113 | 0.784 | 0.316 | 0 |
|     | 0   | 0.081 | 1.634 | 0.732 | 0   | 0.119 | 0.848 | 0.333 | 0 |
|     | 0   | 0.085 | 1.757 | 0.77  | 0   | 0.125 | 0.912 | 0.35  | 0 |
|     | 0   | 0.09  | 1.88  | 0.806 | 0   | 0.132 | 0.975 | 0.367 | 0 |
|     | 0   | 0.094 | 2.003 | 0.841 | 0   | 0.137 | 1.039 | 0.383 | 0 |
|     | 0   | 0.098 | 2.126 | 0.874 | 0   | 0.143 | 1.103 | 0.398 | 0 |
|     | 0   | 0.103 | 2.249 | 0.906 | 0   | 0.149 | 1.167 | 0.413 | 0 |
|     | 0   | 0.107 | 2.372 | 0.937 | 0   | 0.154 | 1.231 | 0.427 | 0 |
|     | 0   | 0.111 | 2.495 | 0.967 | 0   | 0.159 | 1.294 | 0.44  | 0 |
|     | 0   | 0.115 | 2.618 | 0.996 | 0   | 0.164 | 1.358 | 0.453 | 0 |

| MHD<br>DSL | MHD<br>ALL | HHD<br>NCAT | HHD<br>CAT | HHD<br>DSL | HHD<br>ALL | OBUS<br>NCAT | OBUS<br>CAT | OBUS<br>DSL |
|------------|------------|-------------|------------|------------|------------|--------------|-------------|-------------|
|------------|------------|-------------|------------|------------|------------|--------------|-------------|-------------|

|   |        |         |         |   |        |         |         |   |
|---|--------|---------|---------|---|--------|---------|---------|---|
| 0 | 3.44   | 292.049 | 23.057  | 0 | 5.211  | 61.004  | 10.707  | 0 |
| 0 | 5.18   | 258.616 | 45.176  | 0 | 8.305  | 54.02   | 20.979  | 0 |
| 0 | 8.456  | 199.636 | 86.605  | 0 | 14.121 | 41.701  | 40.217  | 0 |
| 0 | 11.462 | 151.172 | 124.287 | 0 | 19.443 | 31.577  | 57.715  | 0 |
| 0 | 14.198 | 113.223 | 158.222 | 0 | 24.271 | 23.65   | 73.473  | 0 |
| 0 | 16.662 | 85.789  | 188.409 | 0 | 28.603 | 17.92   | 87.491  | 0 |
| 0 | 18.857 | 68.871  | 214.848 | 0 | 32.442 | 14.386  | 99.769  | 0 |
| 0 | 17.194 | 212.816 | 189.375 | 0 | 29.519 | 44.453  | 91.33   | 0 |
| 0 | 18.28  | 336.265 | 194.911 | 0 | 31.094 | 70.24   | 94      | 0 |
| 0 | 19.317 | 446.632 | 200.629 | 0 | 32.617 | 93.293  | 96.758  | 0 |
| 0 | 20.304 | 543.914 | 206.53  | 0 | 34.088 | 113.614 | 99.604  | 0 |
| 0 | 21.241 | 628.113 | 212.613 | 0 | 35.506 | 131.202 | 102.538 | 0 |
| 0 | 22.129 | 699.229 | 218.879 | 0 | 36.872 | 146.057 | 105.559 | 0 |
| 0 | 22.967 | 757.261 | 225.327 | 0 | 38.186 | 158.178 | 108.669 | 0 |
| 0 | 23.756 | 802.209 | 231.958 | 0 | 39.447 | 167.567 | 111.867 | 0 |
| 0 | 24.495 | 834.073 | 238.772 | 0 | 40.656 | 174.223 | 115.153 | 0 |
| 0 | 25.184 | 852.855 | 245.767 | 0 | 41.813 | 178.146 | 118.527 | 0 |
| 0 | 25.824 | 858.552 | 252.945 | 0 | 42.917 | 179.336 | 121.989 | 0 |

| MHD<br>DSL | MHD<br>ALL | HHD<br>NCAT | HHD<br>CAT | HHD<br>DSL | HHD<br>ALL | OBUS<br>NCAT | OBUS<br>CAT | OBUS<br>DSL |
|------------|------------|-------------|------------|------------|------------|--------------|-------------|-------------|
| 0          | 0.352      | 3.826       | 4.152      | 0          | 0.642      | 0.819        | 2.215       | 0           |
| 0          | 0.522      | 4.159       | 6.255      | 0          | 0.958      | 0.891        | 3.337       | 0           |
| 0          | 0.821      | 4.764       | 9.95       | 0          | 1.512      | 1.02         | 5.308       | 0           |
| 0          | 1.064      | 5.289       | 12.96      | 0          | 1.964      | 1.132        | 6.914       | 0           |
| 0          | 1.253      | 5.732       | 15.287     | 0          | 2.313      | 1.227        | 8.155       | 0           |
| 0          | 1.386      | 6.095       | 16.929     | 0          | 2.56       | 1.305        | 9.031       | 0           |
| 0          | 1.464      | 6.377       | 17.888     | 0          | 2.705      | 1.366        | 9.542       | 0           |
| 0          | 1.483      | 6.5         | 18.115     | 0          | 2.74       | 1.392        | 9.663       | 0           |
| 0          | 1.477      | 6.344       | 18.049     | 0          | 2.729      | 1.358        | 9.628       | 0           |
| 0          | 1.468      | 6.139       | 17.947     | 0          | 2.712      | 1.314        | 9.573       | 0           |
| 0          | 1.456      | 5.883       | 17.81      | 0          | 2.69       | 1.26         | 9.5         | 0           |
| 0          | 1.44       | 5.577       | 17.638     | 0          | 2.663      | 1.194        | 9.409       | 0           |
| 0          | 1.422      | 5.22        | 17.431     | 0          | 2.63       | 1.118        | 9.298       | 0           |
| 0          | 1.401      | 4.814       | 17.189     | 0          | 2.591      | 1.031        | 9.169       | 0           |
| 0          | 1.376      | 4.357       | 16.912     | 0          | 2.547      | 0.933        | 9.021       | 0           |
| 0          | 1.348      | 3.85        | 16.599     | 0          | 2.497      | 0.824        | 8.854       | 0           |
| 0          | 1.318      | 3.292       | 16.251     | 0          | 2.442      | 0.705        | 8.669       | 0           |
| 0          | 1.284      | 2.685       | 15.868     | 0          | 2.381      | 0.575        | 8.464       | 0           |

| MHD<br>DSL | MHD<br>ALL | HHD<br>NCAT | HHD<br>CAT | HHD<br>DSL | HHD<br>ALL | OBUS<br>NCAT | OBUS<br>CAT | OBUS<br>DSL |   |
|------------|------------|-------------|------------|------------|------------|--------------|-------------|-------------|---|
|            | 0          | 6.512       | 170.667    | 9.546      | 0          | 2.46         | 170.667     | 9.546       | 0 |
|            | 0          | 9.29        | 185.2      | 19.039     | 0          | 3.963        | 185.2       | 19.039      | 0 |
|            | 0          | 14.786      | 213.408    | 37.866     | 0          | 6.94         | 213.408     | 37.866      | 0 |
|            | 0          | 20.2        | 240.47     | 56.482     | 0          | 9.88         | 240.47      | 56.482      | 0 |
|            | 0          | 25.532      | 266.386    | 74.887     | 0          | 12.78        | 266.386     | 74.887      | 0 |
|            | 0          | 30.783      | 291.155    | 93.081     | 0          | 15.643       | 291.155     | 93.081      | 0 |
|            | 0          | 35.953      | 314.778    | 111.063    | 0          | 18.466       | 314.778     | 111.063     | 0 |
|            | 0          | 58.542      | 425.955    | 188.899    | 0          | 30.743       | 425.955     | 188.899     | 0 |
|            | 0          | 67.33       | 426.29     | 223.17     | 0          | 35.853       | 426.29      | 223.17      | 0 |
|            | 0          | 75.6        | 426.625    | 255.419    | 0          | 40.662       | 426.625     | 255.419     | 0 |
|            | 0          | 83.351      | 426.96     | 285.644    | 0          | 45.169       | 426.96      | 285.644     | 0 |
|            | 0          | 90.584      | 427.294    | 313.847    | 0          | 49.375       | 427.294     | 313.847     | 0 |
|            | 0          | 97.299      | 427.629    | 340.027    | 0          | 53.279       | 427.629     | 340.027     | 0 |
|            | 0          | 103.496     | 427.964    | 364.184    | 0          | 56.882       | 427.964     | 364.184     | 0 |
|            | 0          | 109.174     | 428.299    | 386.319    | 0          | 60.183       | 428.299     | 386.319     | 0 |
|            | 0          | 114.335     | 428.633    | 406.43     | 0          | 63.182       | 428.633     | 406.43      | 0 |
|            | 0          | 118.977     | 428.968    | 424.519    | 0          | 65.881       | 428.968     | 424.519     | 0 |
|            | 0          | 123.101     | 429.303    | 440.586    | 0          | 68.277       | 429.303     | 440.586     | 0 |

| MHD | MHD | HHD   | HHD   | HHD   | HHD | OBUS  | OBUS  | OBUS  |
|-----|-----|-------|-------|-------|-----|-------|-------|-------|
| DSL | ALL | NCAT  | CAT   | DSL   | ALL | NCAT  | CAT   | DSL   |
|     | 0   | 0     | 0.007 | 0     | 0   | 0     | 0.003 | 0     |
|     | 0   | 0     | 0.006 | 0.001 | 0   | 0     | 0.003 | 0.001 |
|     | 0   | 0     | 0.006 | 0.002 | 0   | 0     | 0.003 | 0.001 |
|     | 0   | 0     | 0.005 | 0.003 | 0   | 0     | 0.003 | 0.002 |
|     | 0   | 0     | 0.005 | 0.003 | 0   | 0.001 | 0.003 | 0.002 |
|     | 0   | 0.001 | 0.005 | 0.004 | 0   | 0.001 | 0.003 | 0.002 |
|     | 0   | 0.001 | 0.005 | 0.005 | 0   | 0.001 | 0.004 | 0.003 |
|     | 0   | 0.001 | 0.008 | 0.005 | 0   | 0.001 | 0.005 | 0.003 |
|     | 0   | 0.001 | 0.01  | 0.005 | 0   | 0.001 | 0.005 | 0.004 |
|     | 0   | 0.001 | 0.012 | 0.006 | 0   | 0.001 | 0.006 | 0.004 |
|     | 0   | 0.001 | 0.013 | 0.006 | 0   | 0.001 | 0.006 | 0.004 |
|     | 0   | 0.001 | 0.014 | 0.007 | 0   | 0.001 | 0.007 | 0.005 |
|     | 0   | 0.001 | 0.016 | 0.007 | 0   | 0.001 | 0.007 | 0.005 |
|     | 0   | 0.001 | 0.016 | 0.007 | 0   | 0.001 | 0.007 | 0.005 |
|     | 0   | 0.001 | 0.017 | 0.008 | 0   | 0.001 | 0.007 | 0.006 |
|     | 0   | 0.002 | 0.018 | 0.008 | 0   | 0.001 | 0.007 | 0.006 |
|     | 0   | 0.002 | 0.018 | 0.008 | 0   | 0.001 | 0.007 | 0.006 |
|     | 0   | 0.002 | 0.018 | 0.009 | 0   | 0.001 | 0.007 | 0.006 |

| MHD | MHD | HHD   | HHD   | HHD   | HHD | OBUS  | OBUS  | OBUS  |   |
|-----|-----|-------|-------|-------|-----|-------|-------|-------|---|
| DSL | ALL | NCAT  | CAT   | DSL   | ALL | NCAT  | CAT   | DSL   |   |
|     | 0   | 0.001 | 0.011 | 0.002 | 0   | 0     | 0.011 | 0.002 | 0 |
|     | 0   | 0.001 | 0.01  | 0.003 | 0   | 0.001 | 0.01  | 0.003 | 0 |
|     | 0   | 0.001 | 0.008 | 0.007 | 0   | 0.001 | 0.008 | 0.006 | 0 |
|     | 0   | 0.002 | 0.006 | 0.009 | 0   | 0.001 | 0.006 | 0.009 | 0 |
|     | 0   | 0.002 | 0.004 | 0.012 | 0   | 0.002 | 0.004 | 0.011 | 0 |
|     | 0   | 0.003 | 0.003 | 0.014 | 0   | 0.002 | 0.003 | 0.014 | 0 |
|     | 0   | 0.003 | 0.003 | 0.016 | 0   | 0.002 | 0.003 | 0.016 | 0 |
|     | 0   | 0.004 | 0.007 | 0.022 | 0   | 0.003 | 0.007 | 0.021 | 0 |
|     | 0   | 0.004 | 0.011 | 0.023 | 0   | 0.003 | 0.011 | 0.022 | 0 |
|     | 0   | 0.005 | 0.015 | 0.023 | 0   | 0.004 | 0.015 | 0.023 | 0 |
|     | 0   | 0.005 | 0.018 | 0.024 | 0   | 0.004 | 0.018 | 0.023 | 0 |
|     | 0   | 0.005 | 0.021 | 0.025 | 0   | 0.004 | 0.021 | 0.024 | 0 |
|     | 0   | 0.005 | 0.023 | 0.026 | 0   | 0.004 | 0.023 | 0.025 | 0 |
|     | 0   | 0.005 | 0.025 | 0.026 | 0   | 0.004 | 0.025 | 0.025 | 0 |
|     | 0   | 0.006 | 0.027 | 0.027 | 0   | 0.004 | 0.027 | 0.026 | 0 |
|     | 0   | 0.006 | 0.028 | 0.028 | 0   | 0.004 | 0.028 | 0.027 | 0 |
|     | 0   | 0.006 | 0.029 | 0.029 | 0   | 0.004 | 0.029 | 0.028 | 0 |
|     | 0   | 0.006 | 0.029 | 0.03  | 0   | 0.005 | 0.029 | 0.028 | 0 |





| MHD<br>DSL | MHD<br>ALL | HHD<br>NCAT | HHD<br>CAT | HHD<br>DSL | HHD<br>ALL | OBUS<br>NCAT | OBUS<br>CAT | OBUS<br>DSL |   |
|------------|------------|-------------|------------|------------|------------|--------------|-------------|-------------|---|
|            | 0          | 0           | 0          | 0          | 0          | 0            | 0           | 0           | 0 |

| MHD<br>DSL | MHD<br>ALL | HHD<br>NCAT | HHD<br>CAT | HHD<br>DSL | HHD<br>ALL | OBUS<br>NCAT | OBUS<br>CAT | OBUS<br>DSL |       |
|------------|------------|-------------|------------|------------|------------|--------------|-------------|-------------|-------|
| 0.014      | 0.017      |             | 0          | 0.001      | 0.063      | 0.064        | 0           | 0           | 0     |
| 0.036      | 0.049      |             | 0          | 0.002      | 0.011      | 0.013        | 0           | 0.002       | 0.001 |





|             |              |             |             |             |             |            |            |            |
|-------------|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|
| OBUS<br>ALL | UBUS<br>NCAT | UBUS<br>CAT | UBUS<br>DSL | UBUS<br>ALL | MCY<br>NCAT | MCY<br>CAT | MCY<br>DSL | MCY<br>ALL |
| 0.037       | 0.311        | 0.156       | 0.024       | 0.049       | 0.217       | 0.161      | 0          | 0.186      |

|             |              |             |             |             |             |            |            |            |
|-------------|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|
| OBUS<br>ALL | UBUS<br>NCAT | UBUS<br>CAT | UBUS<br>DSL | UBUS<br>ALL | MCY<br>NCAT | MCY<br>CAT | MCY<br>DSL | MCY<br>ALL |
| 4.362       | 120.964      | 28.159      | 1.627       | 7.37        | 28.869      | 9.045      | 0          | 17.79      |

|             |              |             |             |             |             |            |            |            |
|-------------|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|
| OBUS<br>ALL | UBUS<br>NCAT | UBUS<br>CAT | UBUS<br>DSL | UBUS<br>ALL | MCY<br>NCAT | MCY<br>CAT | MCY<br>DSL | MCY<br>ALL |
| 3.482       | 4.514        | 13.95       | 15.854      | 15.405      | 1.464       | 1.074      | 0          | 1.246      |

|             |              |             |             |             |             |            |            |            |
|-------------|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|
| OBUS<br>ALL | UBUS<br>NCAT | UBUS<br>CAT | UBUS<br>DSL | UBUS<br>ALL | MCY<br>NCAT | MCY<br>CAT | MCY<br>DSL | MCY<br>ALL |
| 1087.065    | 497.421      | 497.421     | 2548.483    | 2200.938    | 113.528     | 149.591    | 0          | 133.682    |

|             |              |             |             |             |             |            |            |            |
|-------------|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|
| OBUS<br>ALL | UBUS<br>NCAT | UBUS<br>CAT | UBUS<br>DSL | UBUS<br>ALL | MCY<br>NCAT | MCY<br>CAT | MCY<br>DSL | MCY<br>ALL |
| 0.01        | 0.007        | 0.005       | 0.024       | 0.021       | 0.002       | 0.002      | 0          | 0.002      |

|             |              |             |             |             |             |            |            |            |
|-------------|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|
| OBUS<br>ALL | UBUS<br>NCAT | UBUS<br>CAT | UBUS<br>DSL | UBUS<br>ALL | MCY<br>NCAT | MCY<br>CAT | MCY<br>DSL | MCY<br>ALL |
| 0.095       | 0.015        | 0.015       | 0.245       | 0.206       | 0.038       | 0.002      | 0          | 0.018      |

|             |              |             |             |             |             |            |            |            |
|-------------|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|
| OBUS<br>ALL | UBUS<br>NCAT | UBUS<br>CAT | UBUS<br>DSL | UBUS<br>ALL | MCY<br>NCAT | MCY<br>CAT | MCY<br>DSL | MCY<br>ALL |
| 0.012       | 0.012        | 0.012       | 0.008       | 0.009       | 0.004       | 0.004      | 0          | 0.004      |

|             |              |             |             |             |             |            |            |            |
|-------------|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|
| OBUS<br>ALL | UBUS<br>NCAT | UBUS<br>CAT | UBUS<br>DSL | UBUS<br>ALL | MCY<br>NCAT | MCY<br>CAT | MCY<br>DSL | MCY<br>ALL |
| 0.013       | 0.013        | 0.013       | 0.013       | 0.013       | 0.006       | 0.006      | 0          | 0.006      |

|             |              |             |             |             |             |            |            |            |
|-------------|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|
| OBUS<br>ALL | UBUS<br>NCAT | UBUS<br>CAT | UBUS<br>DSL | UBUS<br>ALL | MCY<br>NCAT | MCY<br>CAT | MCY<br>DSL | MCY<br>ALL |
| 17.281      | 12.581       | 16.142      | 0           | 15.859      | 52.75       | 52.594     | 0          | 52.663     |

|             |              |             |             |             |             |            |            |            |
|-------------|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|
| OBUS<br>ALL | UBUS<br>NCAT | UBUS<br>CAT | UBUS<br>DSL | UBUS<br>ALL | MCY<br>NCAT | MCY<br>CAT | MCY<br>DSL | MCY<br>ALL |
| 6.698       | 0            | 0           | 3.955       | 3.955       | 0           | 0          | 0          | 0          |

| OBUS<br>ALL | UBUS<br>NCAT | UBUS<br>CAT | UBUS<br>DSL | UBUS<br>ALL | MCY<br>NCAT | MCY<br>CAT | MCY<br>DSL | MCY<br>ALL |
|-------------|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|
| 0.031       | 0.83         | 0.088       | 0           | 0.025       | 0.129       | 0.017      | 0          | 0.073      |
| 0.052       | 0.823        | 0.172       | 0           | 0.038       | 0.128       | 0.033      | 0          | 0.081      |
| 0.091       | 0.83         | 0.326       | 0           | 0.062       | 0.129       | 0.063      | 0          | 0.096      |
| 0.126       | 0.868        | 0.461       | 0           | 0.084       | 0.135       | 0.089      | 0          | 0.112      |
| 0.157       | 0.934        | 0.579       | 0           | 0.103       | 0.146       | 0.112      | 0          | 0.129      |
| 0.183       | 1.031        | 0.68        | 0           | 0.12        | 0.161       | 0.131      | 0          | 0.146      |
| 0.204       | 1.072        | 0.762       | 0           | 0.133       | 0.167       | 0.147      | 0          | 0.157      |
| 0.199       | 0.916        | 0.757       | 0           | 0.13        | 0.143       | 0.159      | 0          | 0.151      |
| 0.212       | 0.997        | 0.803       | 0           | 0.139       | 0.155       | 0.143      | 0          | 0.149      |
| 0.224       | 1.079        | 0.848       | 0           | 0.147       | 0.168       | 0.151      | 0          | 0.16       |
| 0.235       | 1.16         | 0.891       | 0           | 0.155       | 0.181       | 0.159      | 0          | 0.17       |
| 0.247       | 1.241        | 0.933       | 0           | 0.162       | 0.193       | 0.166      | 0          | 0.18       |
| 0.258       | 1.322        | 0.973       | 0           | 0.17        | 0.206       | 0.174      | 0          | 0.19       |
| 0.268       | 1.403        | 1.012       | 0           | 0.177       | 0.219       | 0.18       | 0          | 0.2        |
| 0.278       | 1.484        | 1.049       | 0           | 0.184       | 0.231       | 0.187      | 0          | 0.209      |
| 0.288       | 1.565        | 1.085       | 0           | 0.19        | 0.244       | 0.194      | 0          | 0.219      |
| 0.298       | 1.647        | 1.12        | 0           | 0.197       | 0.256       | 0.2        | 0          | 0.228      |
| 0.307       | 1.728        | 1.153       | 0           | 0.203       | 0.269       | 0.206      | 0          | 0.237      |

| OBUS<br>ALL | UBUS<br>NCAT | UBUS<br>CAT | UBUS<br>DSL | UBUS<br>ALL | MCY<br>NCAT | MCY<br>CAT | MCY<br>DSL | MCY<br>ALL |
|-------------|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|
|-------------|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|

|        |         |         |   |        |        |        |   |        |
|--------|---------|---------|---|--------|--------|--------|---|--------|
| 7.655  | 71.664  | 24.238  | 0 | 4.744  | 6.327  | 1.798  | 0 | 4.069  |
| 14.089 | 63.46   | 47.49   | 0 | 8.262  | 5.603  | 3.522  | 0 | 4.565  |
| 26.149 | 48.987  | 91.041  | 0 | 14.862 | 4.325  | 6.752  | 0 | 5.535  |
| 37.133 | 37.095  | 130.653 | 0 | 20.882 | 3.275  | 9.69   | 0 | 6.474  |
| 47.042 | 27.783  | 166.326 | 0 | 26.322 | 2.453  | 12.336 | 0 | 7.381  |
| 55.874 | 21.051  | 198.059 | 0 | 31.182 | 1.859  | 14.689 | 0 | 8.256  |
| 63.631 | 16.9    | 225.853 | 0 | 35.463 | 1.492  | 16.751 | 0 | 9.1    |
| 58.684 | 52.221  | 209.109 | 0 | 33.325 | 4.61   | 19.928 | 0 | 12.248 |
| 60.74  | 82.514  | 215.222 | 0 | 34.686 | 7.285  | 14.945 | 0 | 11.104 |
| 62.814 | 109.596 | 221.536 | 0 | 36.035 | 9.676  | 15.383 | 0 | 12.522 |
| 64.905 | 133.467 | 228.052 | 0 | 37.372 | 11.783 | 15.836 | 0 | 13.804 |
| 67.015 | 154.128 | 234.769 | 0 | 38.697 | 13.607 | 16.302 | 0 | 14.951 |
| 69.143 | 171.579 | 241.688 | 0 | 40.011 | 15.148 | 16.783 | 0 | 15.963 |
| 71.289 | 185.819 | 248.808 | 0 | 41.313 | 16.405 | 17.277 | 0 | 16.84  |
| 73.452 | 196.848 | 256.13  | 0 | 42.604 | 17.379 | 17.785 | 0 | 17.582 |
| 75.634 | 204.667 | 263.653 | 0 | 43.883 | 18.069 | 18.308 | 0 | 18.188 |
| 77.834 | 209.276 | 271.378 | 0 | 45.15  | 18.476 | 18.844 | 0 | 18.66  |
| 80.051 | 210.674 | 279.304 | 0 | 46.405 | 18.6   | 19.395 | 0 | 18.996 |

| OBUS<br>ALL | UBUS<br>NCAT | UBUS<br>CAT | UBUS<br>DSL | UBUS<br>ALL | MCY<br>NCAT | MCY<br>CAT | MCY<br>DSL | MCY<br>ALL |
|-------------|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|
| 1.419       | 1.086        | 6.791       | 0           | 1.074       | 0.284       | 0.092      | 0          | 0.188      |
| 2.134       | 1.181        | 10.232      | 0           | 1.612       | 0.309       | 0.138      | 0          | 0.224      |
| 3.389       | 1.353        | 16.275      | 0           | 2.557       | 0.354       | 0.219      | 0          | 0.287      |
| 4.411       | 1.502        | 21.199      | 0           | 3.327       | 0.393       | 0.286      | 0          | 0.34       |
| 5.202       | 1.628        | 25.004      | 0           | 3.923       | 0.426       | 0.337      | 0          | 0.382      |
| 5.76        | 1.731        | 27.691      | 0           | 4.343       | 0.453       | 0.373      | 0          | 0.413      |
| 6.086       | 1.811        | 29.258      | 0           | 4.589       | 0.474       | 0.394      | 0          | 0.434      |
| 6.163       | 1.845        | 29.628      | 0           | 4.647       | 0.483       | 0.396      | 0          | 0.44       |
| 6.14        | 1.801        | 29.519      | 0           | 4.63        | 0.471       | 0.398      | 0          | 0.435      |
| 6.105       | 1.743        | 29.353      | 0           | 4.603       | 0.456       | 0.396      | 0          | 0.426      |
| 6.058       | 1.67         | 29.129      | 0           | 4.567       | 0.437       | 0.393      | 0          | 0.415      |
| 5.998       | 1.583        | 28.848      | 0           | 4.522       | 0.414       | 0.389      | 0          | 0.402      |
| 5.927       | 1.482        | 28.509      | 0           | 4.468       | 0.388       | 0.384      | 0          | 0.386      |
| 5.844       | 1.367        | 28.113      | 0           | 4.404       | 0.358       | 0.379      | 0          | 0.368      |
| 5.748       | 1.237        | 27.659      | 0           | 4.332       | 0.324       | 0.373      | 0          | 0.348      |
| 5.641       | 1.093        | 27.148      | 0           | 4.25        | 0.286       | 0.366      | 0          | 0.326      |
| 5.521       | 0.935        | 26.579      | 0           | 4.159       | 0.245       | 0.358      | 0          | 0.301      |
| 5.39        | 0.762        | 25.953      | 0           | 4.059       | 0.199       | 0.35       | 0          | 0.275      |

| OBUS<br>ALL | UBUS<br>NCAT | UBUS<br>CAT | UBUS<br>DSL | UBUS<br>ALL | MCY<br>NCAT | MCY<br>CAT | MCY<br>DSL | MCY<br>ALL |
|-------------|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|
| 8.442       | 170.667      | 9.546       | 0           | 3.782       | 35.213      | 1.777      | 0          | 18.542     |
| 14.679      | 185.2        | 19.039      | 0           | 5.458       | 38.212      | 3.545      | 0          | 20.926     |
| 27.042      | 213.408      | 37.866      | 0           | 8.775       | 44.032      | 7.05       | 0          | 25.592     |
| 39.254      | 240.47       | 56.482      | 0           | 12.043      | 49.615      | 10.516     | 0          | 30.12      |
| 51.315      | 266.386      | 74.887      | 0           | 15.262      | 54.962      | 13.942     | 0          | 34.509     |
| 63.227      | 291.155      | 93.081      | 0           | 18.433      | 60.073      | 17.33      | 0          | 38.761     |
| 74.988      | 314.778      | 111.063     | 0           | 21.556      | 64.947      | 20.678     | 0          | 42.874     |
| 126.02      | 425.955      | 188.899     | 0           | 35.193      | 87.885      | 35.169     | 0          | 61.601     |
| 147.814     | 426.29       | 223.17      | 0           | 40.544      | 87.955      | 41.55      | 0          | 64.817     |
| 168.321     | 426.625      | 255.419     | 0           | 45.58       | 88.024      | 47.554     | 0          | 67.845     |
| 187.542     | 426.96       | 285.644     | 0           | 50.3        | 88.093      | 53.181     | 0          | 70.685     |
| 205.478     | 427.294      | 313.847     | 0           | 54.704      | 88.162      | 58.432     | 0          | 73.338     |
| 222.127     | 427.629      | 340.027     | 0           | 58.793      | 88.231      | 63.306     | 0          | 75.803     |
| 237.49      | 427.964      | 364.184     | 0           | 62.567      | 88.3        | 67.804     | 0          | 78.08      |
| 251.568     | 428.299      | 386.319     | 0           | 66.024      | 88.369      | 71.925     | 0          | 80.17      |
| 264.359     | 428.633      | 406.43      | 0           | 69.167      | 88.438      | 75.669     | 0          | 82.071     |
| 275.864     | 428.968      | 424.519     | 0           | 71.993      | 88.507      | 79.037     | 0          | 83.785     |
| 286.083     | 429.303      | 440.586     | 0           | 74.504      | 88.576      | 82.028     | 0          | 85.311     |

| OBUS<br>ALL | UBUS<br>NCAT | UBUS<br>CAT | UBUS<br>DSL | UBUS<br>ALL | MCY<br>NCAT | MCY<br>CAT | MCY<br>DSL | MCY<br>ALL |
|-------------|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|
| 0           | 0.003        | 0.001       | 0           | 0           | 0           | 0          | 0.057      | 0          |
| 0           | 0.003        | 0.001       | 0           | 0           | 0.001       | 0          | 0.057      | 0          |
| 0.001       | 0.003        | 0.002       | 0           | 0           | 0.001       | 0          | 0.057      | 0          |
| 0.001       | 0.003        | 0.003       | 0           | 0           | 0.001       | 0          | 0.057      | 0          |
| 0.001       | 0.003        | 0.004       | 0           | 0.001       | 0.001       | 0          | 0.057      | 0.001      |
| 0.002       | 0.004        | 0.004       | 0           | 0.001       | 0.001       | 0          | 0.057      | 0.001      |
| 0.002       | 0.004        | 0.005       | 0           | 0.001       | 0.001       | 0.001      | 0.057      | 0.001      |
| 0.002       | 0.005        | 0.005       | 0           | 0.001       | 0.001       | 0.001      | 0.057      | 0.001      |
| 0.002       | 0.006        | 0.006       | 0           | 0.001       | 0.001       | 0.001      | 0.057      | 0.001      |
| 0.003       | 0.006        | 0.006       | 0           | 0.001       | 0.001       | 0.001      | 0.057      | 0.001      |
| 0.003       | 0.007        | 0.007       | 0           | 0.001       | 0.001       | 0.001      | 0.057      | 0.001      |
| 0.003       | 0.007        | 0.007       | 0           | 0.001       | 0.001       | 0.001      | 0.057      | 0.001      |
| 0.003       | 0.007        | 0.007       | 0           | 0.001       | 0.001       | 0.001      | 0.057      | 0.001      |
| 0.003       | 0.008        | 0.008       | 0           | 0.001       | 0.001       | 0.001      | 0.057      | 0.001      |
| 0.004       | 0.008        | 0.008       | 0           | 0.001       | 0.001       | 0.001      | 0.057      | 0.001      |
| 0.004       | 0.008        | 0.008       | 0           | 0.001       | 0.001       | 0.001      | 0.057      | 0.001      |
| 0.004       | 0.008        | 0.009       | 0           | 0.001       | 0.001       | 0.001      | 0.057      | 0.001      |
| 0.004       | 0.008        | 0.009       | 0           | 0.002       | 0.001       | 0.001      | 0.057      | 0.001      |

| OBUS<br>ALL | UBUS<br>NCAT | UBUS<br>CAT | UBUS<br>DSL | UBUS<br>ALL | MCY<br>NCAT | MCY<br>CAT | MCY<br>DSL | MCY<br>ALL |
|-------------|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|
| 0.001       | 0.011        | 0.002       | 0           | 0           | 0.02        | 0          | 0          | 0.01       |
| 0.002       | 0.01         | 0.003       | 0           | 0.001       | 0.017       | 0          | 0          | 0.009      |
| 0.004       | 0.008        | 0.006       | 0           | 0.001       | 0.013       | 0.001      | 0          | 0.007      |
| 0.006       | 0.006        | 0.009       | 0           | 0.002       | 0.01        | 0.001      | 0          | 0.006      |
| 0.007       | 0.004        | 0.012       | 0           | 0.002       | 0.008       | 0.001      | 0          | 0.004      |
| 0.009       | 0.003        | 0.014       | 0           | 0.002       | 0.006       | 0.002      | 0          | 0.004      |
| 0.01        | 0.003        | 0.016       | 0           | 0.003       | 0.005       | 0.002      | 0          | 0.003      |
| 0.014       | 0.007        | 0.022       | 0           | 0.004       | 0.013       | 0.002      | 0          | 0.007      |
| 0.014       | 0.011        | 0.023       | 0           | 0.004       | 0.02        | 0.002      | 0          | 0.011      |
| 0.015       | 0.015        | 0.023       | 0           | 0.004       | 0.026       | 0.002      | 0          | 0.014      |
| 0.015       | 0.018        | 0.024       | 0           | 0.004       | 0.032       | 0.003      | 0          | 0.017      |
| 0.015       | 0.021        | 0.025       | 0           | 0.004       | 0.037       | 0.003      | 0          | 0.02       |
| 0.016       | 0.023        | 0.025       | 0           | 0.004       | 0.041       | 0.003      | 0          | 0.022      |
| 0.016       | 0.025        | 0.026       | 0           | 0.004       | 0.045       | 0.003      | 0          | 0.024      |
| 0.017       | 0.027        | 0.027       | 0           | 0.005       | 0.047       | 0.003      | 0          | 0.025      |
| 0.017       | 0.028        | 0.028       | 0           | 0.005       | 0.049       | 0.003      | 0          | 0.026      |
| 0.018       | 0.029        | 0.029       | 0           | 0.005       | 0.05        | 0.003      | 0          | 0.027      |
| 0.018       | 0.029        | 0.029       | 0           | 0.005       | 0.051       | 0.003      | 0          | 0.027      |







| OBUS<br>ALL | UBUS<br>NCAT | UBUS<br>CAT | UBUS<br>DSL | UBUS<br>ALL | MCY<br>NCAT | MCY<br>CAT | MCY<br>DSL | MCY<br>ALL |   |
|-------------|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|---|
|             | 0            | 0           | 0           | 0           | 0           | 0          | 0          | 0          | 0 |

| OBUS<br>ALL | UBUS<br>NCAT | UBUS<br>CAT | UBUS<br>DSL | UBUS<br>ALL | MCY<br>NCAT | MCY<br>CAT | MCY<br>DSL | MCY<br>ALL |       |
|-------------|--------------|-------------|-------------|-------------|-------------|------------|------------|------------|-------|
| 0.001       |              | 0           | 0           | 0.002       | 0.002       | 0.004      | 0.005      | 0          | 0.009 |
| 0.002       |              | 0           | 0           | 0           | 0           | 0.005      | 0.005      | 0          | 0.011 |



|              |             |             |             |            |           |           |           |             |
|--------------|-------------|-------------|-------------|------------|-----------|-----------|-----------|-------------|
| SBUS<br>NCAT | SBUS<br>CAT | SBUS<br>DSL | SBUS<br>ALL | MH<br>NCAT | MH<br>CAT | MH<br>DSL | MH<br>ALL | ALL<br>NCAT |
| 0.268        | 0.088       | 0.015       | 0.021       | 0.268      | 0.033     | 0.004     | 0.032     | 0.248       |

|              |             |             |             |            |           |           |           |             |
|--------------|-------------|-------------|-------------|------------|-----------|-----------|-----------|-------------|
| SBUS<br>NCAT | SBUS<br>CAT | SBUS<br>DSL | SBUS<br>ALL | MH<br>NCAT | MH<br>CAT | MH<br>DSL | MH<br>ALL | ALL<br>NCAT |
| 102.971      | 12.616      | 2.497       | 3.535       | 102.971    | 4.381     | 0.717     | 4.783     | 39.965      |

|              |             |             |             |            |           |           |           |             |
|--------------|-------------|-------------|-------------|------------|-----------|-----------|-----------|-------------|
| SBUS<br>NCAT | SBUS<br>CAT | SBUS<br>DSL | SBUS<br>ALL | MH<br>NCAT | MH<br>CAT | MH<br>DSL | MH<br>ALL | ALL<br>NCAT |
| 3.404        | 2.777       | 10.096      | 9.446       | 3.404      | 1.087     | 6.113     | 1.709     | 2.6         |

|              |             |             |             |            |           |           |           |             |
|--------------|-------------|-------------|-------------|------------|-----------|-----------|-----------|-------------|
| SBUS<br>NCAT | SBUS<br>CAT | SBUS<br>DSL | SBUS<br>ALL | MH<br>NCAT | MH<br>CAT | MH<br>DSL | MH<br>ALL | ALL<br>NCAT |
| 497.421      | 497.421     | 1505        | 1415.383    | 497.421    | 497.421   | 1505      | 618.128   | 217.289     |

|              |             |             |             |            |           |           |           |             |
|--------------|-------------|-------------|-------------|------------|-----------|-----------|-----------|-------------|
| SBUS<br>NCAT | SBUS<br>CAT | SBUS<br>DSL | SBUS<br>ALL | MH<br>NCAT | MH<br>CAT | MH<br>DSL | MH<br>ALL | ALL<br>NCAT |
| 0.006        | 0.005       | 0.014       | 0.014       | 0.006      | 0.005     | 0.014     | 0.006     | 0.003       |

|              |             |             |             |            |           |           |           |             |
|--------------|-------------|-------------|-------------|------------|-----------|-----------|-----------|-------------|
| SBUS<br>NCAT | SBUS<br>CAT | SBUS<br>DSL | SBUS<br>ALL | MH<br>NCAT | MH<br>CAT | MH<br>DSL | MH<br>ALL | ALL<br>NCAT |
| 0.015        | 0.01        | 0.389       | 0.355       | 0.015      | 0.003     | 0.133     | 0.018     | 0.035       |

|              |             |             |             |            |           |           |           |             |
|--------------|-------------|-------------|-------------|------------|-----------|-----------|-----------|-------------|
| SBUS<br>NCAT | SBUS<br>CAT | SBUS<br>DSL | SBUS<br>ALL | MH<br>NCAT | MH<br>CAT | MH<br>DSL | MH<br>ALL | ALL<br>NCAT |
| 0.012        | 0.012       | 0.012       | 0.012       | 0.012      | 0.012     | 0.012     | 0.012     | 0.005       |

|              |             |             |             |            |           |           |           |             |
|--------------|-------------|-------------|-------------|------------|-----------|-----------|-----------|-------------|
| SBUS<br>NCAT | SBUS<br>CAT | SBUS<br>DSL | SBUS<br>ALL | MH<br>NCAT | MH<br>CAT | MH<br>DSL | MH<br>ALL | ALL<br>NCAT |
| 0.013        | 0.013       | 0.013       | 0.013       | 0.013      | 0.013     | 0.013     | 0.013     | 0.008       |

|              |             |             |             |            |           |           |           |             |
|--------------|-------------|-------------|-------------|------------|-----------|-----------|-----------|-------------|
| SBUS<br>NCAT | SBUS<br>CAT | SBUS<br>DSL | SBUS<br>ALL | MH<br>NCAT | MH<br>CAT | MH<br>DSL | MH<br>ALL | ALL<br>NCAT |
| 13.178       | 17.029      | 0           | 16.963      | 13.178     | 17.552    | 0         | 17.509    | 41.458      |

|              |             |             |             |            |           |           |           |             |
|--------------|-------------|-------------|-------------|------------|-----------|-----------|-----------|-------------|
| SBUS<br>NCAT | SBUS<br>CAT | SBUS<br>DSL | SBUS<br>ALL | MH<br>NCAT | MH<br>CAT | MH<br>DSL | MH<br>ALL | ALL<br>NCAT |
| 0            | 0           | 6.698       | 6.698       | 0          | 0         | 6.698     | 6.698     | 0           |

| SBUS<br>NCAT | SBUS<br>CAT | SBUS<br>DSL | SBUS<br>ALL | MH<br>NCAT | MH<br>CAT | MH<br>DSL | MH<br>ALL | ALL<br>NCAT |
|--------------|-------------|-------------|-------------|------------|-----------|-----------|-----------|-------------|
| 0.652        | 0.033       | 0           | 0.004       | 0.652      | 0.016     | 0         | 0.021     | 0.259       |
| 0.647        | 0.064       | 0           | 0.007       | 0.647      | 0.031     | 0         | 0.034     | 0.256       |
| 0.653        | 0.121       | 0           | 0.012       | 0.653      | 0.059     | 0         | 0.058     | 0.259       |
| 0.682        | 0.172       | 0           | 0.016       | 0.682      | 0.083     | 0         | 0.08      | 0.27        |
| 0.735        | 0.215       | 0           | 0.02        | 0.735      | 0.105     | 0         | 0.099     | 0.291       |
| 0.81         | 0.253       | 0           | 0.023       | 0.81       | 0.123     | 0         | 0.116     | 0.321       |
| 0.842        | 0.283       | 0           | 0.026       | 0.842      | 0.138     | 0         | 0.129     | 0.334       |
| 0.72         | 0.27        | 0           | 0.025       | 0.72       | 0.123     | 0         | 0.115     | 0.286       |
| 0.784        | 0.286       | 0           | 0.026       | 0.784      | 0.13      | 0         | 0.122     | 0.311       |
| 0.848        | 0.302       | 0           | 0.028       | 0.848      | 0.138     | 0         | 0.129     | 0.336       |
| 0.912        | 0.318       | 0           | 0.029       | 0.912      | 0.145     | 0         | 0.136     | 0.361       |
| 0.975        | 0.333       | 0           | 0.031       | 0.975      | 0.151     | 0         | 0.142     | 0.387       |
| 1.039        | 0.347       | 0           | 0.032       | 1.039      | 0.158     | 0         | 0.149     | 0.412       |
| 1.103        | 0.361       | 0           | 0.033       | 1.103      | 0.164     | 0         | 0.155     | 0.437       |
| 1.167        | 0.374       | 0           | 0.035       | 1.167      | 0.17      | 0         | 0.161     | 0.463       |
| 1.231        | 0.387       | 0           | 0.036       | 1.231      | 0.176     | 0         | 0.167     | 0.488       |
| 1.294        | 0.4         | 0           | 0.037       | 1.294      | 0.182     | 0         | 0.172     | 0.513       |
| 1.358        | 0.411       | 0           | 0.038       | 1.358      | 0.187     | 0         | 0.178     | 0.539       |

| SBUS<br>NCAT | SBUS<br>CAT | SBUS<br>DSL | SBUS<br>ALL | MH<br>NCAT | MH<br>CAT | MH<br>DSL | MH<br>ALL | ALL<br>NCAT |
|--------------|-------------|-------------|-------------|------------|-----------|-----------|-----------|-------------|
|--------------|-------------|-------------|-------------|------------|-----------|-----------|-----------|-------------|

|         |        |   |       |         |        |   |        |        |
|---------|--------|---|-------|---------|--------|---|--------|--------|
| 61.004  | 8.512  | 0 | 0.837 | 61.004  | 5.212  | 0 | 5.21   | 22.324 |
| 54.02   | 16.677 | 0 | 1.54  | 54.02   | 10.212 | 0 | 9.467  | 19.768 |
| 41.701  | 31.972 | 0 | 2.859 | 41.701  | 19.577 | 0 | 17.447 | 15.26  |
| 31.577  | 45.882 | 0 | 4.059 | 31.577  | 28.096 | 0 | 24.718 | 11.555 |
| 23.65   | 58.41  | 0 | 5.142 | 23.65   | 35.767 | 0 | 31.28  | 8.655  |
| 17.92   | 69.554 | 0 | 6.107 | 17.92   | 42.59  | 0 | 37.132 | 6.558  |
| 14.386  | 79.314 | 0 | 6.955 | 14.386  | 48.567 | 0 | 42.274 | 5.264  |
| 44.453  | 70.134 | 0 | 6.199 | 44.453  | 41.03  | 0 | 36.079 | 16.267 |
| 70.24   | 72.184 | 0 | 6.417 | 70.24   | 42.23  | 0 | 37.412 | 25.704 |
| 93.293  | 74.302 | 0 | 6.638 | 93.293  | 43.469 | 0 | 38.747 | 34.14  |
| 113.614 | 76.487 | 0 | 6.86  | 113.614 | 44.747 | 0 | 40.086 | 41.576 |
| 131.202 | 78.74  | 0 | 7.084 | 131.202 | 46.065 | 0 | 41.428 | 48.012 |
| 146.057 | 81.061 | 0 | 7.309 | 146.057 | 47.423 | 0 | 42.773 | 53.448 |
| 158.178 | 83.449 | 0 | 7.536 | 158.178 | 48.82  | 0 | 44.122 | 57.884 |
| 167.567 | 85.904 | 0 | 7.765 | 167.567 | 50.257 | 0 | 45.474 | 61.32  |
| 174.223 | 88.428 | 0 | 7.996 | 174.223 | 51.733 | 0 | 46.829 | 63.756 |
| 178.146 | 91.018 | 0 | 8.229 | 178.146 | 53.248 | 0 | 48.188 | 65.191 |
| 179.336 | 93.677 | 0 | 8.463 | 179.336 | 54.804 | 0 | 49.55  | 65.627 |

| SBUS<br>NCAT | SBUS<br>CAT | SBUS<br>DSL | SBUS<br>ALL | MH<br>NCAT | MH<br>CAT | MH<br>DSL | MH<br>ALL | ALL<br>NCAT |
|--------------|-------------|-------------|-------------|------------|-----------|-----------|-----------|-------------|
| 0.819        | 1.259       | 0           | 0.111       | 0.819      | 0.769     | 0         | 0.676     | 0.626       |
| 0.891        | 1.897       | 0           | 0.167       | 0.891      | 1.158     | 0         | 1.014     | 0.68        |
| 1.02         | 3.017       | 0           | 0.265       | 1.02       | 1.842     | 0         | 1.609     | 0.779       |
| 1.132        | 3.93        | 0           | 0.345       | 1.132      | 2.4       | 0         | 2.093     | 0.865       |
| 1.227        | 4.636       | 0           | 0.407       | 1.227      | 2.83      | 0         | 2.468     | 0.938       |
| 1.305        | 5.134       | 0           | 0.451       | 1.305      | 3.135     | 0         | 2.733     | 0.997       |
| 1.366        | 5.425       | 0           | 0.476       | 1.366      | 3.312     | 0         | 2.887     | 1.043       |
| 1.392        | 5.494       | 0           | 0.482       | 1.392      | 3.355     | 0         | 2.925     | 1.063       |
| 1.358        | 5.474       | 0           | 0.481       | 1.358      | 3.343     | 0         | 2.914     | 1.038       |
| 1.314        | 5.443       | 0           | 0.478       | 1.314      | 3.324     | 0         | 2.897     | 1.004       |
| 1.26         | 5.401       | 0           | 0.474       | 1.26       | 3.298     | 0         | 2.874     | 0.962       |
| 1.194        | 5.349       | 0           | 0.469       | 1.194      | 3.267     | 0         | 2.846     | 0.912       |
| 1.118        | 5.286       | 0           | 0.464       | 1.118      | 3.228     | 0         | 2.812     | 0.854       |
| 1.031        | 5.213       | 0           | 0.457       | 1.031      | 3.183     | 0         | 2.772     | 0.787       |
| 0.933        | 5.129       | 0           | 0.45        | 0.933      | 3.132     | 0         | 2.726     | 0.713       |
| 0.824        | 5.034       | 0           | 0.441       | 0.824      | 3.074     | 0         | 2.675     | 0.63        |
| 0.705        | 4.929       | 0           | 0.432       | 0.705      | 3.01      | 0         | 2.618     | 0.539       |
| 0.575        | 4.812       | 0           | 0.422       | 0.575      | 2.939     | 0         | 2.555     | 0.439       |

| SBUS<br>NCAT | SBUS<br>CAT | SBUS<br>DSL | SBUS<br>ALL | MH<br>NCAT | MH<br>CAT | MH<br>DSL | MH<br>ALL | ALL<br>NCAT |
|--------------|-------------|-------------|-------------|------------|-----------|-----------|-----------|-------------|
| 170.667      | 9.546       | 0           | 1.095       | 170.667    | 9.546     | 0         | 10.21     | 78.167      |
| 185.2        | 19.039      | 0           | 1.947       | 185.2      | 19.039    | 0         | 18.606    | 84.824      |
| 213.408      | 37.866      | 0           | 3.636       | 213.408    | 37.866    | 0         | 35.25     | 97.744      |
| 240.47       | 56.482      | 0           | 5.305       | 240.47     | 56.482    | 0         | 51.698    | 110.138     |
| 266.386      | 74.887      | 0           | 6.953       | 266.386    | 74.887    | 0         | 67.95     | 122.008     |
| 291.155      | 93.081      | 0           | 8.582       | 291.155    | 93.081    | 0         | 84.005    | 133.352     |
| 314.778      | 111.063     | 0           | 10.19       | 314.778    | 111.063   | 0         | 99.865    | 144.172     |
| 425.955      | 188.899     | 0           | 17.163      | 425.955    | 188.899   | 0         | 168.613   | 195.093     |
| 426.29       | 223.17      | 0           | 20.16       | 426.29     | 223.17    | 0         | 198.332   | 195.246     |
| 426.625      | 255.418     | 0           | 22.979      | 426.625    | 255.419   | 0         | 226.297   | 195.4       |
| 426.96       | 285.644     | 0           | 25.622      | 426.96     | 285.644   | 0         | 252.508   | 195.553     |
| 427.294      | 313.847     | 0           | 28.088      | 427.295    | 313.847   | 0         | 276.965   | 195.706     |
| 427.629      | 340.027     | 0           | 30.377      | 427.629    | 340.027   | 0         | 299.669   | 195.859     |
| 427.964      | 364.184     | 0           | 32.489      | 427.964    | 364.184   | 0         | 320.618   | 196.013     |
| 428.299      | 386.319     | 0           | 34.425      | 428.299    | 386.319   | 0         | 339.814   | 196.166     |
| 428.633      | 406.43      | 0           | 36.183      | 428.633    | 406.43    | 0         | 357.256   | 196.319     |
| 428.968      | 424.519     | 0           | 37.765      | 428.968    | 424.519   | 0         | 372.944   | 196.473     |
| 429.303      | 440.585     | 0           | 39.17       | 429.303    | 440.586   | 0         | 386.878   | 196.626     |

| SBUS<br>NCAT | SBUS<br>CAT | SBUS<br>DSL | SBUS<br>ALL | MH<br>NCAT | MH<br>CAT | MH<br>DSL | MH<br>ALL | ALL<br>NCAT |
|--------------|-------------|-------------|-------------|------------|-----------|-----------|-----------|-------------|
| 0.003        | 0           | 0           | 0           | 0.003      | 0         | 0         | 0         | 0.001       |
| 0.003        | 0           | 0           | 0           | 0.003      | 0         | 0         | 0         | 0.001       |
| 0.003        | 0.001       | 0           | 0           | 0.003      | 0.001     | 0         | 0.001     | 0.001       |
| 0.003        | 0.001       | 0           | 0           | 0.003      | 0.001     | 0         | 0.001     | 0.001       |
| 0.003        | 0.002       | 0           | 0           | 0.003      | 0.001     | 0         | 0.001     | 0.001       |
| 0.003        | 0.002       | 0           | 0           | 0.003      | 0.002     | 0         | 0.001     | 0.002       |
| 0.004        | 0.002       | 0           | 0           | 0.004      | 0.002     | 0         | 0.002     | 0.002       |
| 0.005        | 0.003       | 0           | 0           | 0.005      | 0.002     | 0         | 0.002     | 0.002       |
| 0.005        | 0.003       | 0           | 0           | 0.005      | 0.003     | 0         | 0.003     | 0.002       |
| 0.006        | 0.004       | 0           | 0           | 0.006      | 0.003     | 0         | 0.003     | 0.003       |
| 0.006        | 0.004       | 0           | 0           | 0.006      | 0.003     | 0         | 0.003     | 0.003       |
| 0.007        | 0.004       | 0           | 0           | 0.007      | 0.004     | 0         | 0.003     | 0.003       |
| 0.007        | 0.005       | 0           | 0           | 0.007      | 0.004     | 0         | 0.004     | 0.003       |
| 0.007        | 0.005       | 0           | 0           | 0.007      | 0.004     | 0         | 0.004     | 0.003       |
| 0.007        | 0.005       | 0           | 0           | 0.007      | 0.005     | 0         | 0.004     | 0.003       |
| 0.007        | 0.005       | 0           | 0           | 0.007      | 0.005     | 0         | 0.004     | 0.003       |
| 0.007        | 0.006       | 0           | 0.001       | 0.007      | 0.005     | 0         | 0.004     | 0.003       |
| 0.007        | 0.006       | 0           | 0.001       | 0.007      | 0.005     | 0         | 0.005     | 0.003       |



| SBUS<br>NCAT | SBUS<br>CAT | SBUS<br>DSL | SBUS<br>ALL | MH<br>NCAT | MH<br>CAT | MH<br>DSL | MH<br>ALL | ALL<br>NCAT |
|--------------|-------------|-------------|-------------|------------|-----------|-----------|-----------|-------------|
| 0.011        | 0.001       | 0           | 0           | 0.011      | 0         | 0         | 0         | 0.016       |
| 0.01         | 0.002       | 0           | 0           | 0.01       | 0.001     | 0         | 0.001     | 0.014       |
| 0.008        | 0.004       | 0           | 0           | 0.008      | 0.001     | 0         | 0.001     | 0.011       |
| 0.006        | 0.006       | 0           | 0.001       | 0.006      | 0.002     | 0         | 0.002     | 0.008       |
| 0.004        | 0.008       | 0           | 0.001       | 0.004      | 0.002     | 0         | 0.002     | 0.006       |
| 0.003        | 0.01        | 0           | 0.001       | 0.003      | 0.003     | 0         | 0.002     | 0.005       |
| 0.003        | 0.011       | 0           | 0.001       | 0.003      | 0.003     | 0         | 0.003     | 0.004       |
| 0.007        | 0.015       | 0           | 0.001       | 0.007      | 0.004     | 0         | 0.004     | 0.01        |
| 0.011        | 0.016       | 0           | 0.001       | 0.011      | 0.004     | 0         | 0.004     | 0.016       |
| 0.015        | 0.016       | 0           | 0.001       | 0.015      | 0.004     | 0         | 0.004     | 0.022       |
| 0.018        | 0.016       | 0           | 0.001       | 0.018      | 0.004     | 0         | 0.004     | 0.026       |
| 0.021        | 0.017       | 0           | 0.002       | 0.021      | 0.005     | 0         | 0.004     | 0.031       |
| 0.023        | 0.017       | 0           | 0.002       | 0.023      | 0.005     | 0         | 0.004     | 0.034       |
| 0.025        | 0.018       | 0           | 0.002       | 0.025      | 0.005     | 0         | 0.004     | 0.037       |
| 0.027        | 0.018       | 0           | 0.002       | 0.027      | 0.005     | 0         | 0.005     | 0.039       |
| 0.028        | 0.019       | 0           | 0.002       | 0.028      | 0.005     | 0         | 0.005     | 0.041       |
| 0.029        | 0.02        | 0           | 0.002       | 0.029      | 0.005     | 0         | 0.005     | 0.041       |
| 0.029        | 0.02        | 0           | 0.002       | 0.029      | 0.005     | 0         | 0.005     | 0.042       |





| SBUS<br>NCAT | SBUS<br>CAT | SBUS<br>DSL | SBUS<br>ALL | MH<br>NCAT | MH<br>CAT | MH<br>DSL | MH<br>ALL | ALL<br>NCAT |   |
|--------------|-------------|-------------|-------------|------------|-----------|-----------|-----------|-------------|---|
|              | 0           | 0           | 0           | 0          | 0         | 0         | 0         | 0           | 0 |

| SBUS<br>NCAT | SBUS<br>CAT | SBUS<br>DSL | SBUS<br>ALL | MH<br>NCAT | MH<br>CAT | MH<br>DSL | MH<br>ALL | ALL<br>NCAT |       |
|--------------|-------------|-------------|-------------|------------|-----------|-----------|-----------|-------------|-------|
|              | 0           | 0           | 0.001       | 0.001      | 0         | 0.003     | 0         | 0.003       | 0.006 |
|              | 0           | 0           | 0.001       | 0.001      | 0         | 0         | 0         | 0           | 0.009 |



|       |       |      |
|-------|-------|------|
| ALL   | ALL   | ALL  |
| CAT   | DSL   | ALL  |
| 0.018 | 0.022 | 0.02 |

|       |       |       |
|-------|-------|-------|
| ALL   | ALL   | ALL   |
| CAT   | DSL   | ALL   |
| 1.827 | 2.425 | 2.108 |

|       |       |       |
|-------|-------|-------|
| ALL   | ALL   | ALL   |
| CAT   | DSL   | ALL   |
| 0.231 | 8.204 | 0.998 |

|         |          |         |
|---------|----------|---------|
| ALL     | ALL      | ALL     |
| CAT     | DSL      | ALL     |
| 364.679 | 1590.738 | 479.612 |

|       |       |       |
|-------|-------|-------|
| ALL   | ALL   | ALL   |
| CAT   | DSL   | ALL   |
| 0.004 | 0.015 | 0.005 |

|       |       |       |
|-------|-------|-------|
| ALL   | ALL   | ALL   |
| CAT   | DSL   | ALL   |
| 0.014 | 0.258 | 0.037 |

|       |       |      |
|-------|-------|------|
| ALL   | ALL   | ALL  |
| CAT   | DSL   | ALL  |
| 0.008 | 0.028 | 0.01 |

|       |       |       |
|-------|-------|-------|
| ALL   | ALL   | ALL   |
| CAT   | DSL   | ALL   |
| 0.013 | 0.023 | 0.013 |

|        |     |       |
|--------|-----|-------|
| ALL    | ALL | ALL   |
| CAT    | DSL | ALL   |
| 25.054 | 0   | 25.16 |

|     |       |       |
|-----|-------|-------|
| ALL | ALL   | ALL   |
| CAT | DSL   | ALL   |
| 0   | 8.137 | 8.137 |

| ALL<br>CAT | ALL<br>DSL | ALL<br>ALL |
|------------|------------|------------|
| 0.004      | 0          | 0.006      |
| 0.007      | 0          | 0.009      |
| 0.014      | 0          | 0.015      |
| 0.02       | 0          | 0.021      |
| 0.025      | 0          | 0.026      |
| 0.03       | 0          | 0.03       |
| 0.034      | 0          | 0.034      |
| 0.042      | 0          | 0.041      |
| 0.038      | 0          | 0.038      |
| 0.04       | 0          | 0.04       |
| 0.042      | 0          | 0.042      |
| 0.045      | 0          | 0.045      |
| 0.047      | 0          | 0.047      |
| 0.049      | 0          | 0.049      |
| 0.051      | 0          | 0.051      |
| 0.053      | 0          | 0.053      |
| 0.055      | 0          | 0.055      |
| 0.056      | 0          | 0.057      |

| ALL<br>CAT | ALL<br>DSL | ALL<br>ALL |
|------------|------------|------------|
|------------|------------|------------|



|        |   |        |
|--------|---|--------|
| 0.854  | 0 | 0.991  |
| 1.678  | 0 | 1.727  |
| 3.239  | 0 | 3.124  |
| 4.683  | 0 | 4.421  |
| 6.01   | 0 | 5.617  |
| 7.219  | 0 | 6.712  |
| 8.311  | 0 | 7.706  |
| 10.275 | 0 | 9.617  |
| 8.64   | 0 | 8.196  |
| 9.119  | 0 | 8.715  |
| 9.563  | 0 | 9.191  |
| 9.97   | 0 | 9.625  |
| 10.341 | 0 | 10.017 |
| 10.676 | 0 | 10.366 |
| 10.975 | 0 | 10.673 |
| 11.237 | 0 | 10.937 |
| 11.463 | 0 | 11.158 |
| 11.653 | 0 | 11.338 |

|       |     |       |
|-------|-----|-------|
| ALL   | ALL | ALL   |
| CAT   | DSL | ALL   |
|       |     |       |
| 0.373 | 0   | 0.35  |
| 0.433 | 0   | 0.405 |
| 0.538 | 0   | 0.503 |
| 0.625 | 0   | 0.584 |
| 0.694 | 0   | 0.648 |
| 0.745 | 0   | 0.696 |
| 0.778 | 0   | 0.726 |
| 0.818 | 0   | 0.763 |
| 0.827 | 0   | 0.772 |
| 0.822 | 0   | 0.766 |
| 0.813 | 0   | 0.758 |
| 0.802 | 0   | 0.747 |
| 0.788 | 0   | 0.734 |
| 0.77  | 0   | 0.717 |
| 0.75  | 0   | 0.698 |
| 0.727 | 0   | 0.676 |
| 0.701 | 0   | 0.651 |
| 0.672 | 0   | 0.624 |

| ALL<br>CAT | ALL<br>DSL | ALL<br>ALL |
|------------|------------|------------|
| 13.889     | 0          | 13.512     |
| 16.503     | 0          | 15.982     |
| 22.241     | 0          | 21.387     |
| 28.657     | 0          | 27.412     |
| 35.751     | 0          | 34.057     |
| 43.524     | 0          | 41.323     |
| 51.975     | 0          | 49.209     |
| 113.46     | 0          | 106.329    |
| 129.746    | 0          | 121.337    |
| 145.79     | 0          | 136.122    |
| 161.593    | 0          | 150.685    |
| 177.154    | 0          | 165.025    |
| 192.474    | 0          | 179.143    |
| 207.552    | 0          | 193.039    |
| 222.389    | 0          | 206.712    |
| 236.985    | 0          | 220.162    |
| 251.339    | 0          | 233.39     |
| 265.452    | 0          | 246.395    |

| ALL<br>CAT | ALL<br>DSL | ALL<br>ALL |
|------------|------------|------------|
| 0          | 0          | 0          |
| 0          | 0          | 0          |
| 0          | 0          | 0          |
| 0          | 0          | 0          |
| 0          | 0          | 0          |
| 0.001      | 0          | 0.001      |
| 0.001      | 0          | 0.001      |
| 0.001      | 0          | 0.001      |
| 0.001      | 0          | 0.001      |
| 0.002      | 0          | 0.001      |
| 0.002      | 0          | 0.002      |
| 0.002      | 0          | 0.002      |
| 0.002      | 0          | 0.002      |
| 0.002      | 0          | 0.002      |
| 0.002      | 0          | 0.002      |
| 0.002      | 0          | 0.002      |
| 0.003      | 0          | 0.002      |
| 0.003      | 0          | 0.003      |

| ALL<br>CAT | ALL<br>DSL | ALL<br>ALL |
|------------|------------|------------|
| 0.001      | 0          | 0.001      |
| 0.002      | 0          | 0.002      |
| 0.004      | 0          | 0.004      |
| 0.006      | 0          | 0.005      |
| 0.007      | 0          | 0.007      |
| 0.009      | 0          | 0.008      |
| 0.01       | 0          | 0.009      |
| 0.016      | 0          | 0.015      |
| 0.017      | 0          | 0.016      |
| 0.019      | 0          | 0.017      |
| 0.02       | 0          | 0.018      |
| 0.021      | 0          | 0.019      |
| 0.022      | 0          | 0.02       |
| 0.022      | 0          | 0.021      |
| 0.023      | 0          | 0.021      |
| 0.023      | 0          | 0.022      |
| 0.024      | 0          | 0.022      |
| 0.024      | 0          | 0.022      |

| ALL<br>CAT | ALL<br>DSL | ALL<br>ALL |   |
|------------|------------|------------|---|
|            | 0          | 0          | 0 |
|            | 0          | 0          | 0 |
|            | 0          | 0          | 0 |
|            | 0          | 0          | 0 |
|            | 0          | 0          | 0 |

| ALL<br>CAT | ALL<br>DSL | ALL<br>ALL |   |
|------------|------------|------------|---|
|            | 0          | 0          | 0 |

|            |            |            |   |
|------------|------------|------------|---|
| ALL<br>CAT | ALL<br>DSL | ALL<br>ALL |   |
|            | 0          | 0          | 0 |

|            |            |            |   |
|------------|------------|------------|---|
| ALL<br>CAT | ALL<br>DSL | ALL<br>ALL |   |
|            | 0          | 0          | 0 |

|            |            |            |   |
|------------|------------|------------|---|
| ALL<br>CAT | ALL<br>DSL | ALL<br>ALL |   |
|            | 0          | 0          | 0 |

|            |            |            |   |
|------------|------------|------------|---|
| ALL<br>CAT | ALL<br>DSL | ALL<br>ALL |   |
|            | 0.9        | 0.094      | 1 |
|            | 0.921      | 0.069      | 1 |

|       |       |   |
|-------|-------|---|
| 0.936 | 0.041 | 1 |
|-------|-------|---|

[illegible]

## Urbemis 2007 Version 9.2.4

## Detail Report for Annual Area Source Mitigated Emissions (Tons/Year)

File Name: C:\Documents and Settings\20197\Desktop\Silva Estats Area with no natural gas or hearth.urb924

Project Name: Silva Estates Operational Emissions

Project Location: San Joaquin County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

## AREA SOURCE EMISSION ESTIMATES (Annual Tons Per Year, Mitigated)

| <u>Source</u>                 | <u>ROG</u> | <u>NOx</u> | <u>CO</u> | <u>SO2</u> | <u>PM10</u> | <u>PM2.5</u> | <u>CO2</u> |
|-------------------------------|------------|------------|-----------|------------|-------------|--------------|------------|
| Natural Gas                   | 0.00       | 0.00       | 0.00      | 0.00       | 0.00        | 0.00         | 0.00       |
| Hearth                        | 0.00       | 0.00       | 0.00      | 0.00       | 0.00        | 0.00         | 0.00       |
| Landscape                     | 0.15       | 0.01       | 0.85      | 0.00       | 0.00        | 0.00         | 1.40       |
| Consumer Products             | 1.40       |            |           |            |             |              |            |
| Architectural Coatings        | 0.29       |            |           |            |             |              |            |
| TOTALS (tons/year, mitigated) | 1.84       | 0.01       | 0.85      | 0.00       | 0.00        | 0.00         | 1.40       |

Area Source Mitigation Measures Selected

| <u>Mitigation Description</u>                                                                                                                | <u>Percent Reduction</u> |
|----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Percent of Wood Stoves changed from: 56% to: 0%                                                                                              |                          |
| Percent of Gas Fireplaces changed from: 44% to: 0%                                                                                           |                          |
| Percent of No Hearth changed from: 0% to: 100%                                                                                               |                          |
| Percent of Residential Landscape Equipment that are Electrically Powered and have Electrical Outlets at the the Front and Rear of Residences | 3.00                     |
| Percent of Commercial and Industrial Landscape Equipment that are Electrically Powered and have Electrical Outlets Available                 | 3.00                     |



Page: 2

**9/23/2009 4:37:15 PM**

|                                                 |       |
|-------------------------------------------------|-------|
| For Residential Interior Use Low VOC Coating    | 0.00  |
| For Residential Exterior Use Low VOC Coating    | 0.00  |
| For Nonresidential Interior Use Low VOC Coating | 45.60 |
| For Nonresidential Exterior Use Low VOC Coating | 45.60 |

Area Source Changes to Defaults

Percent residential using natural gas changed from 60% to 0%

Percent nonresidential using natural gas changed from 100% to 0%

Percentage of residences with wood stoves changed from 0% to 56%

Percentage of residences with natural gas fireplaces changed from 0% to 44%

### 5.4.3 Best Performance Standards for Development Projects

#### Introduction

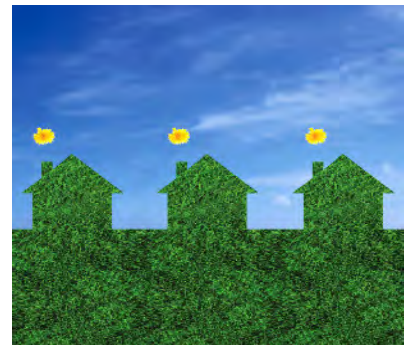
As presented previously in Chapter 1, Figure 1: *California's Greenhouse Gas Emissions by Sector*, the Commercial and Residential sectors represents nine (9) percent of the State's greenhouse gas (GHG) emissions inventory. Greenhouse gas (GHG) emissions from development projects result from operational and transportation related activities. GHG emissions from operational activities are dominated by energy consumed for space and water heating, lighting, and operation of electrical appliances. GHG emissions from transportation activities are dominated by consumption of gasoline and diesel for movement of goods and people.

In characterizing GHG emissions from the Commercial and Residential sectors, the 1990 emissions set by the California Air Resources Board (ARB) are based on fuel use activities which comprise more than 80 percent of the overall 1990 statewide greenhouse gas emissions. The forecasted 2020 business-as-usual emissions developed by ARB considered GHG emissions contributions resulting from energy consumption only (e.g.: natural gas, distillate, wood, and diesel)<sup>18</sup>. Thus, reducing GHG emissions from these sectors has significant overlap with energy efficiency and conservation measures (E-1 and CR-1) addressed in ARB's *Climate Change Proposed Scoping Plan*-Electricity Generation sector that was adopted by ARB's Board in December 2008.

#### 5.4.3.1 GHG Emissions and Reduction Measures

##### 5.4.3.1.1 Energy Efficiency and Conservation

The Electricity Generation sector overlaps and intercepts many of the GHG sectors identified by ARB. Generating electricity consumes about half of all natural gas in the state, making electricity production the single largest consumer of natural gas. The Residential sector consumes another 22 percent of the state's total natural gas consumption; 88 percent of which is used for space and water heating<sup>19</sup>. Comprising 23 percent of the state's total GHG emissions, the Electricity Generation sector is



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<sup>18</sup> Staff report – *California 1990 Greenhouse Gas Emissions Level and 2020 Emissions Limit*. California Air Resources Board, November 16, 2007

<sup>19</sup> *Integrated Energy Policy Report, 2007 Summary*, P.18. California Energy Commission.

California's second largest source of GHG emissions. The Transportation sector is number one, responsible for 38 percent of the State's GHG emissions.

Strategies for reducing GHG emissions from the Electricity Generation sector include reducing the amount of energy consumed and reducing GHG emissions resulting from electricity production. Of these two strategies, the California Energy Commissions (CEC) has determined that reducing GHG emissions depends largely on the success of California's energy efficiency and renewable energy programs<sup>20</sup>. The importance of increasing energy efficiency is mirrored by ARB's determination that increasing energy efficiency will be California's most effective tool for achieving GHG reductions in the Electricity Generation sector<sup>21</sup>.

Existing progressive green building standards provide a starting point for performance standards. Existing green building rating systems like LEED (Leadership in Energy and Environmental Design), the California Green Building Code, and others, contain examples of measures that are likely to result in substantial GHG emission reductions from residential and commercial projects.

As presented below in Table 2, ARB has proposed 12 strategies for maximizing energy efficiency, four of which are based on further development of the State's building and appliance energy efficiency codes and standards.

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<sup>20</sup> *Integrated Energy Policy Report, 2007 Summary*, P.6. California Energy Commission.

<sup>21</sup> *Climate Change Proposed Scoping Plan Appendices; Vol. I, Electricity and Natural Gas*. P.C-87. California Air Resources Board, October 2008

Table 2- Twelve Strategies for Maximizing Energy Efficiency<sup>22</sup>

|                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| • <b>Cross-cutting Strategy for Buildings</b>                                                                                                           |
| ○ “Zero Net Energy” Buildings                                                                                                                           |
| • <b>Codes and Standards Strategies</b>                                                                                                                 |
| ○ More stringent building codes and appliance standards                                                                                                 |
| ○ Broader standards for new types of appliances and for water efficiency                                                                                |
| ○ Improved compliance and enforcement for existing standards                                                                                            |
| ○ Voluntary efficiency and green building targets beyond mandatory codes                                                                                |
| • <b>Strategies for Existing Buildings</b>                                                                                                              |
| ○ Voluntary and mandatory whole-building retrofits for existing buildings                                                                               |
| ○ Innovated financing to overcome first-cost and split incentives for energy efficiency, on-site renewables, and high efficiency distributed generation |
| • <b>Existing and Improved Utility Program Strategies</b>                                                                                               |
| ○ More aggressive utility programs to achieve long-term savings                                                                                         |
| • <b>Other Needed Strategies</b>                                                                                                                        |
| ○ Water system and water use efficiency and conservation measures                                                                                       |
| ○ Local government programs that lead by example and tap local authority over planning, development, and code compliance                                |
| ○ Additional industrial and agricultural efficiency efforts                                                                                             |
| ○ Providing real time energy information to help customers conserve                                                                                     |
| ○ and optimize energy performance                                                                                                                       |

#### 5.4.3.1.2 Building and Appliance Standards

Under California Public Resources Code, the CEC is authorized to adopt and update Building Efficiency Standards and Appliance Efficiency Regulation. Building standards include both prescriptive and performance standards for new construction, and for alterations and additions to existing buildings. The standards include pre-defined performance levels for various building components and energy consumption. Examples of such standards are new Cool Roof requirements, mechanical ventilation requirements, compliance option

<sup>22</sup> *Climate Change Proposed Scoping Plan Appendices*; Vol. I, Electricity and Natural Gas. P.C-100. California Air Resources Board, October 2008

credits for distributed energy storage, and calculation of Time Dependent Valuation energy.

Because most of California's older buildings were built to lesser or non-existent building efficiency standards, improving the energy efficiency of existing residential and commercial buildings in California could produce substantial GHG benefits. In fact, improving the efficiency of California's existing building stocks is the single most important activity to reduced GHG emissions within the electricity and natural gas sectors<sup>23</sup>. New standards will become in effect in August 2009.

California's Appliance Efficiency Regulations include standards for both federally and non-federally regulated appliances. The standards apply to appliances sold or offered for sale in California, with a few exceptions. Appliance standards improve the operation and efficiency of refrigerators, freezers, air conditioners and other appliances. Normally, the CEC updates building standards on a three-year cycle. The most recent update occurred in 2008, and several updates are expected to occur between now and 2020<sup>24</sup>. As with building standards, the CEC establishes appliance standards at its discretion. The most recent update occurred in 2007, and several updates are expected to occur between now and 2020<sup>25</sup>.

As presented in ARB's Scoping Plan, the California Public Utilities Commission working with the CEC, California's Investor owned utilities (IOUs) and numerous stakeholders, prepared the Long Term Energy Efficiency Strategic Plan. This long-term plan recommends strategies that can enable the utilities and other factors to achieve energy efficiency goals for the 2009-2020 period and beyond, contributing ignorantly to the State's AB 32 goals. Two targets adopted by the CPUC, and supported by the CEC, are as follows:

1. By 2020, all new residential buildings will be zero net energy; and
2. By 2030, all new commercial buildings will be zero net energy<sup>26</sup>.

Zero net energy building, which is yet to be defined by energy agencies, would be those that are very energy efficient and generate

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<sup>23</sup> *Climate Change Proposed Scoping Plan Appendices*; Vol. I, Electricity and Natural Gas. P.C-108. California Air Resources Board, October 2008

<sup>24</sup> *Climate Change Proposed Scoping Plan Appendices*; Vol. I, Electricity and Natural Gas. P.C-104. California Air Resources Board, October 2008

<sup>25</sup> *Climate Change Proposed Scoping Plan Appendices*; Vol. I, Electricity and Natural Gas. P.C-104. California Air Resources Board, October 2008

<sup>26</sup> *Climate Change Proposed Scoping Plan Appendices*; Vol. I, Electricity and Natural Gas. P.C-112. California Air Resources Board, October 2008

enough energy on-site to completely offset the energy consumed within the building over the course of a year.

#### **5.4.3.1.3 Green Building Strategy**

“Green buildings” are designed, built, operated, renovated, and maintained using an integrated approach that creates and ensures a healthy and comfortable environment while maximizing energy and resource efficiencies<sup>27</sup>. As concluded by ARB, the design, construction, demolition, renovation, maintenance and operation of buildings together account for considerable electricity, and natural gas demand. Water usage and waste generation further contributes to GHG emissions. Mining, harvesting, processing, and transportation of building materials used in construction, and products used in the operation of buildings, accounts for further GHG emissions. The choice of where buildings are sited and how they are integrated within communities also affects transportation patterns and infrastructure needs resulting in potentially significant GHG impacts. The *Climate Change Proposed Scoping Plan* (adopted by ARB Board in December 2008) includes a Green Building Strategy that when implemented will further reduce GHG emissions from both existing and new buildings.

#### **5.4.3.1.4 Vehicle Use**

GHG emission from vehicle use is the other factor contributing to GHG emissions from development projects and overlap with emission reductions targeted by ARB under the Transportation sector of the *Climate Change Proposed Scoping Plan*. As determined by ARB, the Transportation sector is responsible for 38 percent of the State’s GHG emissions. ARB has established three overarching strategies for reducing GHG emissions from vehicle use: more efficient vehicles, lower-carbon fuels, and reduction in vehicle miles traveled (VMT)<sup>28</sup>. ARB has stated that these strategies will be achieved through regulations, market mechanisms, and land use policy. ARB’s recommended actions to reduce GHG emissions from the Transportation sector are listed below in Table 3.

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<sup>27</sup> *Climate Change Proposed Scoping Plan Appendices*; Vol. I, Electricity and Natural Gas. P.C-138. California Air Resources Board, October 2008

<sup>28</sup> *Climate Change Proposed Scoping Plan Appendices*; Vol. I, Transportation. P.C-55. California Air Resources Board, October 2008

Table 3: Actions for Reducing Transportation GHG Emissions<sup>29</sup>

|                                                                             |
|-----------------------------------------------------------------------------|
| • California Cap-and-Trade Program linked to the Western Climate Initiative |
| • Pavley I and Pavley II – Light-Duty Vehicle Standards                     |
| • Vehicle Efficiency Measures                                               |
| • Low-Carbon Fuel Standard                                                  |
| • Ship Electrification at Ports                                             |
| • Goods Movement Efficiency Measures                                        |
| • Heavy-Duty Vehicle GHG Emission Reduction – Aerodynamic Efficiency        |
| • Medium- and Heavy-Duty Vehicle Hybridization                              |
| • Regional Transportation-Related Greenhouse Gas Targets                    |
| • High Speed Rail                                                           |

#### 5.4.3.1.5 Regional Transportation-Related Greenhouse Gas Targets<sup>30</sup>

Transportation planning is done on a regional level in major urban areas, reflecting local land use patterns and decisions. Through regional planning efforts, such as the “Blueprint” planning model, regions can select future growth scenarios that lead to more environmentally and economically sustainable and energy efficient communities. Senate Bill 375 (SB 375) (Steinberg, Chapter 728, Statutes of 2008) establishes mechanisms for the development of regional GHG reduction targets for passenger vehicle. Under SB 375, ARB is required to develop, in consultation with metropolitan planning organizations (MPOs) passenger vehicle GHG reduction targets for 2020 and 2035. The bill creates incentives for local governments and developers by providing relief from certain CEQA requirements for development projects that are consistent with regional plans that achieve the GHG reduction targets.

#### 5.4.3.1.6 GHG Baseline & Business as Usual Emissions

ARB estimated the statewide 1990 greenhouse gas emissions level of 427 MMT CO<sub>2</sub>E based on data from State and federal agencies, international organizations, and California industries. Upon approval by

<sup>29</sup> *Climate Change Proposed Scoping Plan Appendices*; Vol. I, Transportation. P.C-55. California Air Resources Board, October 2008

<sup>30</sup> *Climate Change Proposed Scoping Plan Appendices*; Vol. I, Transportation. P.C-75. California Air Resources Board, October 2008

ARB's Board in December 2007, the 1990 emissions level became the 2020 emissions limit, which represents an aggregated emissions limit for California. The gross statewide emissions in 1990 were 433 MMT CO<sub>2</sub>E with forestry sinks offsetting approximately 7 MMT CO<sub>2</sub>E, resulting in net emissions to the atmosphere of approximately 427 MMT CO<sub>2</sub>E. The 1990 emissions level is a compilation or inventory of the amount and type of greenhouse gases emitted by different sources on an annual basis<sup>31</sup>. The resulting 2020 BAU estimates of 596 MMT CO<sub>2</sub>E are compared to the 1990 level target for 2020 of 427 MMT CO<sub>2</sub>E in yr 1990 to determine the total statewide GHG reductions needed which is 169 MMT CO<sub>2</sub>E or approximately 30% reduction.

The California Air Resources Board (ARB) forecasting approach for BAU greenhouse gas emissions in 2020 uses emissions estimates from 2002 through 2004 to develop baseline GHG emissions from which to grow emissions into the future<sup>32</sup>. The 3-year average baseline emissions estimate of 2002-2004 includes emissions from older, less energy efficient structures and emissions from structures built to comply with building and appliance standards in effect during the baseline years. Based on the GHG emissions ARB determined, in order to achieve the GHG reduction targets established in AB 32 development projects after 2004 would need to reduce GHG emissions by about 10% from the 1990 emissions and for all sectors altogether by about 30% from BAU emissions as projected for 2020.

#### **5.4.3.1.7 Achieved GHG Emission Reductions**

Building and appliance standards are critical tools in reducing energy demand. During the baseline years of 2002-2004, all new construction was required to comply with building standards adopted in 2001. Building and Appliance standards have been revised since 2004. Each successive version of the building and appliance standards requires new technologies and tighter performance standards, thus, reducing GHG emissions from new development projects, as well as reducing emissions from renovation of older structures<sup>33</sup>. The building standards were updated in 2005 and new 2008 standards have been published that take effect in 2009. The 2009 standards contain numerous

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<sup>31</sup> *Business-as-Usual Forecasting Method Summary*, P. 1. California Air Resources Board, July 30, 2008

<sup>32</sup> *California 1990 Greenhouse Gas Emissions Level and 2020 Emissions Limit*; P. 2. California Air Resources Board, November 16, 2007

<sup>33</sup> *Climate Change Proposed Scoping Plan Appendices; Vol. I, Electricity and Natural Gas*. P.C-104. California Air Resources Board, October 2008



requirements for improving energy efficiency in both residential and non-residential structures. The appliance standards were updated in 2003, 2005 and again in 2006, with further updates planned. Thus, it is reasonable to conclude that new development projects occurring after 2004 are already implementing measures that reduce GHG emissions below the 2002-2004 emissions.

As presented below in Tables 4 and 5, preliminary estimates by the District show that 2007 residential use of natural gas is about 20% less than the 2002-2004 baseline period. Reducing natural gas consumption should result in a concomitant reduction in GHG emissions. Thus, these data suggest that new residential developments may already be emitting less GHG emissions than the 2002-2004 baseline period. CEC also has data demonstrating that although the number of residential customers have increased, the average household use has been reduced as a result of the appliance and building energy efficiency standards<sup>34</sup>.

Emission reduction targets established by ARB are based on average fuel consumption for the baseline year. Therefore, emission reductions occurring after the baseline year should be credited towards the achieving the required percent reduction. The District recognizes that this apparent reduction may be influenced by other factors other than building and appliance standards and that commercial development may not have experienced equivalent reductions. Before finalizing its determination, the District will conduct a more detailed analysis of development project energy consumption and associated emission reductions.

Table 4: 2002-2004 Per capita GHG Emissions from natural gas - Residential

|             | CA MTCO <sub>2</sub> <sup>1</sup> | SJV MTCO <sub>2</sub> | SJV average household <sup>2</sup> | MTCO <sub>2</sub> per Dwelling Unit |
|-------------|-----------------------------------|-----------------------|------------------------------------|-------------------------------------|
| Residential | 26.87                             | 2.821                 | 1,161,751.00                       | 0.0000024                           |

Notes:

- <sup>1</sup> Excel with embedded PDF document, Air Resources Board, <http://www.arb.ca.gov/cc/inventory/data/forecast.htm>
- <sup>2</sup> From E-5 Population and Housing Estimates for Cities, Counties and the State, 2001-2009, with 2000 Benchmark, California Energy Commission, <http://www.cedf.ca.gov/research/demographic/reports/estimates/e-5/2009/>
- It is assumed that natural gas consumption for San Joaquin Valley (SJV) is about 10.5% of California's.

Table 5: 2007 Per capita GHG Emissions from natural gas - Residential

<sup>34</sup> California Residential Natural Gas Consumption,  
[http://energyalmanac.ca.gov/naturalgas/residential\\_natural\\_gas\\_consumption.html](http://energyalmanac.ca.gov/naturalgas/residential_natural_gas_consumption.html)

|             | SJV MTCO <sub>2</sub> <sup>1</sup> | SJV average household <sup>2</sup> | MTCO <sub>2</sub> per Dwelling Unit |
|-------------|------------------------------------|------------------------------------|-------------------------------------|
| Residential | 3                                  | 1,304,301.00                       | 0.0000019                           |

Notes:

<sup>-1</sup> Calculated value based on data from California Energy Consumption Database, <http://www.ecdms.energy.ca.gov/> and methodologies by Air Resource Board, <http://www.arb.ca.gov/cc/inventory/1990level/1990level.htm>

<sup>-2</sup> From E-5 Population and Housing Estimates for Cities, Counties and the State, 2001-2009, with 2000 Benchmark, California Energy Commission, <http://www.cedf.ca.gov/research/demographic/reports/estimates/e-5/2009/>

## 5.4.4 Energy Efficiency and Land Use Planning

As previously discussed, GHG emissions from commercial and residential develop are dominated by building and appliance energy efficiencies and GHG emissions resulting from movement of goods and people. Thus, there is considerable overlap between Commercial and Residential sectors and the Electricity Generation and Transportation Sectors.

In developing its recommendations for approved GHG emission reduction measures for development projects, the District considered the extent to which development projects will be subject to GHG emission reduction requirements imposed by ARB and other state agencies with statutory authority for reducing GHG emissions from development projects. Additionally, the District considered GHG emission reductions that have already been achieved as a result of changes to the building and appliance standards adopted by the CEC after the 2002-2004 baseline period.

### 5.4.4.1 Energy Efficiency and Conservation GHG Emission Reduction Measures

As previously discussed, the CEC has statutory authority for establishing performance standards for building and appliance efficiencies. California's per capita electricity use has stayed flat for the past 30 years because of efficiency standards and utility efficiency programs<sup>35</sup>.

The California Public Utilities Commission and the California Energy Commission provided their recommendations to ARB on strategies for reducing GHG emissions in the electricity and natural gas sectors<sup>36</sup>. Included in their evaluations for potential areas of GHG emissions

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<sup>35</sup> *Integrated Energy Policy Report 2007 Summary*. California Energy Commission. 2007

<sup>36</sup> *Final Opinion and Recommendations on Greenhouse Gas regulatory Strategies*. CA Energy Commission & CA public Utilities Commissions, October 2008

reductions is the energy efficiency through codes and standards. The CEC has set the 2008 standards for building energy efficiency standards which are to be in effect as of January 1, 2010.

The CEC and the Climate Action Team Energy Subgroup have the necessary expertise and statutory authority for establishing performance standard for building and appliance standards. The CEC and Climate Change Action Team Energy Subgroup have already done outstanding research and brought forth recommendations to ARB. The measures or areas identified for the energy sector are already those that would bring the majority of the reductions and already reflect the best practices in energy efficiency.

The District concludes that for commercial and residential developments, compliance with building and appliance standards established by CEC reduces project specific GHG emissions and thus, constitutes a valid GHG emission reduction measure for energy efficiency and conservation.

#### **5.4.4.2 Land Use Planning GHG Emission Reduction Measures**

Reducing vehicular emissions from commercial and residential developments overlap emission reductions targeted by ARB under the Transportation sector of the *Climate Change Proposed Scoping Plan*. ARB has established three overarching strategies for reducing GHG emissions from vehicle use: more efficient vehicles, lower-carbon fuels, and reduction in vehicle miles traveled (VMT). Local governments have the ability to directly influence both siting and design of new residential and commercial developments in a way that reduces vehicle miles traveled (VMT). Reductions in VMT can be achieved through diversified land use patterns that provide people greater access to alternative forms of transportation, including transit, biking and walking. Reductions in VMT can be achieved through diversified land use patterns where people can live, work, and play without having to drive great distances. Land use planning that reduces VMT can also reduce the GHG emissions by reducing land consumption, energy use, water use, and waste.

Potential reductions in GHG emissions from land use planning are established through Senate Bill 375 (SB375). The bill focuses on housing and transportation planning decisions to reduce fossil fuel consumption and conserve farmlands and habitat. It allows an opportunity to provide incentives to locate housing developments closer

to where people work and go to school, allowing them to reduce vehicle miles traveled every year. SB375 integrates AB 32's goal to reduce GHG emissions into transportation planning by requiring that a sustainable communities strategy be added to the regional transportation Plan. SB 375 also directs ARB to work with California's Metropolitan Planning Organizations to align their regional transportation, housing and land-use plans and prepare a "sustainable communities strategy" to reduce the amount of vehicle miles traveled in their respective regions and demonstrate the region's ability to attain its greenhouse gas reduction targets to be achieved from the automobile and light truck sectors for 2020 and 2035. When it is determined that the SCS cannot achieve the targets, the Metropolitan Planning Organization The must develop an Alternative Planning Strategy.

Per guidance provided by OPR, CEQA authorizes reliance on previously approved plans and mitigation programs that have adequately analyzed and mitigated GHG emissions to a less than significant level.

#### **5.4.5 Illustrative GHG Emission Reduction Measures for Development Projects**

Both GHG and criteria pollutant emissions from development projects are direct results of energy consumption and vehicle miles traveled. Land use decisions that would impact GHG emissions are the same land use decisions that would impact criteria pollutant emissions from development projects. The District, through implementation of District Rule 9510 (Indirect Source Review) has considerable experience with evaluating criteria pollutant emissions from development projects, and evaluating the mitigating effects of project design elements.

Any combination of approved GHG emissions reduction measures achieving a combined 29% of GHG emissions compared to the established Baseline GHG emissions factor per unit of activity is considered **Best Performance Standard** (BPS) for the respective type of development project. Projects achieving a 29% reduction in GHG emissions would be determined to have a less than significant individual and cumulative impact for GHG emissions. To be considered to have a less than significant individual and cumulative impact for GHG emissions, projects not achieving a 29% reduction would require quantification of GHG emissions and demonstration that GHG emissions have been reduced or mitigated by 29%, including GHG emission reductions achieved since the 2002-2004 baseline.

The following discussion illustrates possible GHG emission reduction measure, as presented in Appendix J, for development projects (residential, commercial and industrial) and provides the basis and/or rationale for each, as well as an assessment of potential GHG emissions reduction impact relative to a 2002-2004 emissions inventory baseline. It should be noted that these examples of BPS are for illustrative purposes only, and should not be used by any lead agency as District-approved or sanctioned standards. As discussed further in this staff report, the proposed process of establishing BPS provides opportunity for public input into the development of BPS.

To simplify the evaluation process, the District will develop a point system and tools for use by lead agencies to score the effectiveness of the achieved BPS. An important effort that will contribute to the establishment of GHG Emission Reduction Measures for development projects is the ongoing work by the California Air Pollution Control Officers Association (CAPCOA) to identify and quantify control efficiencies for development mitigation measures reducing GHG and criteria pollutant emissions. The District is an active participant in the CAPCOA effort.

The illustrative GHG Emission Reduction Measures table lists the mitigation measures that relate to bicycle/pedestrian use, transit, parking, commercial and residential development design, building design, and commuting (See Appendix J). Each measure has been assigned a land use type for which a point value in reduction may be claimed. The point values are used to quantify the approximate emission reduction factor associated with a particular mitigation measure. The land use types include residential (R), commercial (C), and mixed-used (M). Each point associated with a particular measure is equivalent to an equal percentage of emission reductions. For example, implementing mitigation measures in a project that adds up to 15 mitigation points means that the measures are anticipated to achieve a 15% reduction in project related GHG operational emissions. The demonstrated GHG emission reductions would be added to the GHG emission reductions achieved since the 2002-2004 baseline.

## **BICYCLE/PEDESTRIAN/TRANSIT MEASURES**

### **1. Bike Parking Measure - Commercial, Mixed-Use**

#### Measure Description

Non-residential projects provide plentiful short-term and long-term bicycle parking facilities to meet peak season maximum demand. Short term facilities are provided at a minimum ratio of one bike rack space per 20 vehicle spaces. Long-term facilities provide a minimum ratio of one long-term bicycle storage space per 20 employee parking spaces.



#### Reduction Methodology & Source<sup>37</sup>

As a rule of thumb, the Center for Clean Air Policy (CCAP) guidebook attributes a 1% to 5% reduction associated with the use of bicycles, which reflects the assumption that their use is typically for shorter trips. Based on the CCAP guidebook, the TIAX report allots 2.5% reduction for all bicycle-related measures and a 1/4 of that for this measure alone. Source: CCAP Transportation Emission Guidebook; TIAX Results of 2005 Literature Search Conducted by TIAX on behalf of SMAQMD.



#### Achieved GHG Emission Reductions

**With this measure the estimated achieved GHG emission reduction is 0.625%.**

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<sup>37</sup> *Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007.* Sacramento Metropolitan Air Quality Management District.

## **2. End of Trip Facilities Measure - Commercial, Mixed-Use**

### Measure Description

Non-residential projects provide “end-of-trip” facilities including showers, lockers, and changing space. Facilities shall be provided in the following ratio: four clothes lockers and one shower provided for every 80 employee parking spaces. For projects with 160 or more employee parking spaces, separate facilities are required for each gender.

### Reduction Methodology & Source<sup>38</sup>

The Transportation Demand Management (TDM) Encyclopedia allows a 2-5% reduction for worksite showers and lockers. The CCAP guidebook attributes a 1% to 5% reduction associated with the use of bicycles, which reflects the assumption that their use is typically for shorter trips. Based on the CCAP guidebook, the TIAX report allots 2.5% reduction for all bicycle-related measures and a 1/4 of that for this measure alone. Source: TDM Encyclopedia May 11, 2006; CCAP Transportation Emission Guidebook; TIAX Results of 2005 Literature Search Conducted by TIAX on behalf of SMAQMD.

### Achieved GHG Emission Reductions

***With this measure the estimated achieved GHG emission reduction is 0.625%.***

## **3. Bike Parking at Multi-Unit Residential Measure - Residential**

### Measure Description

Long-term bicycle parking is provided at apartment complexes or condominiums without garages. Project provides 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.

### Reduction Methodology & Source<sup>39</sup>

As a rule of thumb, the CCAP guidebook attributes a 1% to 5% reduction associated with the use of bicycles, which reflects the assumption that their use is typically for shorter trips. Based on the CCAP guidebook, the TIAX report allots 2.5% reduction for all bicycle-related measures and a 25% of that for this measure

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<sup>38</sup> *Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007.* Sacramento Metropolitan Air Quality Management District.

<sup>39</sup> *Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007.* Sacramento Metropolitan Air Quality Management District.

alone. Source: CCAP Transportation Emission Guidebook; TIAX Results of 2005 Literature Search Conducted by TIAX on behalf of SMAQMD.

Achieved GHG Emission Reductions

**With this measure the estimated achieved GHG emission reduction is 0.625%.**

#### **4. Proximity to Bike Path/Bike Lanes Measure - Commercial, Mixed-Use, Residential**

Measure Description

Entire project is located within 1/2 mile of an existing Class I or Class II bike lane and project design includes a comparable network that connects the project uses to the existing offsite facility. Existing facilities are defined as those facilities that are physically constructed and ready for use prior to the first 20% of the projects occupancy permits being granted. 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 1/2 mile. Bicycle route connects to all streets contiguous with project site. Bicycle route has minimum conflicts with automobile parking and circulation facilities. All streets internal to the project wider than 75 feet have class II bicycle lanes on both sides.

Reduction Methodology & Source<sup>40</sup>

As a rule of thumb, the CCAP guidebook attributes a 1% to 5% reduction associated with the use of bicycles, which reflects the assumption that their use is typically for shorter trips. Based on the CCAP guidebook, the TIAX report allots 2.5% reduction for all bicycle-related measures and a 1/4 of that for this measure alone. Source: CCAP Transportation Emission Guidebook; TIAX Results of 2005 Literature Search Conducted by TIAX on behalf of SMAQMD.

Achieved GHG Emission Reductions

**With this measure the estimated achieved GHG emission reduction is 0.625%.**

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<sup>40</sup> *Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007.* Sacramento Metropolitan Air Quality Management District.



## **5. Pedestrian Network Measure - Commercial, Mixed-Use, Residential**

### Measure Description

The project provides a pedestrian access network that internally links all uses and connects to existing external streets and pedestrian facilities. Existing facilities are defined as those facilities that are physically constructed and ready for use prior to the first 20% of the projects occupancy permits being granted. The project provides a pedestrian access network that internally links all uses for connecting to planned external streets and pedestrian facilities (facilities must be included pedestrian master plan or equivalent).

### Reduction Methodology & Source<sup>41</sup>

Because this measure also eliminates physical barriers between residential and non-residential uses that impede bicycle or pedestrian circulation, this measure is similar in nature to 6. As cited in the TIAX report, the CCAP guidebook attributes a 1% reduction in VMT. Source: CCAP Transportation Emission Guidebook; TIAX Results of 2005 Literature Search Conducted by TIAX on behalf of SMAQMD.

### Achieved GHG Emission Reductions

***With this measure the estimated achieved GHG emission reduction is between 0.5% and 1.0%.***

## **6. Pedestrian Barriers Minimized - Commercial, Mixed-Use, Residential**

### Measure Description

Site design and building placement minimize barriers to pedestrian access and interconnectivity. Physical barriers such as walls, berms, landscaping, and slopes between residential and non-residential uses that impede bicycle or pedestrian circulation are eliminated. Barriers to pedestrian access of neighboring facilities and sites are minimized. This measure is not meant to prevent the limited use of barriers to ensure public safety by prohibiting access to hazardous areas, etc..

### Reduction Methodology & Source<sup>42</sup>

The reduction is based on the TIAX report, which indicates a 1% reduction, and the CCAP report, which attributes a 1% to 5% reduction. Source: CCAP Transportation Emission Guidebook; TIAX Results of 2005 Literature Search Conducted by TIAX on behalf of SMAQMD.

### Achieved GHG Emission Reductions

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<sup>41</sup> *Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007.* Sacramento Metropolitan Air Quality Management District.

<sup>42</sup> *Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007.* Sacramento Metropolitan Air Quality Management District.

***With this measure the estimated achieved GHG emission reduction is 1.0%.***

## **7. Bus Shelter for “existing” Transit Service Measure - Commercial, Mixed-Use, Residential**

### Measure Description

Bus or Streetcar service provides headways of one hour or less for stops within 1/4 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).

### Reduction Methodology & Source<sup>43</sup>

This reduction is based on the assumption that the measure applies to providing bus stop route information & benches. Emission reductions are based on conclusion obtained from the TIAX report and the CCAP guidebook. Source: CCAP Transportation Emission Guidebook; TIAX Results of 2005 Literature Search Conducted by TIAX on behalf of SMAQMD.

### Achieved GHG Emission Reductions

***With this measure the estimated achieved GHG emission reduction is 0.5%.***

## **8. Bus Shelter for “planned” Transit Service - Commercial, Mixed-Use, Residential**

### Measure Description

Project provides transit stops with safe and convenient bicycle/pedestrian access. Project provides essential transit stop improvements (i.e., shelters, route information, benches, and lighting) in anticipation of future transit service. If measure 7 is selected, it excludes this measure.

### Reduction Methodology & Source<sup>44</sup>

This reduction is based on the assumption that the measure applies to providing bus stop route information & benches. Emission reductions are based on conclusion obtained from the TIAX report and the CCAP guidebook. Source: CCAP Transportation Emission Guidebook; TIAX Results of 2005 Literature Search Conducted by TIAX on behalf of SMAQMD.

### Achieved GHG Emission Reductions

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<sup>43</sup> *Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007.* Sacramento Metropolitan Air Quality Management District.

<sup>44</sup> *Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007.* Sacramento Metropolitan Air Quality Management District.

***With this measure the estimated achieved GHG emission reduction is 0.25%.***

## **9. Traffic Calming Measure - Commercial, Mixed-Use, Residential**

### Measure Description

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 measures. Traffic calming measures include: bike lanes, center islands, closures (cul-de-sacs), diverters, education, forced turn lanes, roundabouts, speed humps, etc.

### Reduction Methodology & Source<sup>45</sup>

SMAQMD appears to have the best information available as reflected in their Guidance for Land Use Emission Reductions, which allocates reductions by the percent of intersections with traffic calming improvements as indicated in the table below. We were unable to locate more specific information. Source: Draft Update to SMAQMD Guidance for Land Use Emission Reductions.

### Achieved GHG Emission Reductions

***With this measure the estimated achieved GHG emission reduction is between 0.25% and 1.0%. (See Table in Appendix J)***

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<sup>45</sup> *Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007.* Sacramento Metropolitan Air Quality Management District.

## **PARKING MEASURES**

### **10. Paid Parking - Commercial, Mixed-Use, Residential**

#### **10.1 Paid Parking: Urban Site within ¼ mile from transit stop-**

##### Measure Description

Employee and/or customer paid parking system. Daily charge for parking must be equal to or greater than the cost of a local transit pass + 20%. Monthly charge for parking must be equal to or greater than the cost of a local monthly transit pass, plus 20%.

##### Reduction Methodology & Source<sup>46</sup>

Shoupe, 2005. Parking Cash Out. [\$5/day reduces drive-alone share by 21% 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 (Wilson 1991)) [Reported 1-10% reduction in trips to central city sites, and 2-4% in suburban sites (Urban Institute)]. The District has used a conservative number for this approach.



##### Achieved GHG Emission Reductions

**With this measure the estimated achieved GHG emission reduction is 5.0%.**

#### **10.2 Paid Parking: Urban Site greater than ¼ mile from transit stop-**

##### Measure Description

Employee and/or customer paid parking system. Daily charge for parking must be equal to or greater than the cost of a local transit pass + 20%. Monthly charge for parking must be equal to or greater than the cost of a local monthly transit pass, plus 20%.

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<sup>46</sup> Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007. Sacramento Metropolitan Air Quality Management District.

Reduction Methodology & Source<sup>47</sup>

Shoupe, 2005. Parking Cash Out. [\$5/day reduces drive-alone share by 21% 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 (Wilson 1991)) [Reported 1-10% reduction in trips to central city sites, and 2-4% in suburban sites (Urban Institute)]. The District has used a conservative number for this approach.

Achieved GHG Emission Reductions

**With this measure the estimated GHG achieved emission reduction is 1.5%.**

### 10.3 Paid Parking: Suburban site within 1/4 mile of transit stop

Measure Description

Employee and/or customer paid parking system. Daily charge for parking must be equal to or greater than the cost of a local transit pass + 20%. Monthly charge for parking must be equal to or greater than the cost of a local monthly transit pass, plus 20%.

Reduction Methodology & Source<sup>48</sup>

Shoupe, 2005. Parking Cash Out. [\$5/day reduces drive-alone share by 21% 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 (Wilson 1991)) [Reported 1-10% reduction in trips to central city sites, and 2-4% in suburban sites (Urban Institute)]. The District has used a conservative number for this approach.

Achieved GHG Emission Reductions

**With this measure the estimated GHG achieved emission reduction is 2.0%.**

### 10.4 Paid Parking: Suburban site greater than 1/4 mile from transit stop

Measure Description

Employee and/or customer paid parking system. Daily charge for parking must be equal to or greater than the cost of a local transit pass + 20%. Monthly charge for parking must be equal to or greater than the cost of a local monthly transit pass, plus 20%.

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<sup>47</sup> Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007. Sacramento Metropolitan Air Quality Management District.

<sup>48</sup> Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007. Sacramento Metropolitan Air Quality Management District.

Reduction Methodology & Source<sup>49</sup>

Shoupe, 2005. Parking Cash Out. [\$5/day reduces drive-alone share by 21% 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 (Wilson 1991)] [Reported 1-10% reduction in trips to central city sites, and 2-4% in suburban sites (Urban Institute)]. The District has used a conservative number for this approach.

Achieved GHG Emission Reductions

**With this measure the estimated GHG achieved emission reduction is 1.0%.**

## **11. Parking Cash Out Measure - Commercial, Mixed-Use**

Measure Description

Employer provides employees with a choice of forgoing subsidized parking for a cash payment equivalent to the cost of the parking space to the employer.

Reduction Methodology & Source<sup>50</sup>

Shoupe, 2005. Parking Cash Out. [2/3 as effective as charging for parking (8 case studies - chapter 4, 13% reduction in solo driver trips, -12% VMT per employee, and -11% in vehicle trips per commuter)]. The District has used a conservative number for this approach.

Achieved GHG Emission Reductions

**With this measure the estimated GHG achieved emission reduction is 0.6%.**

## **12. Minimum Parking - Commercial, Mixed-Use, Residential**

Measure Description

Provide minimum amount of parking required. Special review of parking required. If zoning codes in the San Joaquin Valley area have provisions that allow a project to build less than the typically mandated amount of parking if the development features design elements that reduce the need for automobile use. This measure recognizes the air quality benefit that results when facilities minimize parking needs, and grants mitigation value to project that implement all available parking reductions. Once land uses are determined, the trip reduction

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<sup>49</sup> *Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007.* Sacramento Metropolitan Air Quality Management District.

<sup>50</sup> *Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007.* Sacramento Metropolitan Air Quality Management District.



factor associated with this measure can be determined by utilizing the Institute of Transportation Engineers (ITE) Parking generation publication<sup>51</sup>. 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%. The maximum achievable trip reduction is 6%. For projects where retail space occupies 50% or more of the total built space, do not use December specific parking generation rates (from ITE). Percent Trip Reduction =  $50 * [(min \text{ parking required by code} - ITE \text{ peak parking demand}) / (ITE \text{ peak parking demand})]$ .

Reduction Methodology & Source<sup>52</sup>

Nelson/Nygaard, 2005. pg. 16. (trip reduction = ((actual parking provision - ITE parking generation rate) / ITE parking generation rate) \* 0.5). (Note: this formula is not verbatim from that cited in the Nelson/Nygaard document, since the formula provided did not make sense for computing trip reductions. This is what EDAW believes was meant, and this method actually works.) The allowed reduction is the range mid-point.

Achieved GHG Emission Reductions

**With this measure the estimated GHG achieved emission reduction is 3.0%.**

### **13. Parking Reduction Beyond Code Measure - Commercial, Mixed-Use, Residential**

Measure Description

Provide parking reduction less than code. Special review of parking required. Recommend a Shared Parking strategy. Trip reductions associated with parking reductions beyond code shall be computed in the same manner as described under measure 11, as the same methodology applies. The maximum achievable trip reduction is 12%. 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. For example, residential uses and/or restaurant/retail uses, which experience peak parking demand during the evening/night and on the weekends, arrange to share parking facilities with office and/or educational uses, which experience peak demand during business hours and during the week.

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<sup>51</sup> The ITE Parking Generation Manual (3<sup>rd</sup> Edition) is available at: <http://www.ite.org/tripgen/parking.asp>. The ISBN number for this publication is 0-935403-79-5.

<sup>52</sup> *Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007*. Sacramento Metropolitan Air Quality Management District.

Reduction Methodology & Source<sup>53</sup>

Nelson/Nygaard, 2005. pg. 16. (trip reduction = ((actual parking provision - ITE parking generation rate) / ITE parking generation rate) \*0.5). (Note: this formula is not verbatim from that cited in the Nelson/Nygaard document, since the formula provided did not make sense for computing trip reductions. This is what EDAW believes was meant, and this method actually works.) The allowed reduction is the range mid-point. Trip reduction

Achieved GHG Emission Reductions

**With this measure the estimated GHG achieved emission reduction is 6.0%.**

**14. Pedestrian Pathway through Parking Measure - Commercial, Mixed-Use, Residential**

Measure Description

Provide a parking lot design that includes clearly marked and shaded pedestrian pathways between transit facilities and building entrances. Pathway must connect to all transit facilities internal or adjacent to project site. Site plan should demonstrate how the pathways are clearly marked, shaded, and are placed between transit facilities and building entrances.

Reduction Methodology & Source<sup>54</sup>

The CCAP guidebook attributes between 1% and 4% reduction from all pedestrian measures. There is no specific information related to providing shaded pedestrian pathways between transit facilities and building entrances. It could be said that providing covered carpool/vanpool spaces near the entrance to the buildings has the similar goal of increasing the comfort of the user while walking to the building entrance. The TIAX report assigns a 1% reduction to the covered carpool measure. Transit usage is most affected by the headway times and the proximity to the destination. Therefore, it would seem reasonable to assume .5%. Source: CCAP Transportation Emission Guidebook; TIAX Results of 2005 Literature Search Conducted by Tax on behalf of SMAQMD.

Achieved GHG Emission Reductions

**With this measure the estimated GHG achieved emission reduction is 0.5%.**

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<sup>53</sup> Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007. Sacramento Metropolitan Air Quality Management District.

<sup>54</sup> Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007. Sacramento Metropolitan Air Quality Management District.



## **15. Off Street Parking Measure - Commercial, Mixed-Use, Residential**

### Measure Description

**For 1.5% reduction**, parking facilities shall not be sited adjacent to public roads contiguous with project site. Functioning pedestrian entrances to major site uses are located along street frontage. Parking facilities do not restrict pedestrian, bicycle, or transit access from adjoining uses. Proponent shall provide information demonstrating compliance with measure requirements including, but not limited to, a description of where parking is located relative to the buildings on the site, site plans, maps, or other graphics, which demonstrate the placement of parking facilities behind on-site buildings relative to streets contiguous with the project site. Surrounding uses should be high density or mixed-use, there shall be other adjoining pedestrian and bicycle connections, such as wide sidewalks and bike lanes, and surrounding uses shall also implement measure 15.

**For 1.0% reduction**, (parking structures only) proponent must show that parking facilities that face street frontage feature ground floor retail along street frontage. Proponent shall provide information demonstrating compliance with measure requirements including, but not limited to, a written description of the parking facility and the amount of retail space on the ground floor, site plans, maps, or other graphics demonstrating the placement of retail/commercial space along all street fronts contiguous with parking structure.

**For 0.1% reduction**, the project is not among high-density or mixed uses, is not connected to pedestrian or bicycle access ways, or is among uses that do not also hide parking. This point value is reflective of the importance that other pedestrian and density measures be in place in order for this measure to be effective.

### Reduction Methodology & Source<sup>55</sup>

No empirical support for this specific measure; however, range of values is based on other pedestrian-oriented measures. The range recognizes the dependence of this measure on other measures. To be awarded 1.0 points, development must be in an area with density, wide sidewalks, and where other uses are also hiding parking. The efficacy of this measure is reduced to 0.1 if the development does not include other pedestrian and mixed-use measures. Parking structure with ground-floor retail is awarded 0.5.

### Achieved GHG Emission Reductions

***With this measure the estimated achieved GHG emission reduction is between 0.1% and 1.5%.***

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<sup>55</sup> *Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007.* Sacramento Metropolitan Air Quality Management District.



Reduction Methodology & Source<sup>56</sup>

No empirical support for this measure, beyond that provided by SMAQMD in its draft guidance. According to Nelson/Nygaard, 2005, trip generation at the non-residential end is influenced by density to a much lesser degree, so this is fairly consistent with the transit reductions applied in measure 20. Assumes a 30 minute transit schedule.

Achieved GHG Emission Reductions

**With this measure the estimated achieved GHG emission reduction is between 0.2% and 1.5%.**

**17. Orientation toward “existing” transit, bikeway, or pedestrian corridor - Commercial, Mixed- Use, Residential**

Measure Description

Project is oriented towards existing transit, bicycle, or pedestrian corridor. Setback distance is minimized. Setback distance between project and adjacent uses is reduced to the minimum allowed under jurisdiction code. Setback distance between different buildings on project site is reduced to the minimum allowed under jurisdiction code. Setbacks between project buildings and sidewalks is reduced to the minimum allowed under jurisdiction code. Buildings are oriented towards street frontage. Primary entrances to buildings are located along public street frontage. Project provides bicycle access to existing bicycle corridor. Project provides access to existing pedestrian corridor. (Cannot get points for both this measure and measure 17).

Reduction Methodology & Source<sup>57</sup>

The CCAP guidebook attributes a 0.5% reduction per 1% improvement in transit frequency. Based on a case study presented in the CCAP report, a 10% increase in transit rider ship would result in a 0.5% reduction. Source: CCAP Transportation Emission Guidebook; TIAX Results of 2005 Literature Search Conducted by Tax on behalf of SMAQMD.

Achieved GHG Emission Reductions

**With this measure the estimated achieved GHG emission reduction is 0.50%.**

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<sup>56</sup> Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007. Sacramento Metropolitan Air Quality Management District.

<sup>57</sup> Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007. Sacramento Metropolitan Air Quality Management District.

## **18. Orientation toward “planned” transit, bikeway, or pedestrian corridor - Commercial, Mixed-Use**

### Measure Description

Project is oriented towards planned transit, bicycle, or pedestrian corridor. Setback distance is minimized. Planned transit, bicycle or pedestrian corridor must be in the MTP, RT Master Plan, General Plan, or Community Plan. Setback distance between project and existing or planned adjacent uses is minimized or non-existent. 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).

### Reduction Methodology & Source<sup>58</sup>

The CCAP guidebook attributes a 0.5 % reduction per 1% improvement in transit frequency. Based on a case study presented in the CCAP report, a 10% increase in transit rider ship would result in a 0.5% reduction. Source: CCAP Transportation Emission Guidebook; TIAX Results of 2005 Literature Search Conducted by Tax on behalf of SMAQMD.

### Achieved GHG Emission Reductions

**With this measure the estimated achieved GHG emission reduction is 0.25%.**

## **19. Residential Density Measure - Residential**

### Measure Description

**Residential Density with “no transit”**, project provides high-density residential development. Mitigation value is based on project density with no transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area.

**Residential Density with “planned” light rail transit**, project provides high-density residential development. Mitigation value is based on project density and proximity to planned light rail transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Transit facilities must be within 1/4 mile of project border. Project

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<sup>58</sup> *Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007.* Sacramento Metropolitan Air Quality Management District.

provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border. Planned transit must be in a MTP or RT Master Plan.

**Residential Density with “planned” bus rapid transit**, project provides high-density residential development. Mitigation value is based on project density and proximity to planned bus rapid transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border. Planned transit must be in a MTP or RT Master Plan.

**Residential Density with “existing” light rail transit**, project provides high-density residential development. Mitigation value is based on project density and proximity to existing light rail transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Existing transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border.

**Residential Density with “existing” bus rapid transit**, project provides high-density residential development. Mitigation value is based on project density and proximity to existing bus rapid transit. Density is calculated by determining the number of units per acre ("du/acre") within the residential portion of the project's net lot area. Existing transit facilities must be within 1/4 mile of project border. Project provides safe and convenient bicycle/pedestrian access to all transit stop(s) within 1/4 mile of project border.

Reduction Methodology & Source<sup>59</sup>

Nelson/Nygaard, 2005. pg 11. (trip reduction =  $0.6 * (1 - (19749 * ((4.814 + \text{households per residential acre}) / (4.814 + 7.14))^{-.639}) / 25914)$ ) (Holtzclaw et al 2002). Asymptote of 60% reduction. **Relative to a 3 du/ac development.** Note that there is no direct empirical support for the added reductions for proximity to transit; the 60% asymptote in this equation is to correct for double-counting from transit services, mix-of-uses, and bicycle and pedestrian connections (which could contribute another 40% reduction).

Achieved GHG Emission Reductions

**With this measure the estimated achieved GHG emission reduction is: See Table in Appendix J.**

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<sup>59</sup> *Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007.* Sacramento Metropolitan Air Quality Management District.

## **20. Street Grid Measure - Commercial, Mixed-Use, Residential**

### Measure Description

Multiple and direct street routing (grid style). The measure applies to projects with an internal connectivity factor (CF) $\geq$ 0.80, and average of 1/4 mile or less between external connections along perimeter of project. [CF=# of intersections / (# of cul-de-sacs + intersections)].

### Reduction Methodology & Source<sup>60</sup>

Reductions are based on CCAP estimates for similar measures. Source: CCAP Transportation Emission Guidebook.

### Achieved GHG Emission Reductions

**With this measure the estimated achieved GHG emission reduction is 1.0%.**

## **21. Neighborhood Electric Vehicle Access - Commercial, Mixed-Use, Residential**

### Measure Description

Make physical development consistent with requirements for neighborhood electric vehicles (NEV). Current studies show that for most trips, NEVs do not replace gas, fueled vehicles as the primary vehicle. For the purpose of providing incentives for developers to promote NEV use, assume the percent reductions noted below.

**For 1.5% reduction**, a neighborhood shall have internal NEV connections and connections to other existing NEV networks serving all other types of uses.

**For 1.0% reduction**, a neighborhood shall have internal and external connections to surrounding neighborhoods.

**For 0.5% reduction**, a neighborhood has internal connections only.

### Reduction Methodology & Source<sup>61</sup>

No direct empirical support for this measure available. May not be relevant/applicable in the near term, until NEVs become more common/inexpensive. Current studies show that for most trips, NEVs do not

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<sup>60</sup> *Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007.* Sacramento Metropolitan Air Quality Management District.

<sup>61</sup> *Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007.* Sacramento Metropolitan Air Quality Management District.



replace gas-fueled vehicles as the primary vehicle. For the purposes of providing incentives for developers to promote NEV use, assume that a neighborhood with internal NEV connections only receives 0.5 points, with external connections to other surrounding uses, 1.0 point, with external connections to other NEV networks, 1.5 points.

Achieved GHG Emission Reductions

**With this measure the estimated achieved GHG emission reduction is between 0.5% and 1.5%.**

## **22. Affordable Housing Component Measure - Residential**

Measure Description

Residential development projects of 5 or more dwelling units provide a deed-restricted low-income housing component on-site (as defined in Ch 22.35 of Sacramento County Ordinance Code) [Developers who pay into In-Lieu Fee Programs are not considered eligible to receive credit for this measure]. Percent reductions shall be calculated according to the following formula: % reduction=% units deed-restricted below the market rate housing \*0.04. The table in Appendix J illustrates sample percent reductions for the percentage of units that are deed restricted below the market housing rate. If the percentage is not listed on the table, the calculation must be done using the equation provided in the methodology.

Reduction Methodology & Source<sup>62</sup>

Nelson/Nygaard, 2005. pg. 15. (trip reduction = % units deed-restricted below market rate housing \* 0.04).

Achieved GHG Emission Reductions

**With this measure the estimated achieved GHG emission reduction is between 0.6% and 4.0%.**

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<sup>62</sup> Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007. Sacramento Metropolitan Air Quality Management District.

## MIXED-USE MEASURES

### **23. Urban Mixed-Use Measure - Mixed Use**

#### Measure Description

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 inter-relationships and a coherent physical design. Mitigation points for this measure depend on job to housing ratio.



#### Reduction Methodology & Source<sup>63</sup>

Nelson/Nygaard, 2005. pg. 12. (trip reduction =  $(1 - (\text{ABS}(1.5 \cdot h - e) / (1.5 \cdot h + e)) - 0.25) / 0.25 \cdot 0.03$ ) where h = study area housing units, e = study area employment (Criterion & Fehr & Peers, 2001). Asymptote of 9% reduction, and an ideal 1.5 jobs per household. Note, these point reductions were taken from Urbemis 2007 9.2.4<sup>64</sup> data according to sample jobs to housing ratio. Cannot get credit for both this measure and the following measures: Suburban Mixed-Use and Other Mixed-Use.

#### Achieved GHG Emission Reductions

**With this measure the estimated achieved GHG emission reduction is between 3.0% and 9.0%.**

### **24. Suburban Mixed-Use Measure - Commercial, Mixed-Use, Residential**

#### Measure Description

Have at least three of the following on site and/or offsite within ¼ mile: Residential Development, Retail Development, Park, Open Space, or Office.

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<sup>63</sup> Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007. Sacramento Metropolitan Air Quality Management District.

<sup>64</sup> Urbemis 2007 Version 9.2.4. Rimpo and Associates.



Reduction Methodology & Source<sup>65</sup>

By definition, this type of land use implies that housing availability is greater than employment availability. On a project-by-project basis, use formula :Nelson/Nygaard, 2005. pg. 12. (trip reduction =  $(1 - (\text{ABS}(1.5 \cdot h - e) / (1.5 \cdot h + e)) - 0.25) / 0.25 \cdot 0.03$ ) where h = study area housing units, e = study area employment (Criterion & Fehr & Peers, 2001) to obtain higher than 3% reduction. Otherwise, assume 3% max reduction. Cannot get credit for this measure and the following measures: Other Mixed-Use and Urban Mixed-Use measures.

Achieved GHG Emission Reductions

**With this measure the estimated achieved GHG emission reduction is 3.0%.**

## **25. Other Mixed-Use Measure - Mixed-Use, Residential**

Measure Description

All residential units are within ¼ mile of parks, schools or other civic uses. Civic uses are government facilities that provide services directly to the public (post office, city hall, courthouse, community center, etc.).

Reduction Methodology & Source<sup>66</sup>

This measure has less to do with employment/housing balance. No empirical support for this measure, but logic from suburban mixed-use measure applies. Can't get credit for both this measure and the following measures: Urban Mixed-Use and Suburban Mixed-Use Measures.

Achieved GHG Emission Reductions

**With this measure the estimated achieved GHG emission reduction is 1.0%.**

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<sup>65</sup> Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007. Sacramento Metropolitan Air Quality Management District.

<sup>66</sup> Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007. Sacramento Metropolitan Air Quality Management District.

## **BUILDING COMPONENT MEASURES**

### **26. Energy Star Roof Measure - Commercial, Mixed-Use, Residential**

#### **Measure Description**

Install Energy Star labeled roof materials. Energy star qualified roof products reflect more of the sun's rays, decreasing the amount of heat transferred into a building.

#### **Reduction Methodology & Source<sup>67</sup>**

Reductions are based on the credits documented in the SMAQMD Guidance for Land Use Reductions and consistent with the point rating now set at 0.5 for qualified roof products. Baseline conditions assume indirect emission reduction through more even temperature control of environmental space. Approach is enforceable and may be monitored through site review and/or consultation with lead agency that roofing materials match those described in the SMAQMD Guidance for Land Use Reductions. The District has used a conservative number for this approach.



#### **Achieved GHG Emission Reductions**

**With this measure the estimated achieved GHG emission reduction is 0.5%.**

### **27. Onsite Renewable Energy System Measure - Commercial, Mixed-Use, Residential**

#### **Measure Description**

Projects that install renewable energy systems capable of generating 2.5%-12.5% of project's annual energy need shall receive 1.0 mitigation points.

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<sup>67</sup> Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007. Sacramento Metropolitan Air Quality Management District.

Reduction Methodology & Source<sup>68</sup>

Reductions are based on the Energy & Atmosphere credits (EA Credit 2) documented in the Leadership in Energy & Environmental Design (LEED), Green Building Rating System for New Constructions and Major Renovations, Version 2.2, October 2005. The reduction assumes that at least 12.5% of the buildings total energy use (as expressed as a fraction of annual energy cost) is supplied through the use of on-site renewable energy systems. Alternatively a project may use the Department of Energy (DOE) Commercial Buildings Energy Consumption Survey (CBECS) database to determine the estimated electricity use. Non-polluting 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. The measure is enforceable through LEED Letter certification and building design calculations demonstrating that at least 12.5% of total energy costs are supplied by the renewable energy system(s). The District has used a conservative number of 1.0 for projects that install renewable energy systems capable of generating 2.5%-12.5% of project's annual energy need.

Achieved GHG Emission Reductions

**With this measure the estimated achieved GHG emission reduction is 1.0%.**

## **28. Exceed Title 24 Measure - Commercial, Mixed-Use, Residential**

Measure Description

Project Exceeds Title 24 requirements by 20%.

Reduction Methodology & Source<sup>69</sup>

Reductions assume at least a 20% over Title 24 requirements, as calculated by the Sacramento Municipal Utility District (SMUD, 2006 Advantage Home Program Overview). The proposed point value for this operational mitigation measure is 1.0, consistent with the rating assigned to this measure by SMAQMD Land Use Mitigation Measures. Total compliance margin is based on energy savings relative to the total energy budget and cooling energy budget of the Title 24 Standard design home. Proponent shall provide information demonstrating compliance with measure requirements including, but not limited to, specifications and any available manufacturer's documentation on the devices to be used. This measure's successful implementation may be verified by a site review following

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<sup>68</sup> *Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007.* Sacramento Metropolitan Air Quality Management District.

<sup>69</sup> *Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007.* Sacramento Metropolitan Air Quality Management District.

construction to confirm that the project as built contains ozone destruction catalysts as described in the Air Quality Plan.

Achieved GHG Emission Reductions

**With this measure the estimated achieved GHG emission reduction is 1.0%.**

## **29. Solar Orientation Measure - Residential**

Measure Description

Orient 75 or more percent of homes and/or buildings to face either north or south (within 30 degrees of North or South). 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.

Reduction Methodology & Source<sup>70</sup>

Reduction assumes that proper solar orientation can produce a total energy savings of 11% to 16.5% and reduce heating fuel consumption by up to 25% (Local Government Commission, 1998). Mitigation measure points are based on the credits documented in the SMAQMD Guidance for Land Use Reductions and consistent with the point rating now set at 0.5 for proper orientation. Reduction methodology will be based on quantification of the difference in solar radiance from development with designed orientations (75 or more percent of homes and/or buildings to face within 30 degrees either north or south) compared to evenly distributed orientations. Project compliance will be based on the percentage of orientation buildings designed with proper design features (overhangs, landscaping).

Achieved GHG Emission Reductions

**With this measure the estimated achieved GHG emission reduction is 0.5%.**

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<sup>70</sup> Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007. Sacramento Metropolitan Air Quality Management District.

### **30. Non Roof Surfaces Measure - Commercial, Mixed-Use Residential**

#### Measure Description

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 non-roof 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 50% of the parking lot area. Unshaded parking lot areas, driveways, fire lanes, and other paved areas have a minimum albedo of .3 or greater.

#### Reduction Methodology & Source<sup>71</sup>

Reductions are based on the Sustainable Site credits (SS Credit 7.1) documented in the Leadership in Energy & Environmental Design (LEED), Green Building Rating System for New Constructions and Major Renovations, Version 2.2, October 2005. The reduction assumes that the project provides any combination of the following strategies for 50% of the site landscape (including roads, sidewalks, courtyards and parking lots): Shade (within 5 years of occupancy); paving materials with a solar Reflectance Index (SRI) of at least 29; open grid pavement system.

#### Achieved GHG Emission Reductions

**With this measure the estimated achieved GHG emission reduction is 1.0%.**

### **31. Green Roof Measure - Commercial, Mixed-Use, Residential**

#### Measure Description

Install a vegetated roof that covers at least 50% of roof area. Project should demonstrate detailed graphics depicting the planned roof, detailed information on maintenance requirements for the roof, and the facilities plan for maintaining the roof post construction.

#### Reduction Methodology & Source<sup>72</sup>

Reductions are based on the Energy & Atmosphere credits (EA Credit 2) documented in the Leadership in Energy & Environmental Design (LEED), Green

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<sup>71</sup> Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007. Sacramento Metropolitan Air Quality Management District.

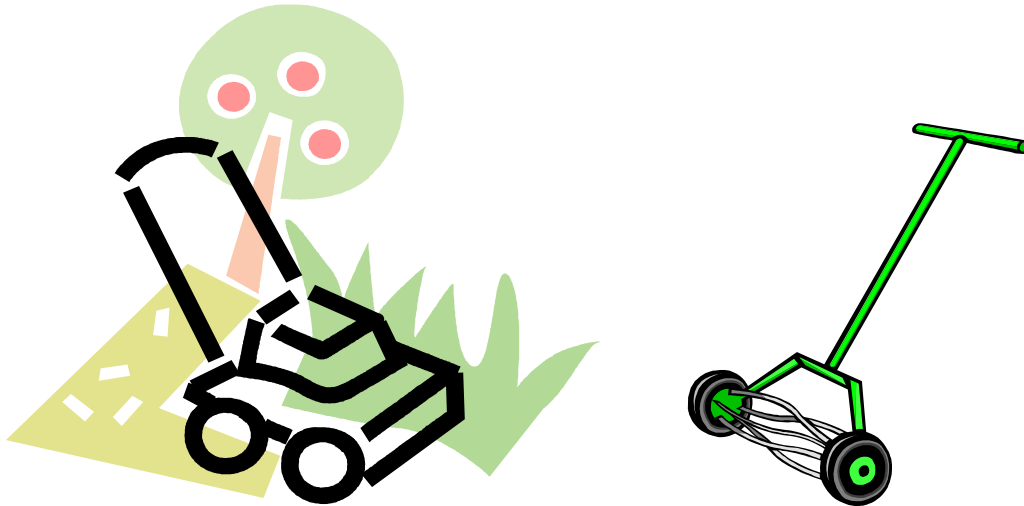
<sup>72</sup> Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007. Sacramento Metropolitan Air Quality Management District.

Building Rating System for New Constructions and Major Renovations, Version 2.2, October 2005. 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:  $(\text{Area of SRI Roof}/0.75) + (\text{Area of vegetated roof}/0.5) \geq \text{Total Roof Area}$ .

Achieved GHG Emission Reductions

**With this measure the estimated achieved GHG emission reduction is 0.5%.**

## TDM & MISC. MEASURES



### **33. Electric Lawnmower Measure - Residential**

#### Measure Description

Provide a complimentary electric lawnmower to each residential buyer.

#### Reduction Methodology & Source<sup>73</sup>

Reduction is based on a 0.5% reduction in total air shed VOC emissions, as attributable to the Lawn Mower Buy-Back program (Portland, Oregon, ten-year ozone maintenance plan). Mitigation measure points are based on the credits documented in the SMAQMD Guidance for Land Use Reductions and consistent with the point rating now set at 1.0 for electric lawnmowers. Approach is enforceable and may be monitored through site review and/or consultation with lead agency that roofing materials match those described in the SMAQMD Guidance for Land Use Reductions.

#### Achieved GHG Emission Reductions

**With this measure the estimated achieved GHG emission reduction is 1.0%.**

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<sup>73</sup> Recommended Guidance for Land Use Emission Reductions, Version 2.4, August 2007. Sacramento Metropolitan Air Quality Management District.



## **ADDITIONAL PERFORMANCE STANDARDS REQUIRING FURTHER INVESTIGATION**



In addition to those GHG emission reduction measures identified above, the District recognizes there are other potential mitigation measures that can be incorporated into the list but would need further evaluation. In relation, those identifiable measures have been incorporated in the Table in Appendix J.

In parallel, CAPCOA has developed a list of mitigation measures compiled from a number of sources (e.g., CAPCOA White Paper, AG's website, & several air agencies). CAPCOA evaluated the list to

eliminate redundancy and rank according to importance or potential GHG control efficiencies. A consultant will be assisting CAPCOA in performing literature search to identify a methodology for quantifying GHG mitigation measure control efficiencies for CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O, and quantifying the control efficiencies. The District participates in this work and will continue to follow it closely as well as other similar types of effort.



