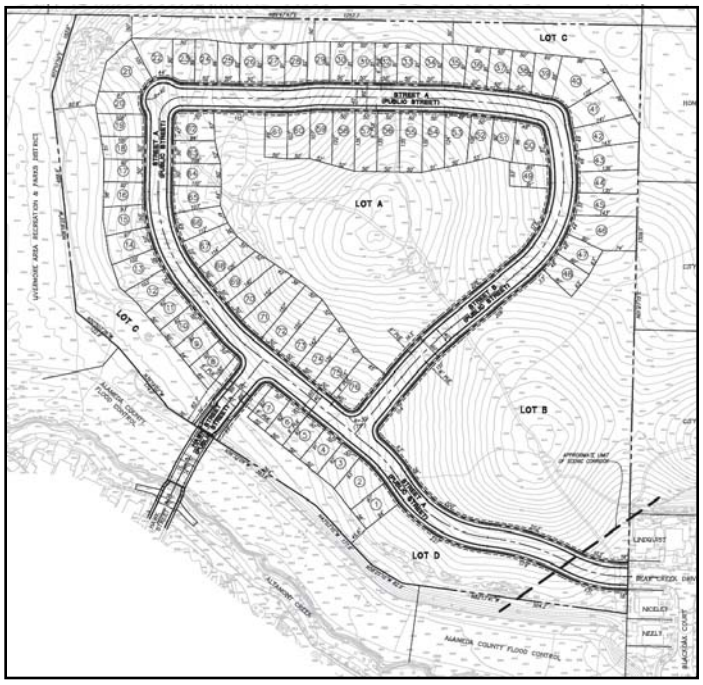
GARAVENTA HILLS PROJECT

Draft Environmental Impact Report

SCH No. 2011112045



LIVERMORE
CALIFORNIA

City of Livermore
Planning Division
1052 South Livermore Avenue
Livermore, CA 94551

November 2012

LAMPHIER - GREGORY
URBAN PLANNING, ENVIRONMENTAL ANALYSIS & PROJECT MANAGEMENT | 510.535.6690

CONTENTS

Page

Chapter 1: Introduction **1-1**
Purpose of the Environmental Impact Report 1-1
EIR Review Process 1-1
Content and Organization of the EIR 1-2

Chapter 2: Executive Summary and Impact Overview **2-1**
Summary Description 2-1
Summary of Impacts and Mitigation Measures 2-2
Significant and Unavoidable Impacts That Cannot be Mitigated to a Level of Less Than Significant 2-2
Impacts Reduced to a Level of Less Than Significant Through Mitigation 2-2
Alternatives 2-4

Chapter 3: Project Description **3-1**
Introduction 3-1
Project Site 3-1
Project Description 3-2
Project Objectives 3-3
Required Approvals 3-3

Chapter 4: Aesthetics **4-1**
Introduction 4-1
Environmental Setting 4-1
Regulatory Setting 4-2
Impacts and Mitigation Measures 4-3
Scenic Vista 4-3
Scenic Highways 4-13
Visual Character 4-14
Light and Glare 4-15
Cumulative Aesthetic Impacts 4-15

Chapter 5: Agricultural, Forest and Mineral Resources **5-1**
Introduction 5-1
Agricultural and Forest Resources 5-1
Mineral Resources 5-2

Chapter 6: Air Quality **6-1**
Introduction 6-1
Setting 6-1

Page

Impacts and Mitigation Measures 6-9
Conflict with Air Quality Plan 6-9
Air Quality Standards 6-10
Exposure of Sensitive Receptors to Substantial Pollution Concentrations 6-13
Odors 6-14
Cumulative Impacts 6-14

Chapter 7: Biological Resources 7-1
Introduction 7-1
Environmental Setting 7-2
Regulatory Setting 7-13
Impacts and Mitigation Measures 7-16
Common Plant Communities/Wildlife Habitat 7-16
Special-Status Species and Habitat 7-17
Wetlands 7-25
Wildlife Corridors 7-26
Plan and Policy Conflicts 7-26

Chapter 8: Cultural Resources 8-1
Introduction 8-1
Regulatory Setting 8-1
Environmental Setting 8-4
Impacts and Mitigation Measures 8-11
Historic/Archaeological Resources, Geologic/Paleontological Features & Human Remains 8-11

Chapter 9: Geology and Soils 9-1
Introduction 9-1
Environmental Setting 9-1
Regulatory Setting 9-3
Impacts and Mitigation Measures 9-4
Earthquake Fault 9-5
Ground Shaking and Seismic-Related Ground Failure and Landslides 9-5
Unstable Soils and Landslides 9-6
Expansive Soils 9-7
Erosion or Loss of Topsoil 9-8
Capability of Soils to Support Septic Systems 9-9

Chapter 10: Greenhouse Gas Emissions 10-1
Introduction 10-1
Environmental Setting 10-1
Regulatory Setting 10-5
Impacts and Mitigation Measures 10-8
Greenhouse Gas Emissions 10-9
Consistency with GHG Reduction Plans 10-11

Chapter 11: Hazardous Materials 11-1
Introduction 11-1
Environmental Setting 11-1
Regulatory Setting 11-3
Impacts and Mitigation Measures 11-5

Page

Routine Transport, Use and Disposal of Hazardous Materials....11-5
Risk from Accidental Upset of Hazardous Materials....11-5
Hazardous Materials Emissions or Handling Near School....11-6
Hazardous Materials on the Site....11-6
Safety Hazards Due to Nearby Airport or Airstrip....11-7
Conflict with Emergency Response Plan or Emergency Evacuation Plan....11-7
Exposure of People or Structures to Wildland Fires....11-7

Chapter 12: Hydrology....12-1
Introduction....12-1
Environmental Setting....12-1
Regulatory Setting....12-2
Impacts and Mitigation Measures....12-6
Violate Water Quality Standards or Waste Discharge Requirements or Otherwise Substantially Degrade Water Quality....12-7
Groundwater Supplies and Groundwater Recharge....12-8
Alter the Existing Drainage Pattern Resulting in Erosion or Siltation or Flooding On- or Off-Site....12-8
Exceed Capacity in Stormwater Drainage System....12-9
Flood Zone Hazards....12-9
Flooding As A Result of the Failure of a Levee or Dam or Inundation by Seiche, Tsunami, Mudflow or Climate-Change Induced Sea Level Rise....12-10

Chapter 13: Land Use....13-1
Introduction....13-1
Setting....13-1
Impacts and Mitigation Measures....13-12
Division of an Established Community....13-12
Conflicts with Land Use Plan and Zoning....13-12
Conflict with Conservation Plan....13-13

Chapter 14: Noise....14-1
Introduction....14-1
Regulatory Setting....14-6
Setting....14-11
Impacts and Mitigation Measures....14-14
Noise Standards....14-14
Groundborne Noise and Vibration....14-15
Permanent Ambient Noise Increases....14-15
Temporary Ambient Noise Increases....14-15
Aircraft Noise....14-18
Cumulative Noise Impact....14-18

Chapter 15: Population, Public Services and Recreation....15-1
Introduction....15-1
Population/Housing....15-1
Setting....15-1
Population/Housing Impact Analysis....15-2
Public Services and Recreation....15-3
Setting....15-3
Public Services and Recreation Impact Analysis....15-5

Page

Chapter 16: Transportation and Circulation 16-1
Introduction 16-1
Setting 16-1
Project Conditions 16-25
Regulatory Setting 16-28
Impacts and Mitigation Measures 16-29
Project-Specific Intersection Impacts 16-31
Bicycle and Pedestrian Impacts 16-34
Transit Impacts 16-35
Parking Conditions 16-36
Additional Considerations 16-36
Cumulative Intersection Impacts 16-39

Chapter 17: Utilities 17-1
Introduction 17-1
Setting 17-1
Regulatory Setting 17-3
Impacts and Mitigation Measures 17-4
Water Supply and Facilities/Wastewater Treatment, Facilities and Capacity 17-5
Stormwater Drainage Facilities 17-5
Solid Waste 17-6
Energy 17-6
Cumulative Utilities Impacts 17-7

Chapter 18: Other CEQA Considerations 18-1
Introduction 18-1
Mandatory Findings of Significance 18-1
Quality of the Environment 18-1
Cumulative Impacts 18-1
Adverse Effects on Human Beings 18-2
Significant and Irreversible Modification in the Environment 18-2
Growth Inducing Impacts 18-2

Chapter 19: Alternatives 19-1
Introduction 19-1
Project Objectives 19-1
Project Impacts 19-2
Alternatives Analysis 19-3
Selection of Alternatives 19-3
Alternative A: No Project, No Development Alternative 19-4
Alternative B: Reduced Density, Current General Plan Density Alternative 19-4
Environmentally Superior Alternative 19-6

Chapter 20: Report Preparers 20-1
Report Preparers 20-1
City Contacts 20-1

Appendices

Included on CD attached to the back cover of this document

Appendix A: Notice of Preparation (NOP) and Comments

Appendix B: Air Quality and Greenhouse Gas Emissions Model and Construction Health Risk Assessment Results

Appendix C: California Natural Diversity Database Results and Biological Reports and Related Documents

Appendix D: Historic Resources Evaluation

Appendix E: Preliminary Geotechnical Recommendations Report and Fault Rupture Hazard Study

Appendix F: Technical Memos Regarding Near-Surface Oil and Phase I Environmental Site Assessment

Appendix G: Hydrology-Related Reports (Hydraulic Summary of the Proposed Hawk Street Bridge, Bay Area Hydrology Model Project Report, Preliminary Stormwater Treatment Plan and Details, Evaluation of Potential Hydrological Impacts to Garaventa Wetlands)

Appendix H: Traffic Study Attachments

Tables

Page

2.1: Summary of Project Impacts and Mitigation Measures 2-5
6.1: Health-Based Ambient Air Quality Standards 6-5
6.2: Summary of Criteria Air Pollution Monitoring Data 6-6
6.3: Regional Attainment Status 6-7
6.4: Maximum Daily Regional Air Pollutant Emissions, Construction 6-10
6.5: Maximum Daily and Annual Regional Air Pollutant Emissions, Operations 6-12
10.1: Annual Operational GHG Emissions 10-10
14.1 Definitions of Acoustical Terms in this Report 14-4
14.2 Typical Noise Levels in the Environment 14-5
14.3 Reaction of People and Damage to Buildings at Various Continuous Vibration Levels 14-6
14.4: Livermore Land Use Compatibility Guidelines for Exterior Noise 14-10
14.5: Typical Ranges of Energy Equivalent Noise Levels at 50 Feet, Leq in Dba, at Construction Sites 14-16
14.6: Construction Equipment 50-Foot Noise Emissions Limit 14-17
15.1: Capacity of Selected LVJUSD Schools 15-4
16.1: Signalized Intersection LOS Criteria 16-5
16.2: Unsignalized Intersection LOS Criteria 16-6
16.3: Existing Intersection Level of Service – Weekday Peak Hour 16-8
16.4: Existing 24-Hour Vehicle Volumes - Weekday 16-9
16.5: Existing Pedestrian Intersection Counts – Weekday Peak Hour 16-12
16.6: Existing Bicyclist Intersection Counts – Weekday Peak Hour 16-15
16.7: Existing Transit Service 16-19
16.8: On-Street Parking Occupancies Before and After School Dismissal 16-22
16.9: Cumulative No Project Intersection Level of Service – Weekday Peak Hour 16-23
16.10: Garaventa Hills Vehicle Trip Generation Estimates 16-25
16.11: Existing Plus Project Conditions Intersection Level of Service 16-32
16.12: Daily Traffic and School Traffic Diversions on Local Streets 16-39
16.13: Cumulative Conditions Intersection Level of Service 16-40
16.14: Laughlin Road-Northfront Road Intersection Mitigations 16-43
19.1: Summary Comparison of Impacts, Proposed Project and Alternatives 19-8

Figures

Page

3.1: Site Location ... 3-5
3.2: Site and Lotting Plan ... 3-7
3.3: Preliminary Hawk Street Bridge and Altamont Creek Realignment Plan ... 3-9
3.4: Preliminary Grading Plan ... 3-11
3.5: Stormwater Bio-Retention Details ... 3-13
4.1: Livermore and Surrounding Topography ... 4-5
4.2a: Existing View from Vasco Road, looking east ... 4-7
4.2b: Simulation from Vasco Road, looking east ... 4-7
4.3a: Existing View from Altamont Park, looking north ... 4-9
4.3b: Simulation from Altamont Park, looking north ... 4-9
4.4a: Existing View from Hawk Street, looking northeast ... 4-11
4.4b: Simulation from Hawk Street, looking northeast ... 4-11
4.5: Existing View from I-580, looking north ... 4-13
7.1: On-Site Seasonal Wetland and Creek ... 7-3
7.2: Special-Status Plant Species in the Vicinity ... 7-5
7.3: Special-Status Wildlife Species in the Vicinity ... 7-7
7.4: Critical Habitat in the Vicinity ... 7-8
7.5: California Red-legged Frog and California Tiger Salamander in the Vicinity ... 7-10
11.1: Location of Oil Seep on Adjacent Property ... 11-2
12.1: 100-Year Event Floodplain in the Project Vicinity ... 12-10
14.1: Noise Measurement Locations ... 14-12
14.2 Noise Levels at LT-1, December 13-14 ... 14-13
14.3 Noise Levels at LT-1, December 14-15 ... 14-13
16.1: Project Area and Study Locations ... 16-2
16.2: Existing Vehicle Turning Movement Volumes and Geometries ... 16-7
16.3: Existing 24-Hour Vehicle Volumes ... 16-9
16.4: Peak-Hour Pedestrian Crossing Volumes ... 16-13
16.5: Existing and Planned Bikeways ... 16-16
16.6: Peak-Hour Bicyclist Turning Movement Volumes ... 16-17
16.7: Existing and Planned Transit Service ... 16-20
16.8: Cumulative No Project Turning Movement Volumes ... 16-24
16.9: Trip Distribution ... 16-26
16.10: Project-Only Trips ... 16-27
16.11: Existing Plus Project Turning Movements ... 16-33
16.12: Cumulative Plus Project Turning Movement Volumes ... 16-41

1

INTRODUCTION

PURPOSE OF THE ENVIRONMENTAL IMPACT REPORT

The California Environmental Quality Act and the California Environmental Quality Act Guidelines (together "CEQA") require an Environmental Impact Report (EIR) to be prepared for any project which may have a significant impact on the environment. An EIR is an informational document, the purposes of which, according to CEQA are "to provide public agencies and the public in general with detailed information about the effect which a proposed project is likely to have on the environment; to list ways in which the significant effects of such a project might be minimized; and to indicate alternatives to such a project." The information contained in this EIR is intended to be objective and impartial, and to enable the reader to arrive at an independent judgment regarding the significance of the impacts resulting from the proposed project.

This EIR evaluates the potential environmental impacts that may be associated with the proposed Garaventa Hills Project ("Project") in the City of Livermore, California. The applicant is Livermore LT Ventures I Group, LLC. The Lead Agency is the City of Livermore.

EIR REVIEW PROCESS

This EIR is intended to enable City decision makers, public agencies and interested citizens to evaluate the broad environmental issues associated with the proposed Project. An EIR does not control the agency's ultimate discretion on the Project. As required under CEQA, the agency must respond to each significant effect identified in the EIR by making findings and if necessary and warranted, by adopting a statement of overriding considerations. In accordance with California law, the EIR must be certified before any action on the Project can be taken. However, EIR certification does not constitute Project approval.

Together, this Draft EIR (Draft EIR) and the subsequent Final EIR (Final EIR) will constitute the EIR for the Project. During the review period for this Draft EIR, interested individuals, organizations and agencies may offer their comments on its evaluation of Project impacts and alternatives. The comments received during this public review period will be compiled and presented together with responses to these comments in the Final EIR. The Livermore decision makers will review the EIR documents and will determine whether or not the EIR provides a full and adequate appraisal of the Project and its alternatives.

In reviewing the Draft EIR, readers should focus on the sufficiency of the document in identifying and analyzing the possible environmental impacts associated with the Project. Readers are also encouraged to review and comment on ways in which significant impacts associated with this Project might be avoided or mitigated. Comments are most helpful when they suggest additional specific alternatives or mitigation measures that would provide better ways to avoid or mitigate significant environmental impacts. Reviewers should explain the basis for their comments and, whenever possible, should submit data or references in support of their comments.

This Draft EIR will be circulated for a 45-day public review period. Written comments may be submitted to the following address:

Steve Stewart
City of Livermore
Planning Division
1052 South Livermore Avenue
Livermore, CA 94551
Telephone: 925-960-4468
Email: SCStewart@cityoflivermore.net

After reviewing the Draft EIR and the Final EIR and certifying the EIR as adequate and complete, the Livermore City Council will be in a position to consider approval, denial, or modification of the Project and related actions.

CONTENT AND ORGANIZATION OF THE EIR

A Notice of Preparation (NOP) was issued in November 2011 to solicit comments from public agencies and the public regarding the scope of the environmental evaluation for the Project. The NOP and all written comments are presented in Appendix A. These comments were taken into consideration during Draft EIR preparation.

An Executive Summary follows this introduction as Chapter 2. This summary presents an overview of the Project and the environmental impacts which may be associated with the Project, including a listing of recommended mitigation measures, where appropriate. The full description of the Project is included in Chapter 3. Chapters 4 through 18 present environmental analysis of the Project, focusing on the following issues:

4. Aesthetics
5. Agricultural, Forest and Mineral Resources
6. Air Quality
7. Biological Resources
8. Cultural Resources
9. Geology and Soils
10. Greenhouse Gas Emissions
11. Hazards and Hazardous Materials
12. Hydrology and Water Quality
13. Land Use and Planning
14. Noise
15. Population, Public Services and Recreation
16. Traffic/Transportation
17. Utilities/Service Systems

Chapter 18 presents other CEQA considerations, including a discussion of significant and irreversible modifications in the environment, growth inducing impacts, and cumulative impacts.

Chapter 19 presents an evaluation of the environmental effects which may be associated with the proposed project and the alternatives evaluated.

Chapter 20 lists the persons who prepared the Draft EIR.

This page intentionally left blank

2

EXECUTIVE SUMMARY AND IMPACT OVERVIEW

SUMMARY DESCRIPTION

This EIR analyzes the potential for environmental impacts resulting from implementation of the proposed Garaventa Hills Project ("Project") in the City of Livermore, California. The applicant is Livermore LT Ventures I Group, LLC. The Lead Agency is the City of Livermore.

The 31.7-acre project site is located north of Interstate-580 and east of Vasco Road and west of Laughlin Road in the City of Livermore, and is an undeveloped parcel consisting predominantly of non-native grassland habitat.

The topography of the site is moderately steeply sloping, having a predominantly 15% to 20% slope. Altamont Creek, an intermittent stream channel, forms the southern boundary of the site. There are two prominent knolls in roughly the center of the site.

The previous Maralisa development is located to the south, across Altamont Creek. This is a largely residential development with Altamont Creek Elementary and the connected Altamont Park also adjacent to the other side of the creek. Existing residential uses border the Project site to the east.

The 24-acre Garaventa Wetlands Preserve borders the site to the west. Along with undeveloped land to the north of the Project, this area contains sensitive alkali wetlands and vernal pools which support special status species.

The Project proposes 76 single family residential units on an internal looped circulation plan that circumscribes the prominent knolls and connects to the planned extension of Bear Creek Drive as well as Hawk Street via a new bridge over Altamont Creek. To reduce necessary grading, a variety of lot sizes are proposed. Lot sizes range from 4,575 square feet to 10,159 square feet. Average lot size is 5,758 square feet.

Less than half of the site will be developed with roadways and lots. The knolls will remain undeveloped with informal public-access trails for hiking and vista views. The remaining area will include a detention basin at the southeast corner and natural areas surrounding development to buffer the nearby creek, wetlands and other sensitive habitat.

The density proposed on the Project site is greater than that allowed under the current General Plan designation. At the time of the previous approval of the Maralisa project, it was noted that development had been transferred from the Project site to properties south of Altamont Creek leaving a maximum of 76 units for the Project site as currently proposed. The City does not have a formal program for transferal of density that covers this circumstance, so a General Plan Amendment will be necessary to change the designation of the Project site to one with a higher residential unit allowance.

In addition to a General Plan amendment, the following approvals will be required: a Tentative Subdivision Map, Planned Development, and Site Plan Design Review (including architecture and landscaping), Grading and Dirt Haul Permit, Stormwater Pollution Prevention Plan, Permits from both the US Army Corps of Engineers (Corps) and from the Regional Water Quality Control Board (RWQCB) relating to potential impacts to Corps jurisdictional wetlands/waters associated with the wetland swale and creek channel, Streambed alteration agreement from the Department of Fish and Game (CDFG), Approval of Mitigation Plans from the US Fish and Wildlife Service (USFWS) and CDFG.

SUMMARY OF IMPACTS AND MITIGATION MEASURES

The analyses in Chapters 4 through 18 of this document provide a description of the existing setting, potential impacts of Project implementation, and recommended mitigation measures to reduce or avoid potentially significant impacts that could occur as a result of Project implementation. **Table 2.1** at the end of this chapter lists a summary statement of each impact and corresponding mitigation measures, as well as the level of significance after mitigation.

SIGNIFICANT AND UNAVOIDABLE IMPACTS THAT CANNOT BE MITIGATED TO A LEVEL OF LESS THAN SIGNIFICANT

No significant and unavoidable impacts have been identified. All impacts are either less than significant or can be reduced to that level through mitigation, as discussed in the following text and table.

IMPACTS REDUCED TO A LEVEL OF LESS THAN SIGNIFICANT THROUGH MITIGATION

The following potentially significant impacts would be reduced to less than significant levels with implementation of mitigation measures:

Air Quality: Construction of the Project would result in temporary emissions of dust and construction vehicle emissions which would contribute to regional emissions. With implementation of construction best management practices (Mitigation Measures Air-1), construction-period air quality impacts would be reduced to a level of less than significant.

Biological Resources: The Project will result in removal of non-native annual grassland that could serve as habitat for a number of special-status species including Congdon's tarplant, California tiger salamander, San Joaquin kit fox, California burrowing owl, American badger. The site is also within designated critical habitat for Vernal Pool Fairy Shrimp habitat. These impacts will be mitigated through construction-period measures to protect offsite wetlands and vernal pools and pre-construction surveys for special status species followed by appropriate offsite compensatory habitat to be provided for potentially impacted special status species. With the plans for provision of compensatory habitat approved through the appropriate regulatory agencies, the impacts of the Project would be less than significant.

Additionally, construction activities could impact on-site or nearby nesting birds. With implementation of a pre-construction survey and implementation of buffer areas if appropriate, the impact would be reduced to less than significant.

Construction of the Project would also fill a small (0.004 acre) seasonal wetland and relocate the Altamont Creek channel several feet to the north of its current location to allow for the construction of a pier supported bridge structure. Mitigation requires re-creation of the creek channel on-site and

re-creation of the same area of seasonal wetlands either on- or off-site as coordinated through appropriate regulatory agencies. This would reduce the impact to jurisdictional waters to less than significant.

Cultural Resources: Construction of the Project could disturb unidentified archeological or paleontological resources and/or human remains. Halting of work in the event such resources are discovered during construction and implementation of appropriate measures (Mitigation Measures Cultural-1a, -1b and -1c) would reduce these impacts to less than significant levels.

Geology and Soils: The Project is located in a seismically active region and likely to be subject to strong seismic shaking during the life of the improvements, including the potential for liquefaction of the soil, densification and lateral spreading. Additionally, the sloping site and plans for deep fill carry the risk of slope instability and soil expansion, respectively. These potential impacts are reduced to less than significant levels through compliance with a design-level Geotechnical Investigation report, as called for in Mitigation Measure Geo-1.

Soils exposed during site grading would be subject to erosion during storm events. Implementation of a required Storm Water Pollution Prevention Plan (Mitigation Measure Geo-5) would reduce this impact to less than significant levels.

Greenhouse Gas Emissions: The Project will contribute to increases in greenhouse gas emissions through construction activities and operation. The contribution will be reduced below significance levels through increased energy efficiency and compliance with the Livermore Climate Change element, as called for in Mitigation Measures GHG-1 and GHG-2.

Hazardous Materials: Because of oil seepage issues at the nearby Bear Creek development, there is concern of near-surface oils at the Project site. Site reconnaissance and borings have not found any evidence of near-surface oil at the site. Additional field confirmation will occur during grading. If oil is encountered, affected areas will be overexcavated and backfilled to prevent seepage (Mitigation Measure Haz-2), thereby reducing this impact to a less than significant level.

Hydrology and Water Quality: Construction activities at the site will disturb soils and create potential erosion concerns. Implementation of a required Storm Water Pollution Prevention Plan (Mitigation Measure Geo-5) would reduce this impact to a less than significant level.

Traffic: The extension of Hawk Street across Altamont Creek would also cross the Altamont Creek pedestrian-bicycle trail, introducing additional potential for conflict with vehicles. Appropriate design of the bridge and crossing would minimize the potential for conflicts (Mitigation Measure Traf-3).

The Project requires design-review for hazards, emergency access and review of the construction-period traffic plan, which will ensure these items are less than significant (Mitigation Measures Traf-5, Traf-6 and Traf-7).

Traffic from the proposed Project will contribute to a cumulative impact at the intersection of Laughlin Road and Northfront Road. This impact can be reduced to less than significant levels through installation of a roundabout or traffic signal toward which this Project would contribute a fair share in coordination with the Public Works Department (Mitigation Measure Traf-10).

All other impacts would be less than significant without the need for mitigation, as detailed in Table 2.1.

ALTERNATIVES

The two alternatives analyzed in Chapter 19 are summarized below:

Alternative A: No Project, No Development Alternative. Alternative A is a "no project" alternative. It assumes the proposed Project is not approved and the site would remain in an undeveloped state, with no development of roadways or residences.

Alternative B: Reduced Density, Current General Plan Allowance Alternative. Alternative B assumes the Project site is developed consistent with the current "UL-1" (Urban Low Residential 1-1.5 dwelling units per acres) General Plan designation. Given this current General Plan designation, the Project site could be developed with another residential project, which could result in the same or greater impacts than the proposed project. Specifically, this alternative assumes 47 residential units would be constructed on the 31.7-acre site (at approximately 1.5 units per acre). This is 62% of the units proposed under the Project. A residential development at these lower densities would likely be comprised of larger lots covering a similar area as under the Project.

Alternatives Conclusion

No significant and unavoidable impacts were identified under the proposed Project. All Project impacts are either less than significant or can be reduced to those levels through implementation of the mitigation contained in this Draft EIR. Because of the low impact of the proposed Project, differences between it and the Alternatives are marginal and limited to reductions in already less than significant impacts.

Alternative A, the No Project, No Development Alternative, has no impacts as it does not propose any change to the site. Alternative A would be the environmentally superior alternative.

The CEQA Guidelines also require that "if the environmentally superior alternative is the 'no project' alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives" (CEQA Guidelines Section 15126.6(e)(2)). In general, the environmentally superior alternative minimizes adverse impacts to the environment, while still achieving the basic project objectives.

Alternative B, the Reduced Density, Current General Plan Density Alternative would be the next most environmentally superior alternative with the lower density contributing to reduced impacts related to both the construction period and operational period. Alternative B would result in marginal reductions in already less than significant impacts, requiring mostly the same mitigation. However, the financial feasibility of this alternative is not known, as the reduction in units could undermine the financial feasibility of bridge construction.

Table 2.1: Summary of Project Impacts and Mitigation Measures

Potential Environmental Impacts	Recommended Mitigation Measures	Resulting Level of Significance
Significant and Unavoidable		
None		
Less than Significant with Mitigation		
Impact Air-1: Construction Period Dust, Emissions and Odors. Construction of the Project would result in temporary emissions of dust, diesel exhaust and odors that may result in both nuisance and health impacts. Without appropriate measures to control these emissions, these impacts would be considered significant.	Air-1: Basic Construction Management Practices. The Project shall demonstrate proposed compliance with all applicable regulations and operating procedures prior to issuance of demolition, building or grading permits, including implementation of the following BAAQMD "Basic Construction Mitigation Measures". • All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. • All haul trucks transporting soil, sand, or other loose material off-site shall be covered. • All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. • All vehicle speeds on unpaved roads shall be limited to 15 mph. • All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used. • Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points. • All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. • Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.	Less than Significant
Impact Bio-1: Loss of Annual Grasslands. The Project will result in the permanent removal of up to 31.78 acres of non-native annual grassland habitat. An additional 1.18 acres will be temporarily disturbed for construction of the bridge and access road over Altamont Creek. Non-	Mitigation Measures Bio-3a, 3b, 3c, 4a, 4b, 4c, 5a, 5b, and 5c would reduce this impact to less than significant levels through mitigation specific to the special status species that the site could support.	Less than Significant

Potential Environmental Impacts	Recommended Mitigation Measures	Resulting Level of Significance
native annual grasslands are common throughout the region and removal of this plant community is not considered a significant impact unless special status species are known to use the habitat. Because the site has the potential to support several special status species, this impact would be considered potentially significant.		
Impact Bio-2: Loss of Designated Critical Habitat for Vernal Pool Fairy Shrimp. The Project will result in the permanent loss of up to 31.78 acres of grassland that is included within designated VPFS critical habitat. This is a potentially significant impact.	Bio-2: Construction-Period Protection of Offsite Wetlands and Vernal Pools. The applicant shall implement the following measures to minimize the potential impact to off-site wetlands and vernal pools resulting from construction activities on the Project site. a) Stormwater Best Management Practices shall be implemented during construction activities to avoid the potential for sediments and other pollutants to enter the offsite wetland areas. b) Install fencing and signage identifying the limits of the wetlands and providing a physical barrier to keep construction equipment and personnel out of the sensitive habitat areas. c) Schedule grading in close proximity to offsite vernal pools during the non-rainy season in order to minimize potential for sedimentation of the pools. d) Fully stabilize the natural vegetated buffer between the grading area and the offsite wetlands during the early phases of construction so that it serves as a protective barrier for the wetlands. Mitigation Measure Geo-5, which requires implementation of a construction-period stormwater pollution prevention plan including Best Management Practices for preventing construction-period stormwater pollution through soil stabilization, sediment control, wind erosion control, soil tracking control, non-storm water management, and waste management and materials pollution control, would also help to mitigate Impact Bio-2.	Less than Significant
Impact Bio-3: Potential Take of Vernal Pool Fairy Shrimp. The Project will result in the permanent loss of approximately 0.004 acre of seasonal wetland that could be occupied by VPFS. This is a potentially significant impact.	Bio-3a:Conduct surveys to determine presence/absence of VPFS. Complete surveys following protocol deemed acceptable by the USFWS to determine presence/absence of VPFS in the seasonal wetland on the Project site prior to initiation of construction. The presence of VPFS can be assumed instead of implementing the surveys required by this measure. If no VPFS are found, no further mitigation is required. If VPFS are found or assumed to be present, implement Mitigation Measures 2b and 2c. Bio-3b: Obtain Authorization from USFWS for take of VPFS. If VPFS are found as a result of directed surveys or are assumed to be present, the Project applicant shall obtain authorization from USFWS for take of VPFS prior to filling or disturbance of the seasonal wetland. USFWS	Less than Significant

Potential Environmental Impacts	Recommended Mitigation Measures	Resulting Level of Significance
	authorization may be obtained through Section 7 of the ESA as a component of the USACE permitting process (see wetland impacts below). Bio-3c: Obtain offsite compensatory habitat for loss of VPFS habitat if determined to be present. If VPFS are found as a result of directed surveys or are assumed to be present, compensatory habitat shall be provided for loss of this habitat at a 9:1, 10:1 or 11:1 mitigation ratio depending on the location of the mitigation site, as recommended in the East Alameda County Conservation Strategy (EACCS). Final replacement ratios shall be based on the assessed functions and values of an agency approved mitigation site.	
Impact Bio-4: Loss/Disturbance of Habitat for and Potential Take of Individual California Tiger Salamanders. The Project will result in the permanent loss of up to 31.78 acres and temporary disturbance of 0.08 acre of potential upland aestivation habitat for CTS. In addition, loss of the 0.004 acre seasonal wetland could result in loss of onsite breeding habitat for CTS. This is a potentially significant impact.	Bio-4a: Obtain Authorization from USFWS and CDFG for potential take of CTS. The Project applicant shall obtain authorization from USFWS and CDFG for potential take of CTS prior to initiation of any ground disturbance activities. Bio-4b: Obtain Offsite Compensatory Habitat for Loss/Disturbance of Potential Upland Aestivation Habitat for CTS. The compensatory habitat shall be provided at a 2.5:1 to 3:1 ratio for acres permanently lost and at a 1.5:1 ratio for areas temporarily disturbed, as recommended in the EACCS. Final replacement ratios shall be based on the assessed functions and values of an agency approved mitigation site. The mitigation site should be of sufficient quality and quantity to fully offset the permanent loss of habitat and should be permanently protected and managed in perpetuity with sufficient funding to maintain and enhance the quality of the site for CTS. Bio-4c: Implement Appropriate Measures during Construction to Minimize Potential Take of CTS. Minimization measures specified in the authorizations obtained from USFWS and CDFG shall be implemented prior to and during construction: Such measures could include the following: • Project applicant shall contract with a Designated Biologist approved by USFWS and CDFG to monitor construction activities. • All earthwork in the construction area shall be confined to the period of June 15 to October 31, or as approved by USFWS and CDFG. • A barrier with one-way ramps shall be constructed around the limits of grading in the fall prior to the initiation of construction. This barrier will allow CTS to move out of the construction area during the fall/winter and keep them from returning in the spring. • Before any construction activities begin, the Designated Biologist will conduct a training session with construction personnel to describe the CTS and	Less than Significant

Potential Environmental Impacts	Recommended Mitigation Measures	Resulting Level of Significance
	its habitat, the specific measures being implemented to minimize effect to the species, and boundaries of the construction area. • The Designated Biologist shall complete walking surveys of the construction area prior to initiation of ground-disturbing activities each day during the construction period. If any CTS are discovered, the Designated Biologist shall move the animal to a safe, nearby location as predetermined through consultation with USFWS and CDFG.	
Impact Bio-5: Loss of Habitat for and Potential Take of Individual California Red-Legged Frogs. The Project will result in the permanent loss of up to 31.78 acres and temporary disturbance of 0.08 acre of potential upland habitat for CRLF. This is a potentially significant impact.	Bio-5a: Obtain Authorization from USFWS for Potential Take of CRLF. The Project applicant shall obtain authorization from USFWS for potential take of CRLF prior to initiation of any ground disturbance activities. Bio-5b: Obtain Offsite Compensatory Habitat for Loss/Disturbance of Potential Upland Habitat for CRLF. The compensatory habitat shall be provided at a 2.5:1 to 3:1 ratio for the acres permanently lost and at a 1.5:1 ratio for areas temporarily disturbed, consistent with the EACCS recommendations for the species. Final replacement ratios shall be based on the assessed functions and values of an agency approved mitigation site. The mitigation site can be the same as that obtained for Mitigation Measure Bio 4b, as long as there is sufficient area to provide habitat for both CRLF and CTS Bio-5c: Implement Appropriate Measures during Construction to Minimize Potential Take of CRLF. Minimization measures specified in the authorizations obtained from USFWS shall be implemented prior to and during construction. Such measures are expected to be similar to those described for Mitigation Measure 4c.	Less than Significant
Impact Bio-6: Loss of burrowing owl habitat and potential harm to individual burrowing owls. The Project will result in the permanent loss of up to 31.78 acres of grasslands that provide habitat for the burrowing owl. Additionally, individual owls could be harmed during construction activities if they are occupying burrows on the site. This is a potentially significant impact.	Bio-6a: Obtain Offsite Compensatory Habitat for Loss/Disturbance of potential burrowing owl habitat. The compensatory habitat to be obtained as described for Mitigation Measures Bio-4b and 5b should also be determined as occupied or suitable for burrowing owls in order to compensate for potential habitat loss resulting from the Project. Bio-6b: Conduct a Pre-Construction Burrowing Owl Survey. A pre-construction survey shall be conducted by a qualified biologist within 30 days prior to initiation of any ground-disturbing activities to ensure individual owls are not harmed. If the survey occurs during the breeding season (February 1 to August 31) and owls are observed on or within 250 feet of the area of disturbance, a 250-foot buffer should be established around the occupied burrow with construction fencing. The fenced area should remain in place for the duration of the breeding season while construction activities are occurring. If the survey is conducted outside of the breeding season and owls are observed, owl eviction may be allowed if authorized by CDFG.	Less than Significant

Potential Environmental Impacts	Recommended Mitigation Measures	Resulting Level of Significance
Impact Bio-7: Potential Harm to Individual American Badgers. Although not observed on the Project site, there is potential for American badgers to use burrows on the property. Project construction activities could harm individual badgers if they occupy the site when grading begins. This is a potentially significant impact.	Bio-7: Conduct a Pre-Construction American Badger Survey. A pre-construction survey shall be conducted by a qualified biologist no less than 14 days and no more than 30 days prior to the beginning of ground disturbance and/or construction activities or any Project activity likely to impact potential burrows. If occupied burrows are found, one of the following actions shall be implemented by the applicant: 1. Initiate an on-site passive relocation program, through which badgers are excluded from occupied burrows by installation of a one-way door in burrow entrances, monitoring of the burrow for one week to confirm badger usage has been discontinued, and hand excavation and collapse of the burrow to prevent reoccupation; or 2. Have a qualified biologist actively trap and relocate badgers to suitable off-site habitat in coordination with the CDFG.	Less than Significant
Impact Bio-8: Loss of potential foraging habitat and potential harm to individual San Joaquin Kit Fox: The Project will result in the permanent loss of up to 31.78 acres of grassland within the historical range of SJKF. Additionally, there is a slight potential for kit fox to forage or den on the site. This is a potentially significant impact.	Bio-8a:Obtain Offsite Compensatory Habitat for Loss/Disturbance of potential SJKF habitat. The compensatory habitat to be obtained as described for Mitigation Measures Bio-4b and 5b should also be determined as occupied or suitable for SJKF in order to compensate for potential habitat loss resulting from the Project. Bio-8b: Conduct pre-construction surveys for San Joaquin kit fox: The pre-construction survey should be conducted by a qualified biologist no less than 14 days and no more than 30 days prior to the beginning of ground disturbance and/or construction activities or any Project activity likely to impact the San Joaquin kit fox. • If potential dens are present, their disturbance and destruction will be avoided. • If potential dens are located within the proposed work area and cannot be avoided during construction, qualified biologist will determine if the dens are occupied or were recently occupied using methodology coordinated with the USFWS and CDFG. • If unoccupied, the qualified biologist will collapse these dens by hand in accordance with USFWS procedures (U.S. Fish and Wildlife Service 1999). • Exclusion zones will be implemented following USFWS procedures (U.S. Fish and Wildlife Service 1999) or the latest USFWS procedures available at the time. The radius of these zones will follow current standards or will be as follows: Potential Den—50 feet; Known Den—100 feet; Natal or Pupping Den—to be determined on a case-by-case basis in coordination with USFWS and CDFG. • Pipes will be capped and trenches will contain exit ramps to avoid direct mortality while construction area is active.	Less than Significant

Potential Environmental Impacts	Recommended Mitigation Measures	Resulting Level of Significance
Impact Bio-9: Loss of Potential Habitat for and Potential Harm to Western Spadefoot Toad: The Project will result in the permanent loss of 0.004 acre of potential breeding habitat for western spadefoot toad and up to about 31 acres of potential burrowing habitat. Additionally, there is a slight potential for individual western spadefoot toads to be harmed during construction activities. This is a potentially significant impact.	Bio-9: Conduct a pre-construction survey for western spadefoot toad. A survey for western spadefoot toad shall be conducted by a qualified biologist a maximum of one week prior to construction. The survey should include the potential breeding habitat and an area within 50 feet of that habitat. If a western spadefoot toad is found, the biologist shall move it to suitable habitat in a safe location outside of the construction zone. In the event that a western spadefoot toad is observed within an active construction zone, the contractor shall temporarily halt construction activities until a biologist has moved the toad to a safe location outside the construction zone, within similar habitat.	Less than Significant
Impact Bio-10:Disturbance of Nesting Birds. Construction activities could adversely affect nesting birds protected by the Migratory Bird Treaty Act and/or Fish and Game Code of California. This is a potentially significant impact.	Bio-10: Conduct a Pre-Construction Nesting Bird Survey. Pre-construction surveys for nesting birds protected by the Migratory Bird Treaty Act of 1918 and/or Fish and Game Code of California shall be conducted within 30 days of initiation of construction activities. The survey area shall include the Project site and areas within 100 feet of the site. If active nests are found, the Project shall follow recommendations of a qualified biologist regarding the appropriate buffer in consideration of species, stage of nesting, location of the nest, and type of construction activity. The buffer shall be maintained until after the nestlings have fledged and left the nest. If there is a complete stoppage in construction activities for 30 days or more, a new nesting-survey shall be completed prior to re-initiation of construction activities.	Less than Significant
Impact Bio-11:Fill of Jurisdictional Wetlands: The proposed activity will permanently impact approximately 0.004 acre of seasonal wetland habitat and 0.053 acre (290 linear feet) of intermittent drainage channel habitat (Altamont Creek). Both of these areas are jurisdictional waters/wetlands. This is a potentially significant impact.	Bio11a: Obtain authorization from USACE, CDFG and RWQCB for fill of wetlands and alteration of Altamont Creek. The applicant shall obtain the necessary permits from the USACE, CDFG and RWQCB pursuant to §404 of the Clean Water Act, §1602 of the California Fish and Game Code, and §401 of the Clean Water Act, respectively. Bio-11b: Re-creation of Jurisdictional Waters along Altamont Creek. The applicant shall create a new channel segment located several feet to the north of the existing channel alignment to replace the reach impacted by the bridge crossing. The new channel segment shall extend 310 linear feet and contain an average width of 8-10 feet, mimicking the channel dimensions of the impacted segment of Altamont Creek. The total jurisdictional area provided by the new channel is approximately 0.071 acre. Enhancement measures such as riparian planting would also take place if approved by Zone 7. Bio-11c: Re-creation of 0.004 Acre of Seasonal Wetland. The applicant shall create a minimum of 0.004 acre of seasonal wetland habitat either onsite or offsite to replace the area lost through Project construction. Creation of this habitat shall be done	Less than Significant

Potential Environmental Impacts	Recommended Mitigation Measures	Resulting Level of Significance
	in consultation with USFWS if the existing seasonal wetland is found to support VPFS (see Mitigation Measure Bio-4c).	
Impact Culture-1: Disturbance of Unidentified Archaeological Resources, Paleontological Resources or Human Remains. During earth-moving activities at the Project site, it is possible that unidentified archaeological resources, paleontological resources, or human remains could be uncovered and disturbed. This is a potentially significant impact.	Culture-1a: Halt Construction Activity, Evaluate Find and Implement Mitigation. In the event that previously unidentified historical resources are uncovered during site preparation, excavation or other construction activity, all such activity within 25 feet of the discovery shall cease until the resources have been evaluated by a qualified archaeologist, and specific mitigation measures can be implemented to protect these resources in accordance with sections 21083.2 and 21084.1 of the California Public Resources Code. Culture-1b: Prepare Mitigation Plan, Halt Construction Activity, Evaluate Find and Implement Mitigation. Because of the high potential for unique paleontological resources within the Project area, a qualified professional Paleontologist shall prepare a Paleontological Mitigation Plan outlining a paleontological monitoring plan and a salvage plan to be implemented during construction excavation and other ground-disturbing activities for the Project. The Paleontological Mitigation Plan should include the following: in the event that previously unidentified paleontological resources are uncovered during site preparation, excavation or other construction activity, all such activity within 25 feet of the discovery shall cease until the resources have been evaluated by a qualified Paleontologist, and specific mitigation measures can be implemented to protect these resources in accordance with sections 21083.2 and 21084.1 of the California Public Resources Code. Culture-1c: Halt Construction Activity, Evaluate Remains and Take Appropriate Action in Coordination with Native American Heritage Commission. In the event that human remains are uncovered during site preparation, excavation or other construction activity, all such activity within 25 feet of the discovery shall cease until the remains have been evaluated by the County Coroner, and appropriate action taken in coordination with the Native American Heritage Commission, in accordance with section 7050.5 of the California Health and Safety Code or, if the remains are Native American, section 5097.98 of the California Public Resources Code.	Less than Significant
Impact Geo-2: Seismic Hazards. The Project is located in a seismically active region and likely to be subject to strong seismic shaking during the life of the improvements. The potential for liquefaction is considered to be low, though densification and lateral spreading is possible. The impact related to seismic hazards would be potentially significant.	Geo-2: Compliance with a design-level Geotechnical Investigation report prepared by a Registered Geotechnical Engineer and with Structural Design Plans as prepared by a Licensed Professional Engineer. Proper slope and foundation engineering and construction shall be performed in accordance with the recommendations of a Registered Geotechnical Engineer and a Licensed Professional Engineer. The structural engineering	Less than Significant

Potential Environmental Impacts	Recommended Mitigation Measures	Resulting Level of Significance
	design, with supporting Geotechnical Investigation, shall incorporate seismic parameters compliant with the California Building Code.	
Impact Geo-3: Unstable Soils and Slope Stability. The topography and soils at the Project site represents a concern for unstable soils and landslides if not properly mitigated. The impact related to unstable soils and landslides would be potentially significant.	Mitigation Measure Geo-2 would also serve to mitigate Impact Geo-3 through requiring compliance with a design-level geotechnical investigation and recommendations.	Less than Significant
Impact Geo-4: Expansive Soils. The Project proposes deep fill in some locations that could result in swell/settlement if not properly mitigated. The impact related to expansive soils would be potentially significant.	Mitigation Measure Geo-2 would also serve to mitigate Impact Geo-4 through requiring compliance with a design-level geotechnical investigation and recommendations.	Less than Significant
Impact Geo-5: Construction-Period Soil Erosion. Grading and construction activities will expose soil to the elements, which would be subject to erosion during storm events. This is a potentially significant impact.	Geo-5: Construction-Period Stormwater Pollution Prevention Plan (SWPPP). The Project applicant shall prepare and implement a SWPPP for the proposed construction period. The SWPPP and Notice of Intent (NOI) must be submitted to the State Water Resources Control Board to receive a Construction General Permit. The plan shall address National Pollutant Discharge Elimination System (NPDES) requirements, include applicable monitoring, sampling and reporting, and be designed to protect water quality during construction. The Project SWPPP shall include "Best Management Practices" (BMPs) as required by the State and the Regional Water Quality Control Board for preventing stormwater pollution through soil stabilization, sediment control, wind erosion control, soil tracking control, non-storm water management, and waste management and materials pollution control. The SWPPP shall take into account the following considerations recommended by the preliminary geotechnical report: • Ponding of stormwater, other than within engineered detention basins, should not be permitted at the site, particularly during work stoppage for rainy weather. Before the grading is halted by rain, positive slopes should be provided to carry surface runoff to storm drainage structures in a controlled manner to prevent erosion damage. • The tops of fill or cut slopes should be graded in such a way as to prevent water from flowing freely down the slopes. Due to the nature of the site soil and bedrock, graded slopes may experience severe erosion when grading is halted by heavy rain. Therefore, before work is stopped, a positive gradient away from the tops of slopes should be provided to carry the surface runoff away from the slopes to areas where erosion can be controlled. It is vital that no completed slope be left standing through a winter season without erosion control measures having been provided.	Less than Significant

Potential Environmental Impacts	Recommended Mitigation Measures	Resulting Level of Significance
	• Because the existing bedrock is relatively nutrient-poor, it may be difficult for vegetation to become properly established, resulting in a potential for slope erosion. Revegetation of graded slopes can be aided by retaining the organic-rich strippings and spreading these materials in a thin layer (approximately 6 inches thick) on the graded slopes prior to the winter rains and following rough grading. When utilizing this method, it is sometimes possible to minimize hydroseeding.	
Impact GHG-1: Increased GHG Emissions. Construction and operation of the proposed Project would be additional sources of GHG emissions, primarily through consumption of fuel for transportation and energy usage on an ongoing basis. This is a potentially significant impact.	GHG-1: Increased Energy Efficiency. The Project shall demonstrate proposed energy efficiency at least 16% greater than Title 24 requirements prior to issuance of building permits.	Less than Significant
Impact GHG-2: Compliance with Livermore Climate Change Element. The Project plans are not detailed enough at this stage to determine consistency with best management practices included in the Climate Change Element of the Livermore General Plan. This is a potentially significant impact.	GHG-2: GHG Emissions Reduction Best Management Practices (BMPs). The Project shall demonstrate proposed compliance with City of Livermore General Plan Climate Change Element BMPs prior to issuance of building permits, including the following. If the City's Climate Action Plan is approved prior to issuance of permits, requirements of the Climate Action Plan can be substituted for the BMPs below. • Climate BMP No. 1 – Energy-efficient buildings in compliance with the Livermore Green Building Ordinance. • Climate BMP No. 2 – Use of energy-efficient appliances that meet Energy Star standards. • Climate BMP No. 3 – Incorporate solar roofs into commercial development. Residential development to be "solar-ready" including proper solar orientation (south facing roof area sloped at 20° to 55° from the horizontal),clear access on the south sloped roof (no chimneys, heating vents, plumbing vents, etc.), electrical conduit installed for solar electric system wiring, plumbing installed for solar hot water system, and space provided for a solar hot water storage tank. • Climate BMP No. 4 – Incorporate transit and bicycle/pedestrian connections into development. • Climate BMP No. 5 – has been omitted as it applies only to Commercial/Industrial projects. • Climate BMP No. 6 – has been omitted as it applies to parking lots and structures. • Climate BMP No. 7 – In compliance with the Construction and Demolition Ordinance, recycle construction materials and divert construction waste from disposal as feasible. • Climate BMP No. 8 – Include recycling facilities to provide for commercial and/or community recycling of plastic, paper, green waste, and food waste.	Less than Significant

Potential Environmental Impacts	Recommended Mitigation Measures	Resulting Level of Significance
	• Climate BMP No. 9 –Incorporate "heat island" treatments including cool roofs, cool pavements, and strategically placed shade trees. • Climate BMP No. 10 –Use landscaping that meets the City's Water Efficient Landscape Ordinance.	
Impact Haz-2: Oil Seepage Possibility. Because there are oil seepage issues on a nearby site, it is possible, though unlikely, that near-surface oil could exist on the Project site. The possibility of future oil seepage from near-surface oil is a potentially significant impact.	Haz-2: Confirm Absence of Near Surface Oil or Implement Overexcavation. The absence of naturally occurring oil should be confirmed during grading of the site. If oil is encountered during grading, the following overexcavation shall be implemented: • The area where naturally occurring near surface oil is encountered shall be overexcavated a minimum of 10 feet below proposed finish grade and replaced with engineered fill. This will provide a low permeable fill cap to prevent the upward migration of oil. • Where proposed storm drain lines cross areas where naturally occurring near surface oil is encountered, the area shall be overexcavated a minimum of 5 feet beyond the outside diameter of the proposed storm drain line. The excavation should be backfilled with engineered fill and the storm drain line trenched through the fill. The storm drain trench within the previously overexcavated and backfilled area should be lined with 20 mil visqueen prior to placement of shading and the storm drain line. • In every case the utility lines shall be designed to be airtight to prevent potential oil from entering the utility lines. • Any stormwater underdrains shall be shallow or eliminated in areas of potential oil seepage. • If oil is encountered then an oil/water separator shall be installed to treat stormwater prior to entering the creek. • A Community Facilities District, or other funding mechanism approved by the City, shall be formed in order to fund remedies to public infrastructure and utilities in the event oil seepage occurs after construction of the Project.	Less than Significant
Impact Hydro-1: Construction-Period Erosion and Siltation. Construction of the proposed Project would involve grading activities that would disturb soils at the site. Such disturbance would present a threat of soil erosion by subjecting unprotected bare soil areas to runoff during construction, which could result in siltation to receiving waters. This is a potentially significant impact.	Mitigation Measure Geo-5, which requires implementation of a construction-period stormwater pollution prevention plan including Best Management Practices for preventing construction-period stormwater pollution through soil stabilization, sediment control, wind erosion control, soil tracking control, non-storm water management, and waste management and materials pollution control, would also mitigate Impact Hydro-1.	Less than Significant

Potential Environmental Impacts	Recommended Mitigation Measures	Resulting Level of Significance
Impact Hydro -2: Surface Water Contamination from existing Oil on Groundwater. Construction of underdrains beneath swales and storm drain systems that are not water tight can potentially allow oil laden groundwater to seep in and deliver contaminated water to the creek.	Mitigation Measure Haz-2 requires implementation of a monitoring program and remediation plan if oil is discovered in the storm drain or swale underdrain system and would mitigate Impact Hydro-2.	Less than Significant
Impact Traf-3:Conflict with Pedestrian-Bicycle Trail. The Project would install the Hawk Street bridge across the existing Altamont Creek Trail. This is a potentially significant impact.	Traf-3: Trail Crossing and Bridge Design. The Project shall design the Hawk Street Bridge for pedestrian, bicycle, and equestrian access at the trail crossings and on the bridge itself. In terms of the trails' intersection with Hawk Street (perpendicular to the bridge), the Federal Highway Administration recommends that the following elements are included: • The trail should intersect the street at a 90-degree angle; • Increase trail width at the intersection to reduce user conflicts; • Provide good sight lines for both motorists and trail users; • Provide signage to ensure that motorists are aware of the trail crossing; • Provide a visible crosswalk across the intersection to increase trail user and motorist awareness; • Signs, both on the road and the trail, should clearly indicate whether motorists or trail users have the right of way; • Use curb ramps as required, including detectable warnings to ensure that trail users with vision impairments are aware of the street. Curb ramps should be designed and located in accordance with Section 16.3.1.d; and • At a road and trail intersection, raising the level of the road up to the level of the trail can eliminate the need for curb ramps and contributes to traffic calming because of the raised crosswalk that is created (see Section 8.4). If this design is used, detectable warnings should be included between the edge of the trail and the roadway to ensure that users with vision impairments can identify the intersection. Instead of striping a standard crosswalk at roadway crossings, some trails use nonstandard crosswalk patterns in locations where cyclists are expected to ride across a roadway instead of dismounting and walking across. For example, crossings where cyclists are supposed to ride can be indicated with parallel dashed lines and bike symbols. Nonstandard striping indicates to drivers and trail users that the crossing is different than a standard crosswalk situation. Pedestrian and bicycle access across the Hawk	Less than Significant

Potential Environmental Impacts	Recommended Mitigation Measures	Resulting Level of Significance
	Street bridge should be provided on both sides and be designed for safe and convenient access, per the City of Livermore's design standards.	
Impact Traf-5: Hazards Due to Design Features or Incompatible Uses. The proposed Project includes installation of new internal roadways, trail access to open space areas, provision of a bridge and new access points from existing streets, and a roadway crossing of the Altamont Creek Trail that could result in hazards if the details are not properly designed. This is a potentially significant impact.	Traf-5: Design Review for Hazards Due to Design Features or Incompatible Uses. The Project's on-site transportation elements, such as sight distances, driveway locations, and marked crosswalk locations, shall be reviewed by the Livermore staff with design-level project approvals and shall be required to meet applicable local regulations. The following design details are recommended, though final details will be determined through consultation with Livermore staff, taking into consideration constraints of the site: a) The stem of each intersection should be stop-controlled or contain other intersection controls. b) Livermore thoroughfare standards should be followed, which could involve narrowed vehicle lanes, widened sidewalks, reduced corner radii, and installation of corner bulb-outs. Narrower vehicle travel lanes and tighter corner radii with bulb-outs are associated with lower vehicle travel speeds, increased visibility between pedestrians and motorists, and reduce pedestrian roadway exposure. c) The mid-block trail crossing between Lot A and Lot B should be marked with a high-visibility crosswalk and include bulb-outs and lighting to enhance pedestrian visibility. d) According to Livermore's Municipal Code 3-15-050, driveways should be located more than 20 feet from the corners, which should be confirmed during the design review. Mitigation Measure Traf-3: Trail Crossing and Bridge Design, would also help to mitigate Impact Traf-5 by requiring appropriate design of the Hawk Street Bridge for pedestrian, bicycle, and equestrian access at the trail crossings and on the bridge itself.	Less than Significant
Impact Traf-6: Emergency Access. The proposed Project includes a new internal roadway system that connects with existing roadways that could result in inadequate emergency access if the details are not properly designed. This is a potentially significant impact.	Traf-6: Design Review for Emergency Access. It is expected that the Project's emergency access elements will be reviewed with design-level project approvals and would be required to meet applicable regulations.	Less than Significant
Impact Traf-7: Construction. Construction-related impacts generally would not be considered significant due to their temporary and limited duration. However, depending on the construction phasing and truck activity, this is a potentially significant impact.	Traf-7: City Review of Construction Plan. It is expected that the construction plan will be reviewed by the City of Livermore and designed to meet applicable regulations.	Less than Significant
Impact Traf-10: Laughlin Road & Northfront Road Intersection. The addition of Project trips would have a cumulatively considerable impact on the delay at an intersection already projected to operate below acceptable levels (an increase of 5.2 seconds of average delay during the PM peak hour	Traf-10: Laughlin Road & Northfront Road Intersection Improvements. The Project shall contribute a fair share amount to improvements at this intersection, as determined by the City of Livermore Community Development Department. The improvements shall consist of either A) or B)	Less than Significant

Potential Environmental Impacts	Recommended Mitigation Measures	Resulting Level of Significance
under Cumulative Plus Project conditions). This is a significant impact.	below, again as determined in coordination with the City of Livermore Community Development Department: A) Roundabout. Install a roundabout with yield-control at all three intersection legs. The current vehicle lane configuration would remain, but right-of-way may need to be expanded to accommodate traffic movements through the intersection. OR B) Signal Control. Signalize the intersection. The current vehicle lane configuration would need to be altered from the existing one lane in each direction to include a left-turn pocket in the eastbound direction and a right-turn pocket in the westbound direction. Right-of-way may need to be expanded to accommodate the turn-pocket lanes at the intersection.	
Less than Significant Impacts		
Impact Visual-1: Scenic Vistas. In the Project vicinity, the Altamont Hills and their ridgelines are identified as scenic resources by the City of Livermore, and creeks, such as the adjacent Altamont Creek, are identified as important topographical and visual features. The Project does not substantially alter views of identified scenic resources from identified vistas and would not substantially change views toward these scenic resources from nearby public areas. Therefore, the impact related to scenic vistas is less than significant.	No mitigation warranted.	Less than Significant
Impact Visual-2: Scenic Corridor. The Project site is located partially within the view corridor of I-580, which is designated as a city scenic corridor in the City of Livermore General Plan and identified as an eligible State Scenic Highway. However, the Project would not substantially obscure, detract from, or negatively affect the quality of the views from this route or substantially obscure view to the distant hills. Further, through substantial conformance with the applicable City design standards and guidelines, any potential impact on this local scenic corridor would be less than significant.	No mitigation warranted.	Less than Significant
Impact Visual-3: Changed Visual Character. The proposed Project would construct a residential subdivision on a currently undeveloped site within the boundaries of the City of Livermore but at the edge of existing development. The proposed Project would change the visual character of the site itself, but is not inconsistent with the character of the adjacent developed areas and would not result in development incongruous to the existing and proposed development in the area. This impact would be less than significant.	No mitigation warranted.	Less than Significant

Potential Environmental Impacts	Recommended Mitigation Measures	Resulting Level of Significance
Impact Visual-4: Increased Light and Glare. The Project would add additional sources of light to a currently undeveloped site adjacent to other residential uses. Lighting quality, intensity and design is required to meet City standards to minimize glare, light trespass and "sky glow" and would be within allowable levels for residential uses. Therefore, impacts related to light and glare would be less than significant.	No mitigation warranted.	Less than Significant
Impact Air-2: Operational Emissions. The Project would result in increased emissions from on-site operations and emissions from vehicles traveling to the site. However, the Project is below applicable threshold levels and the impact would be considered less than significant.	No mitigation warranted.	Less than Significant
Impact Air-3: Construction Period Exposure of Sensitive Receptors. Construction activities would expose nearby sensitive receptors to toxic air contaminants during the construction period, but the maximum exposure risk would be below the thresholds of significance under BAAQMD criteria for cancer, chronic hazard, and PM2.5 exposure. This would be a less than significant impact.	No mitigation warranted.	Less than Significant
Impact Air-4: Operational Period Exposure of Sensitive Receptors. The Project proposes to add new sensitive receptors to a currently undeveloped site. The exposure risk to on-site sensitive receptors would be below applicable threshold levels and therefore, the impact would be less than significant.	No mitigation warranted.	Less than Significant
Impact Bio-12: Removal of a Portion of a Potential Wildlife Corridor. The Project site is adjacent to existing residential development to the east and south and open space to the north and west. While it may currently be used as a wildlife corridor, development of the property would not disrupt that corridor, as open space will remain to the north and east. Consequently, the Project has a less than significant impact on wildlife corridors.	No mitigation warranted.	Less than Significant
Impact Geo-1: Earthquake Fault Zone. The northeastern portion of the Project site is included in the Alquist-Priolo Earthquake Fault Zone for the Greenville fault. However, a focused geologic investigation has demonstrated that there are no active or potentially active fault traces at the site. The impact related to earthquake faults would be less than significant.	No mitigation warranted.	Less than Significant
Impact Haz-1: Routine transportation, use or disposal of hazardous materials. Construction activities routinely utilize fuels and oils in construction equipment that may be considered hazardous and residential operations do not generally utilize substantial amounts of hazardous materials. Compliance with applicable regulations	No mitigation warranted.	Less than Significant

Potential Environmental Impacts	Recommended Mitigation Measures	Resulting Level of Significance
would ensure that the impact is less than significant.		
Impact Haz-3: Construction at a Wildland-Urban Interface. Wildland fire hazard is considered moderate in the undeveloped portions of Livermore and the surrounding area. Compliance with the Wildland-Urban Interface Code, as required during design review, would ensure that the impact is less than significant.	No mitigation warranted.	Less than Significant
Impact Hydro-3: Altered Streambed and Runoff. The Project will modify the collection and treatment of stormwater before release into Altamont Creek and will require re-alignment of Altamont Creek at the site of the proposed Hawk Street bridge. While the Project would alter the existing drainage pattern and flow of stormwater along the creek, such changes would not result in increased erosion, siltation or on- or off- site flooding. This is a less than significant impact.	No mitigation warranted.	Less than Significant
Impact Plan-1: Increased Density. The City's 2003 General Plan identifies the existing use at the site as Allocated Residential and the land use designation as Urban Low Residential 1-1.5 dwelling units per acres. The development proposed is of a higher density than currently allowed under the existing General Plan. The current General Plan designation would allow a maximum of 47 units on the property. Therefore, a General Plan Amendment is required in order to allow the proposed Project. However, the Planned Unit Development for the Maralisa development states that a portion of the density for the Project site was transferred to properties south of Altamont Creek, and the maximum number of units permitted on the Project site is 76 units. The Project site was not developed as a phase of the Maralisa project since environmental constraints were unknown at that time. However, subsequent detailed environmental analysis indicates that the site could be developed without significant impacts to the environment and can support this infill development at a density originally envisioned under the Urban Low Medium Residential designation. The proposed Project would be generally consistent with the goals and policies of the General Plan though would require special consideration to allow the proposed density. This is a less than significant impact.	No mitigation warranted.	Less than Significant
Impact Noise-1: Noise and Land Use Compatibility. Residential uses that would be developed would be exposed to exterior noise levels considered "normally acceptable" by the Livermore General Plan. This is a less-than-significant impact.	No mitigation warranted.	Less than Significant

Potential Environmental Impacts	Recommended Mitigation Measures	Resulting Level of Significance
Impact Noise-2: Ground-borne Noise and Vibration. There are no sources of ground-borne noise or vibration that affect the Project area or would result from development of the Project area. This is a less-than-significant impact.	No mitigation warranted.	Less than Significant
Impact Noise-3: Permanent Noise Level Increases. Project-generated traffic would cause noise levels to increase by less than 3 dBA CNEL along roadways adjoining existing residences in the area. This is a less-than-significant impact.	No mitigation warranted.	Less than Significant
Impact Noise-4: Construction Period Noise Impact. The construction activities necessary to develop the Project would elevate noise levels in the areas near active construction sites but would comply with applicable Livermore regulations and would not cause a substantial temporary or periodic increase in ambient noise levels. This is a less-than-significant impact.	No mitigation warranted.	Less than Significant
Impact Noise-5: Aircraft Noise Impact. The Project site is located more than two miles from Livermore Municipal Airport. Noise exposure contours for the airport show that the noise exposure is less than 60 dBA CNEL. The site is located outside of the airport protection area and the airport influence area. This is a less-than-significant impact.	No mitigation warranted.	Less than Significant
Impact Noise-6: Cumulative Noise Level Increases. The Project would not make a cumulatively considerable contribution to increased traffic noise in the area. This is a less-than-significant impact.	No mitigation warranted.	Less than Significant
Impact Pop-1: Population Growth. The Project would result in an increase of 218 residents at the Project site. However, this increase is consistent with local and regional projections and contributes to a jobs-housing balance in the area. The impact related to population growth would be considered a less than significant impact.	No mitigation warranted.	Less than Significant
Impact Services-1: Increased Public Service Demand. The Project would increase the number of residents at the site. However, the Project could be adequately served with existing facilities and the impact related to public services would be considered less than significant.	No mitigation warranted.	Less than Significant
Impact Traf-1:Project-Generated Traffic. Traffic generated by the proposed Project would increase traffic levels at vicinity intersections. However, these increases would either still be within acceptable service levels or not contribute to delays above threshold levels. This is a less than significant impact.	No mitigation warranted.	Less than Significant

Potential Environmental Impacts	Recommended Mitigation Measures	Resulting Level of Significance
Impact Traf-2: Project-Generated Traffic contribution to Freeway. Traffic generated by the proposed Project would increase the number of vehicles on I-580 during peak-hours. This is a less than significant impact.	No mitigation warranted.	Less than Significant
Impact Traf-4: Project-Generated Transit Demand. The Project may increase levels of transit usage in the vicinity. However, the Project has adequate access to existing transit opportunities with available capacity and would not impede or interfere with existing services. This is a less than significant impact.	No mitigation warranted.	Less than Significant
Impact Traf-8: Vehicle Diversions. It is expected that there will be some school-associated vehicles that will divert through the existing neighborhood. The resulting daily traffic will be within the design capacity for low-volume residential roadways. This is a less than significant impact.	No mitigation warranted.	Less than Significant
Impact Traf-9: Project-Generated Traffic Contribution to Cumulative Levels. Traffic generated by the proposed Project would contribute to cumulative increases in traffic levels at vicinity intersections and the I-580 freeway. However, other than those listed in separate impacts, these increases would either still be within acceptable service levels or the Project would not contribute a cumulatively considerable level to delays or speed reductions. This is a less than significant impact.	No mitigation warranted.	Less than Significant
Impact Traf-11: Cumulative Project-Generated Traffic Contribution to Freeway. Traffic generated by the proposed Project would increase the number of additional vehicles on I-580 during peak-hours. This is a less than significant impact.	No mitigation warranted.	Less than Significant
Impact Util-1: Increased Water Demand and Wastewater Generation. The proposed Project represents new development and related increases in water demand and wastewater generation within the existing service area for Livermore Municipal Water. As a standard condition of any project, the proposed Project will pay appropriate development impact and utility connection fees toward ongoing improvement and maintenance of the water and wastewater systems and comply with all applicable regulations. While the proposed Project would lead to an increase in demand for water and generation of wastewater, it would utilize existing water facilities and resources and would not cause an exceedance of wastewater treatment requirements or result in the need for new off-site facilities. Therefore, the impacts related to water and wastewater are less than significant.	No mitigation warranted.	Less than Significant

Potential Environmental Impacts	Recommended Mitigation Measures	Resulting Level of Significance
Impact Util-2: Increased Solid Waste Generation. The Project would increase solid waste generation at the site but would be served by a landfill with sufficient permitted capacity to accommodate the Project's solid waste disposal needs, and would not impede the ability of the City to meet the applicable federal, state and local statutes and regulations related to solid waste. The Project would have a less-than-significant impact with no mitigation warranted.	No mitigation warranted.	Less than Significant
Impact Util-3: Increased Energy Consumption. The Project would have an incremental increase in the demand for gas and electrical power. However, the Project is expected to be served with existing capacity and would not require or result in construction of new energy facilities or expansion of existing off-site facilities and would not violate applicable federal, state and local statutes and regulations relating to energy standards. The Project would have a less than significant impact relating to energy consumption with no mitigation warranted.	No mitigation warranted.	Less than Significant

3

PROJECT DESCRIPTION

INTRODUCTION

This chapter describes the Project location, existing uses, details of the proposed Project, Project objectives, and intended uses of the EIR

PROJECT SITE

LOCATION AND EXISTING USES

The 31.7-acre project site is located north of Interstate-580 and east of Vasco Road and west of Laughlin Road in the City of Livermore, and is an undeveloped parcel consisting predominantly of non-native grassland habitat (**Figure 3.1)**.

The topography of the site is moderately steeply sloping, having a predominantly 15% to 20% slope. Altamont Creek, an intermittent stream channel, forms the southern boundary of the site. A ridgeline in the center of the site forms a natural watershed divide, with runoff draining either towards the north or south. The ridgeline forms a connection between the two prominent knolls in roughly the center of the site.

GENERAL PLAN DESIGNATION AND ZONING

The zoning is currently "PD" Planned Development. This reflects the Project's inclusion in the Planned Unit Development amendment for the "Maralisa" project, which has otherwise been developed to the south of Altamont Creek.

The General Plan designation for the site is "UL-1" Urban Low Residential. This designation allows development of between 1 and 1.5 dwelling units per acre. The previous PUD amendment noted that a portion of the density for the current Project site had been transferred to other properties within the Maralisa project leaving a maximum of 76 units for the Project site as currently proposed. These density transfers were implemented through the Maralisa PUD permit. A General Plan amendment is proposed with the Project that would change the designation to Urban Low Medium Residential in order to enable the continued density transfer envisioned under the Maralisa development, and allow the proposed number of units. Consistency with General Plan designation and zoning is discussed in more detail in Chapter 13: Land Use and Planning.

SURROUNDING LAND USES

The previous Maralisa development is located to the south, across Altamont Creek. This is a largely residential development with Altamont Creek Elementary and the connected Altamont Park also adjacent to the other side of the creek. Other existing residential uses border the Project site to the east.

The 24-acre Garaventa Wetlands Preserve borders the site to the west. Along with undeveloped land to the north of the Project, this area contains sensitive alkali wetlands and vernal pools which support special status species. This is discussed in more detail in Chapter 7: Biological Resources.

PROJECT DESCRIPTION

The Project applicant is seeking land use entitlements and environmental clearance for a proposed 76-unit residential subdivision that would be known as Garaventa Hills. The proposed site plan is shown included as **Figure 3.2**.

The proposed subdivision would consist of an internal looped circulation plan circumscribing the prominent knolls. The looped roadway system would be connected to the south across Altamont Creek by a new bridge crossing at Hawk Street that would connect to the developed properties to the south, and by the planned extension of Bear Creek Drive, which ultimately connects to Laughlin Road to the east. Construction of this bridge would require modification of the streambed and bridge piers in the creek, as shown in **Figure 3.3**.

Ultimate development will include 76 residential lots ranging in size from 4,575 square feet to 10,159 square feet, and construction of associated roadways and utilities. Each lot will contain one single-family home supported by a shallow foundation system. Lots and roadways will comprise approximately 48% of the site, with the remaining land reserved for open space slopes at the edges (Lot C on Figure 3.2), undeveloped knolls with informal pedestrian trails (Lots A and B), and a detention basin (Lot D) with a new outfall pipe to Altamont Creek.

CONSTRUCTION

Construction was assumed to occur over an approximately 3-year period (April 2013 through March 2016). Grading, bridgework and road paving are the first steps, which are planned to begin in April 2013. This site preparation phase is anticipated to last approximately 8 months. Following that point, homes will be constructed over the next approximately 28 months, with model homes open in February/March of 2014 and completion/sale of approximately 3 homes per month until completion. It is anticipated that construction would be completed in March 2016.

GRADING

The site development plan seeks to work with the existing topological contours by looping the primary internal road system around one of the knolls, retaining the natural slope contours at the peak of the knolls. Excavations into the side slopes of the existing two knolls for the development have been minimized and would result in new slopes at approximately 3:1 (horizontal to vertical) ratios or less, with total gross grading of approximately 180,100 cubic yards. The Grading Plan is included as **Figure 3.4**. The "Daylight Line" on this figure shows the boundary of the area to be graded and that to retain its natural grade.

UTILITIES

The Project proposes to run new water, sewer and stormwater pipes under the proposed roadways. Stormwater is discussed below. Water and sewer will connect to the existing systems at the roadway connections. See Chapter 17: Utilities for additional discussion.

STORMWATER AND LANDSCAPING

The Project proposes to have the boundary buffers and knoll areas remain wild with landscaping along roadways and on residential lots.

Stormwater at the site currently sheet flows unhindered off the site, largely into Altamont Creek. Stormwater bio-retention is built into the plan, including capturing stormwater on lots and bio-retention included in front yards. Swales for bio-retention of stormwater will border all proposed roadways. Details of the bio-retention components are included as **Figure 3.5**. Following these bio-retention systems, the water will run through pipes to the detention basin located on lot D for eventual discharge into Altamont Creek through a new outfall pipe. Undeveloped buffer areas will continue to sheet flow as they do under existing conditions.

PROJECT OBJECTIVES

1. Complete implementation of current Planned Development zoning designation that reflects the Project site's inclusion in the Planned Unit Development Permit (PUD 115-A) for the Maralisa development, which indicated development with a maximum of 76 single-family homes.
2. Contribute to housing availability to accommodate Livermore's growing population and to help satisfy Livermore's share of regional housing needs.
3. Provide housing near Livermore and Tri-Valley employment centers within the existing City Boundary and North Livermore Urban Growth Boundary.
4. Provide a high-quality residential neighborhood that is compatible and integrated with existing nearby residential, park, school and open space uses.
5. Provide adequate access to the site for safety purposes while minimizing environmental impacts and satisfying natural resource and flood control regulatory agencies.
6. Provide buffers as a separation and natural transition from adjacent open space and habitat to urban development.
7. Conserve the two prominent knolls as visual resources for the community.
8. Retain public access to trails around the knolls as a public amenity for hiking and vista views.

REQUIRED APPROVALS

As discussed above, the Project is the last portion of the previously-approved Maralisa project. At the time of the previous approval, it was noted that development had been transferred from the properties south of Altamont Creek to the current Project site to maintain the overall density allowance. However, the City does not have a formal program for transferal of density in this area so a General Plan amendment will be required, as listed below.

The following approvals would be necessary:

- General Plan Amendment to Urban Low Medium Residential designation
- Tentative Subdivision Map
- Development Agreement

- Planned Development
- Site Plan Design Review (including detailed review of architecture and landscaping.
- Grading and Dirt Haul Permit
- Stormwater Pollution Prevention Plan

Approvals from the following agencies are also anticipated to be required:

- Permits from both the Corps and from the Regional Water Quality Control Board (RWQCB) relating to potential impacts to Corps jurisdictional wetlands/waters associated with the wetland swale and creek channel
- Streambed alteration agreement from the Department of Fish and Game (CDFG)
- Approval of Mitigation Plans from the US Fish and Wildlife Service (USFWS) and CDFG.

Figure 3.1: Site Location

Source: Gates + Associates, September 2011

This page intentionally left blank

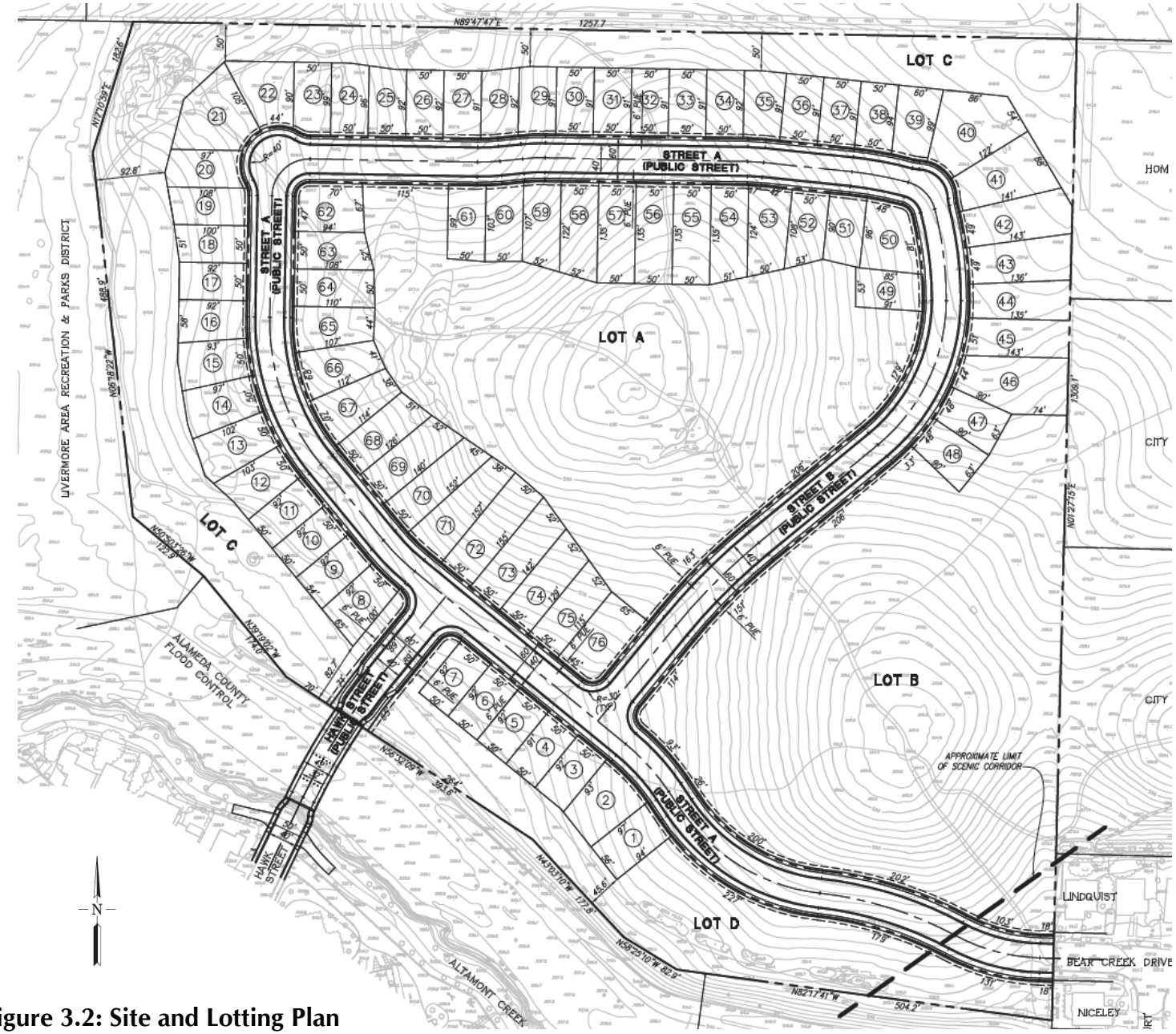


Figure 3.2: Site and Lotting Plan

Source: BDE Architecture/Silverstone Communities, Sept 5, 2012

This page intentionally left blank

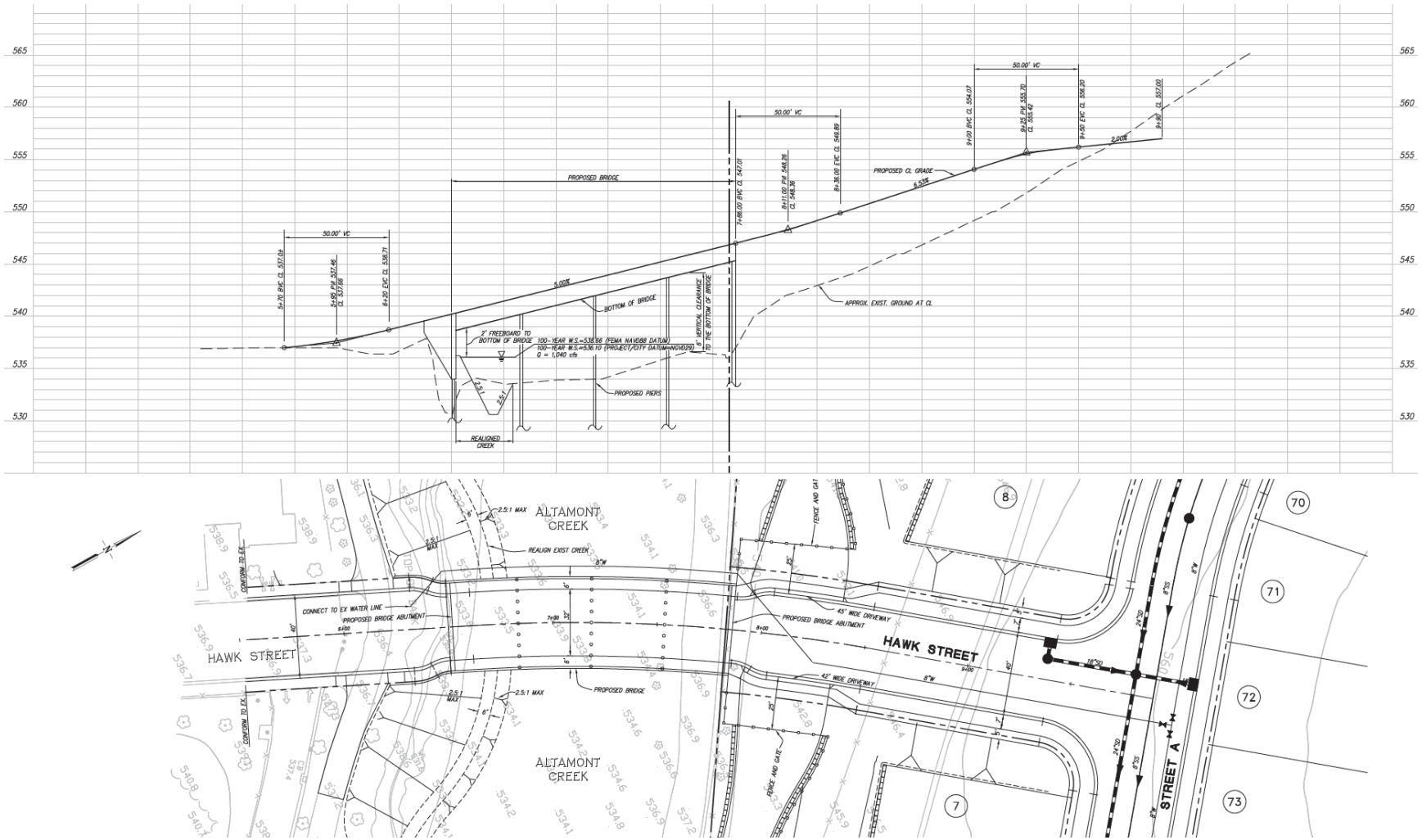


Figure 3.3: Preliminary Hawk Street Bridge and Altamont Creek Realignment Plan

Source: RJA, September 5, 2012

This page intentionally left blank

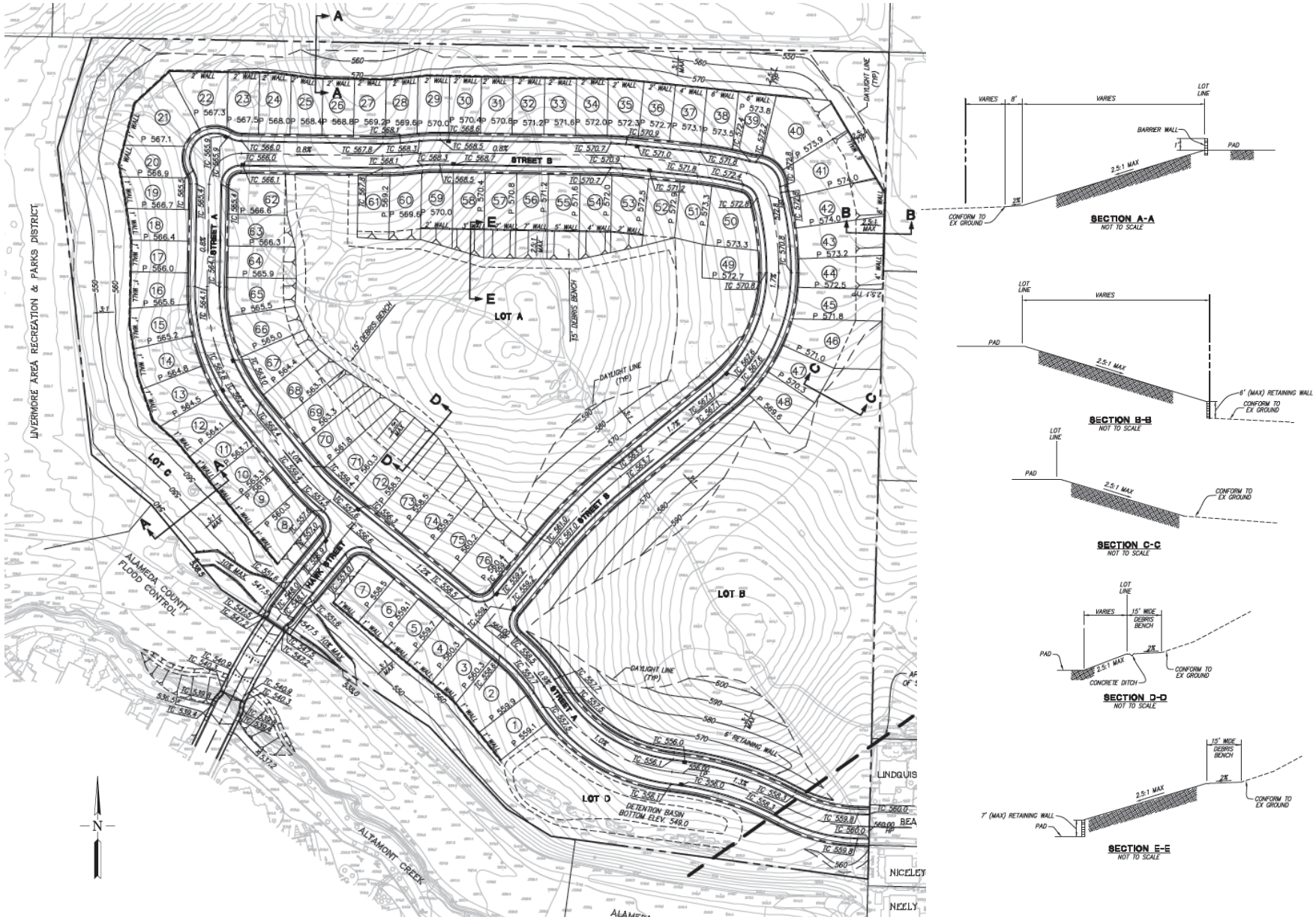
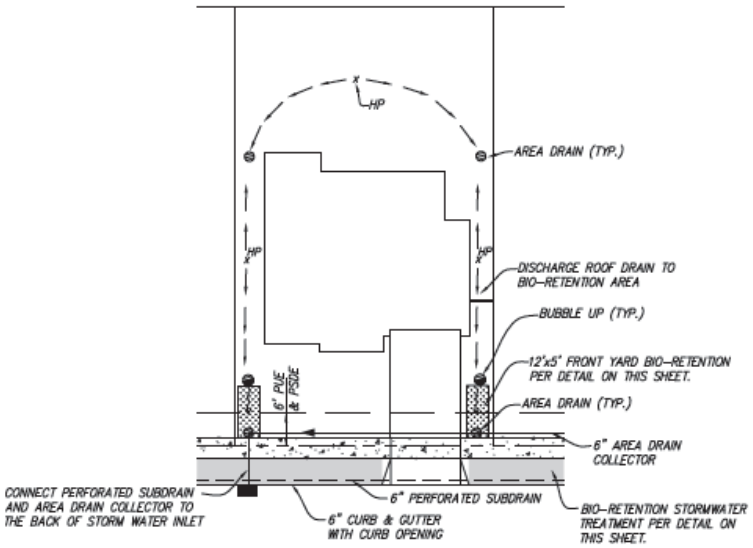


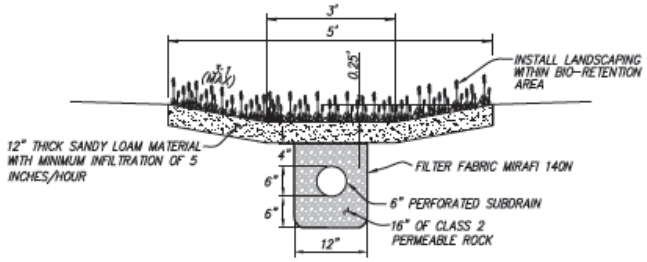
Figure 3.4: Preliminary Grading Plan

Source: RJA, September 6, 2012

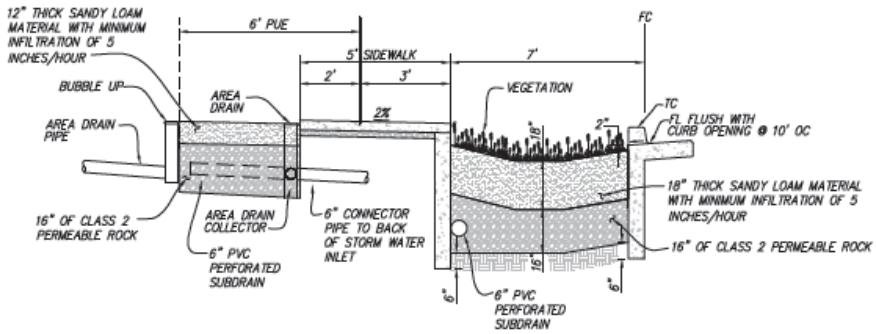
This page intentionally left blank



FRONT YARD BIO-RETENTION
NOT TO SCALE



FRONT YARD BIO-RETENTION DETAIL
NOT TO SCALE



TYPICAL BIO-RETENTION TREATMENT DETAIL
NOT TO SCALE

Figure 3.5: Stormwater Bio-Retention Details

Source: RJA, August 27, 2012

This page intentionally left blank

4

AESTHETICS

INTRODUCTION

New development can substantially change the visual qualities and characteristics of an urban area. It may also have long term lasting effects on the evolution of the urban area, thereby stimulating growth and increasing its attractiveness for new or expanding businesses, residential development or other desired or planned land uses. On the other hand, new development can change the character of an area by disrupting the visual and aesthetic features that establish the identity and value of an area for its existing residents, merchants or other users. Loss of such identity and value may discourage new investment, continued residency or business activity or other activities that attract visitors to the area.

The visual value of any given feature is highly subject to personal sensibilities and variations in subjective reaction to the features of an urban area. A negative visual impression on one person may be viewed as positive or beneficial by another. Objective or commonly agreed upon standards are difficult to establish, but an extensive body of literature is devoted to the subject of urban design and visual aesthetics.

ENVIRONMENTAL SETTING

The following description of the aesthetic setting is excerpted from the Livermore General Plan Community Character Element.

Livermore's most distinctive features are the hills and ridgelines that surround the City, most of which lie outside the City limits. Ridgelines are pronounced along the southern edge of the City, where views of rolling hills, interspersed with sycamore woodland areas, are complemented by intervening vistas of agricultural land and vineyards. Significant ridgelines are also located north of the I-580 corridor, particularly those associated with Brushy Peak to the northeast, as well as the Altamont Hills east of Vasco and Greenville Roads. Other open space to the north consists of more moderate topography, with rolling hills and rangelands. Livermore's built environment, and its planning policies, are designed to preserve views to these hills.

Several creeks and arroyos lie within the Planning Area, including Altamont Creek, Arroyo Seco, Arroyo Mocho, Arroyo Las Positas, Collier Canyon Creek, and Arroyo del Valle. These creeks support vegetation and trees for portions of their length, imparting important topographical and visual features to the general landscape.

Residential uses are the most widespread land use type in the City. The development of Livermore's residential neighborhoods has occurred in several distinct phases, each of which has made its contribution to the City's character and has resulted in distinguishable development types and patterns in different areas of the City. Beyond the center of the City, radiating outward to the urban edge, are numerous residential subdivisions built since 1950. The urban fabric of these areas reflects a classic

suburban development pattern; large tracts of one- and two-story single-family homes of largely similar style arranged on cul-de-sacs and curvilinear local streets.

Newer residential areas at the edge create an interface of new low-density development, designed to be compatible with the open space and agricultural uses that surround the City. Newer development is interspersed with older ranches and small farms spread along outlying roads. In areas north of I-580, residential development is limited to the Springtown and Altamont Creek neighborhoods on the east side of town, as well as adjacent to Las Positas Community College along North Canyons Parkway on the west side of town.

REGULATORY SETTING

STATE

Caltrans Scenic Highway Program

California's Scenic Highway Program is administered by the California Department of Transportation (Caltrans). The Scenic Highway Program was created by the Legislature in 1963. Its purpose is to protect and enhance the natural scenic beauty of California highways and adjacent corridors, through special conservation treatment. A highway may be designated scenic depending upon how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes upon the traveler's enjoyment of the view. The State Scenic Highway System includes a list of highways that are either eligible for designation as scenic highways or have been officially designated.

LOCAL

City of Livermore General Plan Scenic Corridors and Livermore Urban Growth Boundary Initiative

According to the General Plan Community Character Element, protection of scenic views from I-580 is of particular importance. This heavily-traveled roadway provides some of the best views of Livermore's surrounding hillsides and ridgelines. Policies and actions in this General Plan specifically seek to preserve and protect scenic views within the designated I-580 Scenic Corridor through control of grading, landscaping, and building height. The I-580 Scenic Corridor is defined as the area within 3,500 feet of the freeway centerline and visible from the roadway.

Development along the I-580 scenic corridor is required to be found to be consistent with the North Livermore Urban Growth Boundary Initiative (NLUGBI), and the general Scenic Corridor design standards contained in the General Plan Goal CC-4.

The Project site is nearest to Subpart A of Subarea 3 of the identified I-580 scenic corridor. The relevant development requirements under the NLUGBI are:

(1) New development shall preserve the views of the distant hills. The views to be preserved are the upper one-third of the distant hillsides in Subpart A.

(2) The view angles corresponding to these view preservation goals are 1.58 degrees for Subpart A. The view surfaces created by these view angles establishes the maximum building height elevation for development within Subparts A and B.

In addition to I-580, rural roads that pass through undeveloped parts of the Livermore Planning Area constitute the most important scenic roadway routes.

Relevant policies related to scenic corridors focus on requiring site planning, architectural, and landscape architectural design review of projects within the scenic corridors, minimizing grading and impacts to skyline ridges, and protecting public views. The protection of public views is defined as follows:

Development shall not be allowed to obscure, detract from, or negatively affect the quality of the views from designated scenic routes. (General Plan policy CC-4.1, P1.)

The City shall maintain in open space that portion of the hills which is seen from the freeway and which is within the I-580 Scenic Corridor as shown in Figure 4-1. Any development within the I-580 Scenic Corridor is subject to the policies set forth under Goal CC-4 and the conditions set forth in Section C, I-580 Scenic Corridor Implementation. (General Plan policy CC-4.1, P2.)

The City shall permit no development to wholly obstruct or significantly detract from views of any scenic area as viewed from a scenic route. (General Plan policy CC-4.1, P3.)

IMPACTS AND MITIGATION MEASURES

Standards of Significance

The following thresholds for measuring aesthetic impacts are based upon CEQA Guidelines thresholds:

1. Would the project have a substantial adverse effect on a scenic vista?
2. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?
3. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?
4. Would the project create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?

This analysis focuses on the potential for aesthetic issues to raise to the level of an environmental impact and does not presuppose or override the City's consistency determinations or design-level review actions.

SCENIC VISTAS

Impact Visual-1: **Scenic Vistas.** In the Project vicinity, the Altamont Hills and their ridgelines are identified as scenic resources by the City of Livermore, and creeks, such as the adjacent Altamont Creek, are identified as important topographical and visual features. The Project does not substantially alter views of identified scenic resources from identified vistas and would not substantially change views toward these scenic resources from nearby public areas. Therefore, the impact related to scenic vistas is ***less than significant***.

The Project site is located on a hillside adjacent to Altamont Creek. The Project site varies in elevation between approximately 537 and 607 feet above mean sea level, with topography consisting of gentle hills, ridges, rock outcrops, and drainage swales and two knoll areas. The bulk of the Altamont Hills begin approximately 2,500 feet to the northeast with prominent peaks reaching higher than 1,200 feet

above mean sea level, including Brushy Peak almost 3 miles to the north/northeast reaching over 1,500 feet above mean sea level. **Figure 4-1** shows the topography of the Livermore area.

In the Project vicinity, the Altamont Hills and their ridgelines are identified as scenic resources, especially the view toward Brushy Peak. Creeks, such as the adjacent Altamont Creek, are identified as important topographical and visual features to the general landscape.

Other than identifying scenic routes, the City does not officially designate locations from which scenic vistas would be viewed by the public. In the vicinity of the Project site, Dalton Road just west of Vasco Road is considered a scenic route.[1] The closest point of the Project site is approximately 1,300 feet east from this location. **Figures 4.2a and 4.2b** show the change in the view from Vasco Road near this location toward the Project site. (I-580 is also identified as a scenic route, but is instead discussed in the impact assessment below.) As shown in these figures, the Project site is located in the mid-ground of views from Vasco Road. While some development on the Project site would be able to be seen from the scenic route, it would constitute mid-ground views and would not substantially alter views of the more distant Altamont Hills.

Parks are considered public locations from which views are important. The existing and proposed views from Altamont Park, connected to Altamont Creek Elementary to the south are shown in **Figures 4.3a and 4.3b**. As shown in these figures, the views from the park are currently obstructed by the Project site and do not include views toward distant hills. The proposed Project would maintain a portion of the view toward the knolls on the Project site.

While not a scenic route or otherwise identified as a location from which to view a scenic vista, the existing and proposed views from Hawk Street to the south of the Project site are included in **Figures 4.4a and 4.4b**. As can be seen in these figures, the existing topography of the site currently obstructs this area's views of the distant hills, so development at the site would not substantially change distant vistas.

Additionally, Altamont Creek runs along the Project's southern boundary. The Project would modify the creek bed for construction of the bridge extension of Hawk Street, but would maintain the width and character of the creek. Access to the creek as a visual resource will be maintained with a pedestrian pathway along the creek. While it is possible that views toward the creek area from a few homes in the adjacent development along Bear Creek Drive and Blackwood Court could be obstructed to some degree by proposed landscaping, these view locations are not considered scenic viewpoints and views of the creek would be maintained for the public via pedestrian paths and along the new bridge.

The Project does not substantially alter views of identified scenic resources from identified vistas (scenic routes) and would not substantially change views toward these scenic resources from nearby public areas. Therefore, the impact related to scenic vistas is ***less than significant***.

[1] City of Livermore, prepared by DC&E, City of Livermore General Plan 2003-2025, Adopted February 2004, as amended through June 2009, Figure 4-1.

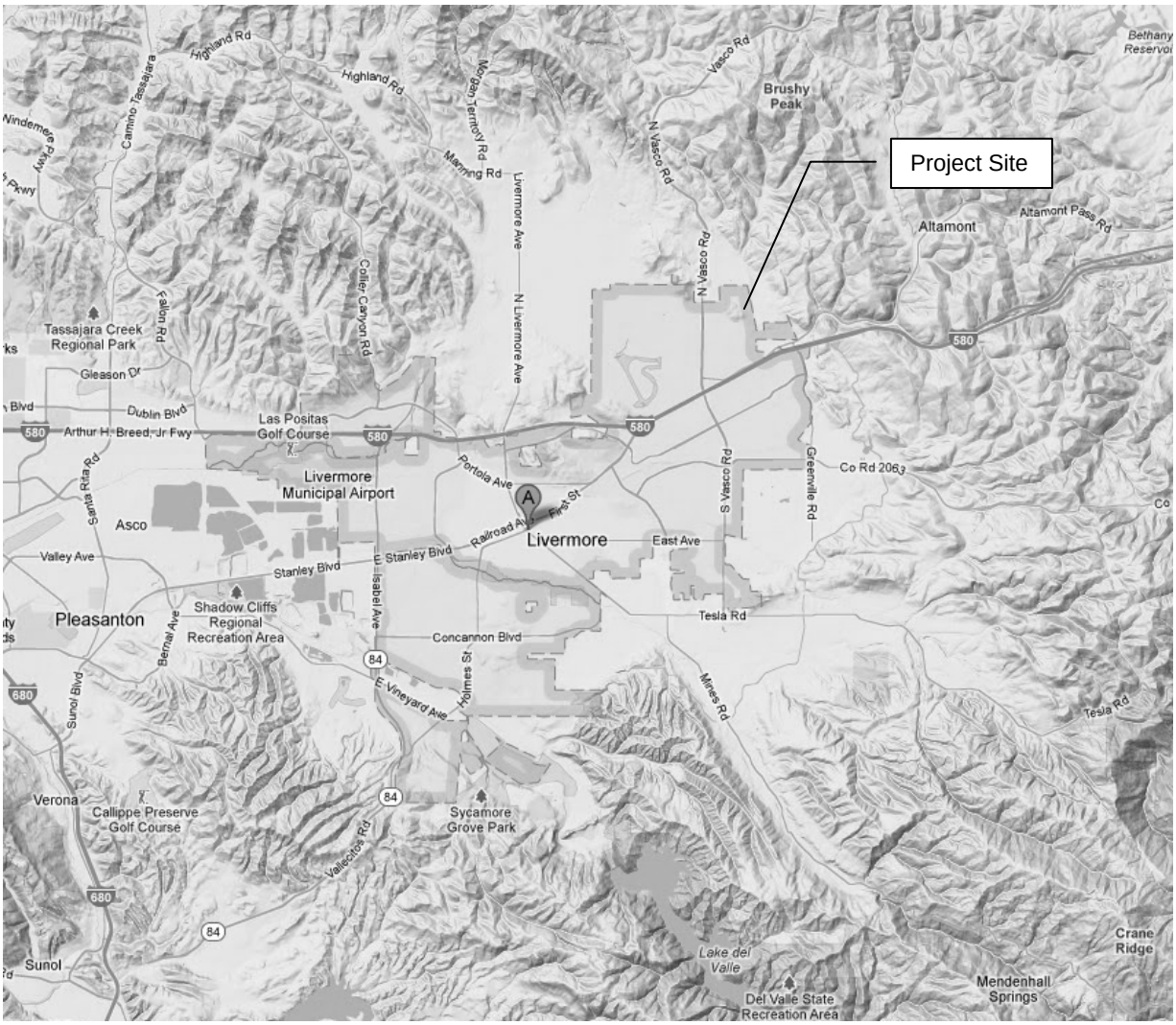


Figure 4.1: Livermore and Surrounding Topography

Source GoogleMaps. City of Livermore boundary shown outlined.

This page intentionally left blank

Viewpoint Location

Figure 4.2a: Existing View from Vasco Road, looking east

Figure 4.2b: Simulation from Vasco Road, looking east

Source: Gates + Associates for the applicant, dated Sept 1, 2011. Note that these simulations are based on a previous version of the plan (included in Appendix A) and show landscaping at installation. Buildout under the proposed plan would look similar from this viewpoint. All the homes would be a little smaller on smaller lots, so a few more would be visible in the same area. The relative height of the rooftops to the knolls and further ridgeline would be similar to that shown here.

This page intentionally left blank

Viewpoint Location

Figure 4.3a: Existing View from Altamont Park, looking north

Figure 4.3b: Simulation from Altamont Park, looking north

Source: Gates + Associates for the applicant, dated Sept 1, 2011. Note that these simulations are based on a previous version of the plan (included in Appendix A) and show landscaping at installation. Visible development from this viewpoint would be reduced under the current plan from that shown as no homes are currently proposed in the location where two homes are shown on the right in the above simulation and development on the left in the simulation would actually begin over 50 feet further away from this viewpoint (to the northwest) under the current plan.

This page intentionally left blank

Viewpoint Location

Figure 4.4a: Existing View from Hawk Street, looking northeast

Figure 4.4b: Simulation from Hawk Street, looking northeast

Source: Gates + Associates for the applicant, dated Sept 1, 2011. Note that these simulations are based on a previous version of the plan (included in Appendix A) and show landscaping at installation. Buildout under the proposed plan would look similar from this viewpoint. All the homes would be a little smaller on smaller lots, so a few more would be visible in the same area. The relative height of the rooftops would be similar to that shown here.

This page intentionally left blank

SCENIC HIGHWAYS

Impact Visual-2: **Scenic Corridor.** The Project site is located partially within the view corridor of I-580, which is designated as a city scenic corridor in the City of Livermore General Plan and identified as an eligible State Scenic Highway. However, the Project would not substantially obscure, detract from, or negatively affect the quality of the views from this route or substantially obscure view to the distant hills. Further, through substantial conformance with the applicable City design standards and guidelines, any potential impact on this local scenic corridor would be ***less than significant***.

I-580 through Livermore is identified as an eligible (though not officially designated) State Scenic Highway though the state's program.[2] Additionally, I-580 is considered a scenic corridor by the City of Livermore, as discussed in the setting above.

The Project is located approximately 3,300 feet to 5,200 feet from I-580, so only the southeast corner of the Project site is within the defined I-580 Scenic Corridor (extending to 3,500 feet). Views toward the Project site are largely obscured to the west of Vasco Road by the sound wall along the Springtown development. Between Vasco Road and Laughlin Road, I-580 runs at grade with no sound wall. Views of development and associated trees predominates the mid-ground with views of the larger Altamont Hills in the background. **Figure 4.5** shows the existing view from I-580.

Figure 4.5: Existing View from I-580, looking north

The Project site is in the mid-ground in approximately the center of the photo.

[2] California Department of Transportation, State Scenic Highway Mapping System, http://www.dot.ca.gov/hq/LandArch/scenic_highways/index.htm

The Project site is largely not visible from I-580 and does not propose any houses within the identified 3,500 foot scenic corridor. (The approximate limit of the scenic corridor is shown on Figure 3.2 in Chapter 3 of this report.) While some development on the Project site could be able to be seen from portions of I-580, it would constitute mid-ground views and would be consistent with the existing character of development in the area. The proposed development would not substantially alter views of the more distant Altamont Hills. Therefore, the Project's impact related to development within a scenic highway would be ***less than significant***.

VISUAL CHARACTER

Impact Visual-3: **Changed Visual Character.** The proposed Project would construct a residential subdivision on a currently undeveloped site within the boundaries of the City of Livermore but at the edge of existing development. The proposed Project would change the visual character of the site itself, but is not inconsistent with the character of the adjacent developed areas and would not result in development incongruous to the existing and proposed development in the area. This impact would be ***less than significant***.

The Project is adjacent to residential development to the south and east that is similar in character to the proposed development. Properties to the north and west are preserved as undeveloped land/ biological habitat (see Chapter 7 for additional detail).

The Project site is currently characterized visually as undeveloped land. As such, any development on the site would constitute changed visual character. The standard of significance is whether the change would constitute a substantial degradation of the existing visual character or quality of the site and its surroundings. The CEQA Guidelines do not provide a threshold of significance, so consistency with applicable policies related to visual character can be analyzed to assess the significance of the impact.

The General Plan Community Character Element policies relating to visual character focus on protection of the views, which are discussed under the impact analyses above, as well as the following issues under which the Project's character is discussed:

- Maintaining an area of non-urbanized land/open space surrounding the developed area (General Plan policies CC-1, P6 and P7)

The Project consists of previously planned development on a site adjacent to existing residential development on two sides (east and south). Properties to the north and west of the Project site are preserved as biological habitat. A "greenbelt" of non-urbanized land surrounding City development will be maintained with this development. Additionally, the Project includes undeveloped areas along the north and western edges of the Project area to buffer the adjacent undeveloped areas along those borders.

- Preservation of knolls (General Plan policy CC-1, P11)

Project plans include maintaining the two knolls on the site in their undeveloped state.

- Maintaining high standards of urban design (General Plan policies under CC-2) including compatibility with existing development (General Plan policies CC-2, P2 and P9).

The proposed Project consists of a single-family residential development consistent with and connected to surrounding similar development. The Project is required to complete site planning, architectural,

and landscape architectural design review through the City to ensure compliance with the City's standards and guidelines.

While the Project would change the character on the Project site, it would not be incompatible with surrounding uses or inconsistent with City policies related to aesthetics, as discussed above. Therefore, the Project would not "substantially degrade" the visual quality of the Project area or its surroundings and the impact related to changed character would be considered ***less than significant***. Note that this determination from an environmental perspective does not presuppose or constrain the City's decision-making with regard to their policies and regulations regarding architecture and aesthetics, which go beyond environmental concerns.

LIGHT AND GLARE

Impact Visual-4: **Increased Light and Glare.** The Project would add additional sources of light to a currently undeveloped site adjacent to other residential uses. Lighting quality, intensity and design is required to meet City standards to minimize glare, light trespass and "sky glow" and would be within allowable levels for residential uses. Therefore, impacts related to light and glare would be ***less than significant***.

Sources of light and glare in the Project vicinity include interior and exterior building lights and street lighting. Light and glare associated with vehicular traffic in the area also create sources of glare. The existing level and sources of light and glare are typical of those in a developed urban setting.

Development of the Project site has the potential to create additional light and glare. The specifics of the lighting plan are not yet known. However, existing City regulations would ensure that new development does not create substantial adverse light and glare impacts through the Site Plan Design Review process. With adherence to applicable regulations and policies, the Project would have a ***less than significant*** impact on light and glare.

CUMULATIVE AESTHETIC IMPACTS

The Project is consistent with the development previously planned for the site and existing adjacent development to the south and east. This Project represents what is anticipated to be one of the furthest edges of development in this area of Livermore and includes buffers along the north and west edges, where properties are currently and may remain undeveloped. Because of the characteristics of the neighboring sites and location near the edge of the growth boundary, substantial development in the immediate vicinity is not anticipated. There would be no additional significant cumulative aesthetic impacts.

This page intentionally left blank

5

AGRICULTURAL, FOREST AND MINERAL RESOURCES

INTRODUCTION

This chapter of the Draft EIR contains discussion regarding the CEQA topic areas of Agricultural, Forest and Mineral Resources. Only limited analysis and discussion for these topic areas is required to make significance determinations due to the nature and specifics of the Project site.

AGRICULTURAL AND FOREST RESOURCES

Under the CEQA Guidelines, Appendix G – Environmental Checklist Form, development of the Project area as proposed would have a significant environmental impact if it were to result in:

1. Conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) as shown on maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use;
2. A conflict with existing zoning for agricultural use, or a Williamson Act contract; or
3. A conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g)).
4. The loss of forest land or conversion of forest land to no-forest land.
5. Changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use.

The General Plan Open Space and Conservation Element includes a discussion of mineral resources as excerpted following:

Much of the area within Livermore's City limits has been urbanized. Population and job growth in the Livermore Valley has resulted in pressure to develop housing and commercial establishments on lands historically used for agriculture. However, agricultural resources remain in the area. As of 2002, approximately 1,061 acres of land within the Livermore City limits were in agricultural uses. Contiguous agricultural resources are more extensive outside the City boundaries. Unincorporated areas to the north, east, and west of Livermore are currently used for rangeland, dry farmland, irrigated cropland, and uncultivated farmland. Agricultural uses south of Livermore include extensive vineyards, orchards (mainly olives and nuts), rangeland, and uncultivated farmland.

Farmland is classified and mapped by the State Department of Conservation, Division of Land Resource Protection for the purposes of tracking farmland development throughout the State. Farmland is mapped into categories ranging from Prime Farmland, which has the best combination of physical characteristics able to sustain long-term agricultural production, to Grazing Land, which allows for the grazing of livestock. Lands to the north and west of Livermore are generally mapped as Grazing Land. Prime Farmland, Farmland of Statewide Importance, and Unique Farmland are primarily located south of Livermore's City limits.

Woodland and forested habitats are largely restricted to the north and east-facing slopes or higher elevations to the south and west of Livermore. The moist microclimate produced by the altitude, steepness and/or aspect of these areas has allowed the establishment of dense stands of trees.

The Project site does not contain Farmland[1] or active agricultural or forested land[2]. No land on the Project site is under a Williamson Act contract. There would be ***no impact*** related to Agricultural and Forest Resources.

MINERAL RESOURCES

Under the CEQA Guidelines, Appendix G – Environmental Checklist Form, development of the Project site as proposed would have a significant environmental impact if it were to result in:

1. Loss of availability of a known mineral resource that would be of future value to the region and the residents of the state; or.
2. Loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

The General Plan Open Space and Conservation Element includes a discussion of mineral resources as excerpted following:

Due to the high value of sand and gravel deposits in the vicinity of Livermore, the California Geological Survey (formerly the California Division of Mines and Geology) has mapped and classified the aggregate resources of the Livermore-Amador Valley. Most of the valley floor south of I-580 is classified as an area of significant mineral resources, but this area is located miles from the Project site. No other mineral resources are identified in the City of Livermore.

No mineral resources of value to the region and the residents of the state have been identified at or in the immediate vicinity of the Project site. [3] Therefore, the proposed Project would have ***no impact*** on mineral resources.

[1] City of Livermore, prepared by DC&E, City of Livermore General Plan 2003-2025, Adopted February 2004, as amended through June 2009, Open Space and Conservation Element, Figure 8-2.

[2] City of Livermore, prepared by DC&E, City of Livermore General Plan 2003-2025, Adopted February 2004, as amended through June 2009, Open Space and Conservation Element, Figure 8-1.

[3] City of Livermore, prepared by DC&E, City of Livermore General Plan 2003-2025, Adopted February 2004, as amended through June 2009, Open Space and Conservation Element, Figure 8-3.

6

AIR QUALITY

INTRODUCTION

This analysis evaluates the air quality impacts of the Project. The impacts associated with implementation of the Project were evaluated consistent with guidance provided by the Bay Area Air Quality Management District (BAAQMD).[1] See the Thresholds of Significance (p. 6-9) for a discussion the legal status of BAAQMD Thresholds and Guidelines.

This section utilizes information from the following reports prepared for this Project or analysis:

Emissions Model and Construction Health Risk Assessment Results compiled by Lamphier-Gregory for this analysis in January and February 2012 (included in Appendix B).

SETTING

METEOROLOGY

Livermore is located in the Livermore Valley subregion of the air basin, with the following description from BAAQMD:

The Livermore Valley is a sheltered inland valley near the eastern border of San Francisco Bay Area Air Basin (SFBAAB). The western side of the valley is bordered by 1,000 to 1,500 foot hills with two gaps connecting the valley to the central SFBAAB, the Hayward Pass and Niles Canyon. The eastern side of the valley also is bordered by 1,000 to 1,500 foot hills with one major passage to the San Joaquin Valley called the Altamont Pass and several secondary passages. To the north lie the Black Hills and Mount Diablo. A northwest to southeast channel connects the Diablo Valley to the Livermore Valley. The south side of the Livermore Valley is bordered by mountains approximately 3,000 to 3,500 feet high.

During the summer months, when there is a strong inversion with a low ceiling, air movement is weak and pollutants become trapped and concentrated. Maximum summer temperatures in the Livermore Valley range from the high-80's to the low-90's, with extremes in the 100's. At other times in the summer, a strong Pacific high pressure cell from the west, coupled with hot inland temperatures causes a strong onshore pressure gradient which produces a strong, afternoon wind. With a weak temperature inversion, air moves over the hills with ease, dispersing pollutants.

In the winter, with the exception of an occasional storm moving through the area, air movement is often dictated by local conditions. At night and early morning, especially under clear, calm and cold

[1] Bay Area Air Quality Management District. May 2011. *California Environmental Quality Act Air Quality Guidelines*.

conditions, gravity drives cold air downward. The cold air drains off the hills and moves into the gaps and passes. On the eastern side of the valley the prevailing winds blow from north, northeast and east out of the Altamont Pass. Winds are light during the late night and early morning hours. Winter daytime winds sometimes flow from the south through the Altamont Pass to the San Joaquin Valley. Average winter maximum temperatures range from the high-50's to the low-60's, while minimum temperatures are from the mid-to-high-30's, with extremes in the high teens and low-20's.

Air pollution potential is high in the Livermore Valley, especially for photochemical pollutants in the summer and fall. High temperatures increase the potential for ozone to build up. The valley not only traps locally generated pollutants but can be the receptor of ozone and ozone precursors from San Francisco, Alameda, Contra Costa and Santa Clara counties. On northeasterly wind flow days, most common in the early fall, ozone may be carried west from the San Joaquin Valley to the Livermore Valley.

During the winter, the sheltering effect of the valley, its distance from moderating water bodies, and the presence of a strong high pressure system contribute to the development of strong, surface-based temperature inversions. Pollutants such as carbon monoxide and particulate matter, generated by motor vehicles, fireplaces and agricultural burning, can become concentrated. Air pollution problems could intensify because of population growth and increased commuting to and through the subregion.

CRITERIA AIR POLLUTANTS

Ambient air quality standards have been established by state and federal environmental agencies for specific air pollutants most pervasive in urban environments. These pollutants are referred to as criteria air pollutants because the standards established for them were developed to meet specific health and welfare criteria set forth in the enabling legislation. The criteria air pollutants emitted by development, traffic and other activities anticipated under the proposed development include ozone (O_3), ozone precursors oxides of nitrogen and reactive organic gases (NOx and ROG), carbon monoxide (CO), nitrogen dioxide (NO_2), and suspended particulate matter (PM_{10} and $PM_{2.5}$). Other criteria pollutants, such as lead (Pb) and sulfur dioxide (SO_2), would not be substantially emitted by the proposed development or traffic, and air quality standards for them are being met throughout the Bay Area.

Ozone (O_3)

While O_3 serves a beneficial purpose in the upper atmosphere (stratosphere) by reducing ultraviolet radiation potentially harmful to humans, when it reaches elevated concentrations in the lower atmosphere it can be harmful to the human respiratory system and to sensitive species of plants. O_3 concentrations build to peak levels during periods of light winds, bright sunshine, and high temperatures. Short-term O_3 exposure can reduce lung function in children, make persons susceptible to respiratory infection, and produce symptoms that cause people to seek medical treatment for respiratory distress. Long-term exposure can impair lung defense mechanisms and lead to emphysema and chronic bronchitis. Sensitivity to O_3 varies among individuals, but about 20 percent of the population is sensitive to O_3, with exercising children being particularly vulnerable. O_3 is formed in the atmosphere by a complex series of photochemical reactions that involve “ozone precursors” that are two families of pollutants: oxides of nitrogen (NOx) and reactive organic gases (ROG). NOx and ROG are emitted from a variety of stationary and mobile sources. While NO_2, an oxide of nitrogen, is another criteria pollutant itself, ROGs are not in that category, but are included in this discussion as O_3 precursors.

Carbon Monoxide (CO)

Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause dizziness and fatigue, impair central nervous system function, and induce angina in persons with

serious heart disease. Primary sources of CO in ambient air are passenger cars, light-duty trucks, and residential wood burning. Emission controls placed on automobiles and the reformulation of vehicle fuels have resulted in a sharp decline in CO levels, especially since 1991.

Nitrogen Dioxide (NO_2)

The major health effect from exposure to high levels of NO_2 is the risk of acute and chronic respiratory disease. NO_2 is a combustion by-product, but it can also form in the atmosphere by chemical reaction. NO_2 is a reddish-brown colored gas often observed during the same conditions that produce high levels of O_3 and can affect regional visibility. NO_2 is one compound in a group of compounds consisting of oxides of nitrogen (NOx). As described above, NOx is an O_3 precursor compound.

Particulate Matter (PM)

Respirable particulate matter, PM_{10}, and fine particulate matter, $PM_{2.5}$, consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively. PM_{10} and $PM_{2.5}$ represent fractions of particulate matter that can be inhaled and cause adverse health effects. PM_{10} and $PM_{2.5}$ are a health concern, particularly at levels above the Federal and State ambient air quality standards. $PM_{2.5}$ (including diesel exhaust particles) is thought to have greater effects on health because minute particles are able to penetrate to the deepest parts of the lungs. Scientific studies have suggested links between fine particulate matter and numerous health problems including asthma, bronchitis, acute and chronic respiratory symptoms such as shortness of breath and painful breathing. Children are more susceptible to the health risks of $PM_{2.5}$ because their immune and respiratory systems are still developing. Very small particles of certain substances (e.g., sulfates and nitrates) can also directly cause lung damage or can contain absorbed gases (e.g., chlorides or ammonium) that may be injurious to health.

Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, fuel combustion, and atmospheric photochemical reactions. Some sources of particulate matter, such as mining and demolition and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. In addition to health effects, particulates also can damage materials and reduce visibility. Dust comprised of large particles (diameter greater than 10 microns) settles out rapidly and is more easily filtered by human breathing passages. This type of dust is considered more of a soiling nuisance rather than a health hazard.

In 1983, CARB replaced the standard for “suspended particulate matter” with a standard for suspended PM_{10} or “respirable particulate matter.” This standard was set at 50 µg/m3 for a 24-hour average and 30 µg/m3 for an annual average. CARB revised the annual PM_{10} standard in 2002, pursuant to the Children's Environmental Health Protection Act. The revised PM_{10} standard is 20 µg/m3 for an annual average. $PM_{2.5}$ standards were first promulgated by the EPA in 1997, and were recently revised to lower the 24-hour $PM_{2.5}$ standard to 35 µg/m3 for 24-hour exposures and revoked the annual PM_{10} standard due to lack of scientific evidence correlating long-term exposures of ambient PM_{10} with health effects. CARB has adopted an annual average $PM_{2.5}$ standard, which is set at 12 µg/m3, which is more stringent than the Federal standard of 15 µg/m3.

TOXIC AIR CONTAMINANTS

Besides the "criteria" air pollutants, there is another group of substances found in ambient air referred to as Hazardous Air Pollutants under the Federal Clean Air Act and Toxic Air Contaminants (TACs) under the California Clean Air Act. These contaminants tend to be localized and are found in relatively low concentrations in ambient air. However, they can result in adverse chronic health effects if exposure to low concentrations occurs for long periods. They are regulated at the local, state, and federal level.

TACs are a broad class of compounds known to cause morbidity or mortality (cancer risk), and include, but are not limited to, the criteria air pollutants listed above. TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., benzene near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, state, and federal level.

Diesel exhaust is the predominant TAC in urban air, and is estimated to represent about two-thirds of the cancer risk from TACs (based on the statewide average). According to CARB, diesel exhaust is a complex mixture of gases, vapors and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by ARB, and are listed as carcinogens either under State Proposition 65 or under the Federal Hazardous Air Pollutants programs.

CARB reports that recent air pollution studies have shown an association that diesel exhaust and other cancer-causing toxic air contaminants emitted from vehicles are responsible for much of the overall cancer risk from TACs in California. Particulate matter emitted from diesel-fueled engines (diesel particulate matter [DPM]) was found to comprise much of that risk. In August, 1998, CARB formally identified DPM as a TAC. Diesel particulate matter is of particular concern, since it can be distributed over large regions, thus leading to widespread public exposure. The particles emitted by diesel engines are coated with chemicals, many of which have been identified by EPA as hazardous air pollutants, and by CARB as TACs. Diesel engines emit particulate matter at a rate about 20 times greater than comparable gasoline engines. The vast majority of diesel exhaust particles (over 90 percent) consist of $PM_{2.5}$, which are the particles that can be inhaled deep into the lung. Like other particles of this size, a portion will eventually become trapped within the lung, possibly leading to adverse health effects. While the gaseous portion of diesel exhaust also contains TACs, CARB's 1998 action was specific to DPM, which accounts for much of the cancer-causing potential from diesel exhaust. California has adopted a comprehensive diesel risk reduction program to reduce DPM emissions 85 percent by 2020. The U.S. EPA and CARB adopted low sulfur diesel fuel standards in 2006 that reduce diesel particulate matter substantially.

In cooler weather, smoke from residential wood combustion can be a source of TACs. Localized high TAC concentrations can result when cold stagnant air traps smoke near the ground and, with no wind, the pollution can persist for many hours, especially in sheltered valleys during winter. Wood smoke also contains a significant amount of PM_{10} and $PM_{2.5}$. Wood smoke is an irritant, and is implicated in worsening asthma and other chronic lung problems. BAAQMD Regulation 6, Rule 3, disallows wood-burning devices in new construction, except those meeting U.S. EPA emissions targets and approved by the Air Pollution Control Officer of the Bay Area Air Quality Management. Compliance with this rule can be assumed.

ODORS

Objectionable odors may be associated with a variety of pollutants. Common sources of odors include wastewater treatment plants, landfills, composting facilities, refineries and chemical plants. Odors rarely have direct health impacts, but they can be very unpleasant and can lead to concern over possible health effects among the public. Each year the Air District receives thousands of citizen complaints about objectionable odors.[2]

[2] BAAQMD, BAAQMD CEQA Guidelines, December 2009, as amended.

STATE OF CALIFORNIA AND FEDERAL AIR QUALITY STANDARDS

Both the California Air Resource Board and the U.S. Environmental Protection Agency have established ambient air quality standards for common pollutants, including ozone, CO, NO_2, PM_{10} and $PM_{2.5}$. [3] These ambient air quality standards represent safe levels that avoid specific adverse health effects associated with each pollutant. Individuals vary widely in their sensitivity to air pollutants, and standards are set to protect more pollution-sensitive populations (e.g., children and the elderly). National and state standards are reviewed and updated periodically based on new health studies. California ambient standards tend to be at least as protective as national ambient standards, and are often more stringent. National and California ambient air quality standards are shown in **Table 6.1**, below.

For planning purposes, regions like the San Francisco Bay Area Air Basin are given an air quality status designation by the federal and state regulatory agencies. Areas with monitored pollutant concentrations that are lower than ambient air quality standards are designated "attainment" on a pollutant-by-pollutant basis. When monitored concentrations exceed ambient standards within an air basin, it is designated "nonattainment" for that pollutant. U.S. EPA designates areas as "unclassified" when insufficient data are available to determine the attainment status; however, these areas are typically considered to be in attainment of the standard.

Table 6.1: Health-Based Ambient Air Quality Standards

Pollutant	Averaging Time	California Standard	National Standard
Ozone	1 Hour	0.09 ppm	---
	8 Hour	0.070 ppm	0.075 ppm
Carbon Monoxide	1 Hour	20 ppm	35 ppm
	8 Hour	9.0 ppm	9 ppm
Nitrogen Dioxide	1 Hour	0.18 ppm	0.100 ppm
	Annual	0.030 ppm	0.053 ppm
Sulfur Dioxide	24 Hour	0.04 ppm	0.14 ppm
	Annual	---	0.030 ppm
Particulates	24 Hour	50 ug/m3	150 ug/m3
< 10 microns	Annual	20 ug/m3	---
Particulates	24 Hour	---	35 ug/m3
< 2.5 microns	Annual	12 ug/m3	15 ug/m3

Concentrations: ppm = parts per million ug/m3 = micrograms per cubic meter
Source: Bay Area Air Quality Management District, Bay Area Pollution Summary – 2010.

EXISTING AIR QUALITY

Air quality in the region is controlled by the rate of pollutant emissions and meteorological conditions. Meteorological conditions such as wind speed, atmospheric stability, and mixing height may all affect the atmosphere's ability to mix and disperse pollutants. Long-term variations in air quality typically result from changes in air pollutant emissions, while frequent, short-term variations result from changes in atmospheric conditions. The San Francisco Bay Area is considered to be one of the cleanest metropolitan areas in the country with respect to air quality. BAAQMD monitors air quality conditions at more than 30 locations throughout the Bay Area, including a monitoring station in Livermore. Monitoring station measurements indicate that air quality in the vicinity of the Project generally

[3] Other pollutants (*e.g.*, lead, sulfur dioxide) also have ambient standards, but they are not discussed in this document because emissions of these pollutants from the Project are expected to be negligible.

performs well against State standards for criteria air pollutants with few exceedances of pollutant standards between 2008 and 2010, the most recent year available. **Table 6.2** summarizes exceedances of the state and federal standards at the San Francisco monitoring site and Bay Area-wide.

Table 6.2: Summary of Criteria Air Pollution Monitoring Data

Pollutant	Standard	Monitoring Site	Days Standard Exceeded		
			2008	2009	2010
Ozone	State 1-Hour	Livermore	5	8	3
		SF Bay Area Air	9	11	8
Ozone	Federal 8-Hour	Livermore	6	6	3
		SF Bay Area Air	12	8	9
Ozone	State 8-Hour	Livermore	8	8	6
		SF Bay Area Air	20	13	11
PM_{10}	Federal 24-Hour	Livermore	-	-	-
		SF Bay Area Air	0	0	0
PM_{10}	State 24-Hour	Livermore	-	-	-
		SF Bay Area Air	5	1	2
$PM_{2.5}$	Federal 24-Hour	Livermore	2	4	0
		SF Bay Area Air	12	11	6
Carbon Monoxide	State/Federal 8-Hour	Livermore	0	0	-
		SF Bay Area Air	0	0	0
Nitrogen Dioxide	State 1-Hour	Livermore	0	0	0
		SF Bay Area Air	0	0	0

Notes:
PM_{10} monitoring was discontinued at the Livermore Station in 2008.
PM_{10} and $PM_{2.5}$ are measured every sixth day in San Francisco and other Bay Area sites, so the number of days exceeding the standard is estimated.
Source: Bay Area Air Quality Management District Air Pollution Summaries (http://www.baaqmd.gov/Divisions/Communications-and-Outreach/Air-Quality-in-the-Bay-Area/Air-Quality-Summaries.aspx)

Table 6.2 shows that air quality as a result of exceedances of O_3 and $PM_{2.5}$ and PM_{10} standards are problematic in the San Francisco Bay Area. In recent years, the State and federal O_3 standards have been exceeded at least somewhere in the Bay Area on 8 to 20 days per year.

The Bay Area has exceeded the $PM_{2.5}$ standard on 6 to 12 sampling days per year. The Livermore monitoring site logged 0 to 4 exceedances per year between 2008 and 2010. Standards for CO and NO_2, or any other criteria air pollutant, were not exceeded anywhere in the Bay Area during this time period.[4]

ATTAINMENT STATUS

Areas that do not violate ambient air quality standards are considered to have attained the standard. Violations of ambient air quality standards are based on air pollutant monitoring data and are judged for each air pollutant. The attainment status for the area is summarized in **Table 6.3**, below. The Bay Area as a whole does not meet state or federal ambient air quality standards for ground level ozone and $PM_{2.5}$ and State standards for PM_{10} and $PM_{2.5}$.

[4] BAAQMD, Air Pollution Summaries, http://www.baaqmd.gov/Divisions/Communications-and-Outreach/Air-Quality-in-the-Bay-Area/Air-Quality-Summaries.aspx , accessed March 28, 2011.

Table 6.3: Regional Attainment Status

Pollutant	Federal Status	State Status
Ozone (O_3) – 1-Hour Standard	No Designation	Serious Nonattainment
Ozone (O_3) – 8-Hour Standard	Marginal Nonattainment	Nonattainment
Respirable Particulate Matter (PM_{10})	Unclassified	Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment	Nonattainment
Carbon Monoxide (CO)	Attainment/Unclassified	Attainment
Nitrogen Dioxide (NO_2)	Unclassified	Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment
Sulfates	No Designation	Attainment
Lead	No Designation	Attainment
Hydrogen Sulfide	No Designation	Unclassified
Visibility Reducing Particles	No Designation	Unclassified

Source: Bay Area Air Quality Management District. http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm

Under the Federal CAA, the U.S. EPA has classified the region as marginally nonattainment for the 1997 8-hour ozone standard. U.S. EPA required the region to attain the standard by 2007. The U.S. EPA determined that the Bay Area has met this standard, but a formal re-designation request and maintenance plan would have to be submitted before formal re-designation could be made.

In May 2008, U.S. EPA lowered the 8-hour ozone standard from 0.08 to 0.075 ppm. The USEPA was poised to promulgate nonattainment designations under the 2008 ozone NAAQS in December 2009, which would have included the Bay Area. These nonattainment designations would have become effective by March 12, 2010. However, in early January 2010, the EPA proposed a stricter air quality standard for ground level ozone. The new ozone proposal would set the primary smog standard at a level between 0.060 and 0.070 parts per million (ppm) measured over an eight hour period. EPA expects to finalize the newly proposed national 8-hour ozone standard soon. Therefore, there is currently no change to the Bay Area's existing designation of Marginal Nonattainment for the federal 8-hour standard.

U.S EPA lowered the 24-hour $PM_{2.5}$ standard from 65 $\mu g/m^3$ to 35 $\mu g/m^3$ in 2006. EPA designated the Bay Area as nonattainment of the $PM_{2.5}$ standard on October 8, 2009. The effective date of the designation is December 14, 2009 and the Air District has three years to develop a plan, called a State Implementation Plan (SIP), that demonstrates the Bay Area will achieve the revised standard by December 14, 2014. The SIP for the new $PM_{2.5}$ standard must be submitted to the US EPA by December 14, 2012.

The range of standards under consideration would be a significant change, which would undoubtedly result in a nonattainment designation for the Bay Area and much of California. The Bay Area has met the CO standards for over a decade, and is classified attainment maintenance by the U.S. EPA. The U.S. EPA grades the region unclassified for all other air pollutants, which include PM_{10} and $PM_{2.5}$. In December 2008, U.S. EPA designated the entire Bay Area as nonattainment for the federal 24-hour $PM_{2.5}$ standard. The Bay Area will have until 2015 to attain the standards, although U.S. EPA could grant extensions to 2020.

At the State level, the region is considered serious non-attainment for ground level O_3 and non-attainment for PM_{10} and $PM_{2.5}$. The area is considered attainment or unclassified for all other pollutants.

In 1988, California passed the California Clean Air Act (CCAA, California Health and Safety Code § 39600 *et seq.*). Under the CCAA, the Bay Area Air Basin is required to have a Clean Air Plan (CAP) to achieve and maintain ozone standards.

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Livermore is located within the nine county San Francisco Bay Area Air Basin and therefore within the jurisdiction of BAAQMD. BAAQMD enforces rules and regulations regarding air pollution sources and is the primary agency preparing the regional air quality plans mandated under state and federal law.

According to the standards of the federal Clean Air Act, the Bay Area is in attainment with all ambient air quality standards except for state and national ozone standards and national particulate matter ambient air quality standards. The nonattainment status is attributed to the region's development history. Past, present and future development projects contribute to the region's adverse air quality impacts on a cumulative basis. By its very nature, air pollution is largely a cumulative impact. No single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. If a project's contribution to the cumulative impact is considerable, then the project's impact on air quality would be considered significant.

In 1991, the BAAQMD, MTC and ABAG prepared the Bay Area 1991 Clean Air Plan or CAP. This air quality plan addresses the California Clean Air Act. Updates are developed approximately every three years. The plans were meant to demonstrate progress toward meeting the more stringent 1-hour ozone CAAQS. The latest update to the plan, which was adopted in September 2010, is called the Bay Area 2010 Clean Air Plan. The plan includes the following:

- Updates the recent Bay Area 2005 Ozone Strategy in accordance with the requirements of the California Clean Air Act to implement "all feasible measures" to reduce ozone;
- Provide a control strategy to reduce ozone, particulate matter (PM), TACs, and greenhouse gases in a single, integrated plan;
- Review progress in improving air quality in recent years; and
- Establish emission control measures to be adopted or implemented in the 2010-2012 timeframe.

BAAQMD also provides a document titled *California Environmental Quality Act Air Quality Guidelines* ("BAAQMD Guidelines"), which provides guidance for consideration by lead agencies, consultants, and other parties evaluating air quality impacts in the San Francisco Bay Area Air Basin conducted pursuant to CEQA. The document provides guidance on evaluating air quality impacts of development projects and local plans, determining whether an impact is significant, and mitigating significant air quality impacts.

BAAQMD has recently updated these Guidelines in coordination with adoption of new thresholds of significance on June 2, 2010.[5] The most recent version of the Guidelines are dated May 2012, (though the May 2011 version includes the updated thresholds, as discussed below). The updated CEQA Guidelines revised significance thresholds, assessment methodologies, and mitigation strategies for criteria pollutants, air toxics, odors, and greenhouse gas emissions.

[5] Bay Area Air Quality Management District, June 2, 2010, News Release, available at: http://www.baaqmd.gov/~/media/Files/Communications%20and%20Outreach/Publications/News%20Releases/2010/ceqa_100602.ashx .

IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Appendix G of the CEQA Guidelines (Environmental Checklist) contains a list of air quality effects that may be considered significant. Implementation of the Project would have a significant effect on the environment if it were to:

1. Conflict with or obstruct implementation of the applicable air quality plan;

2. Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

3. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);

4. Expose sensitive receptors to substantial pollutant concentrations; or

5. Create objectionable odors affecting a substantial number of people.

The CEQA Guidelines state that, where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the above determinations. BAAQMD updated their thresholds on June 2, 2010 and the BAAQMD Guidelines in May 2011, which have been used for this air quality analysis, as detailed under each item below.

On March 5, 2012 the Alameda County Superior Court issued a judgment finding that BAAQMD had failed to comply with CEQA when it adopted its 2010 Thresholds. The court did not determine whether the Thresholds were valid on the merits, but found that the adoption of the Thresholds was a project under CEQA. The court issued a writ of mandate ordering BAAQMD to set aside the Thresholds and cease dissemination of them until BAAQMD had complied with CEQA.

This analysis is based upon these BAAQMD 2010 Thresholds. While it is possible to instead analyze the Project under BAAQMD's previous 1999 Thresholds, the newer thresholds are more conservative and based upon current regulations, scientific understanding and methodologies and therefore considered the most appropriate for the most conservative CEQA analysis.

CONFLICT WITH AIR QUALITY PLAN

BAAQMD recommends analyzing a project's consistency with current air quality plan control measures. The impact would be significant if the Project would conflict with or obstruct implementation of the regional air quality plan, in this case, the 2010 Clean Air Plan.

Many of the Clean Air Plan's control measures are targeted to area-wide improvements, large stationary source reductions, or large employers and these are not applicable to the proposed Project. However, the Project would be consistent with applicable control measures aimed at improving access/connectivity for bicycles and pedestrians (Transportation Control Measures D-1 and D-2) and would meet current standard of energy efficiency (Energy and Climate Measure 1).

Therefore, there would be ***no impact*** in relation to inconsistency with Clean Air Plan control measures.

AIR QUALITY STANDARDS

Construction-Period Criteria Pollutants

Impact Air-1: **Construction Period Dust, Emissions and Odors.** Construction of the Project would result in temporary emissions of dust, diesel exhaust and odors that may result in both nuisance and health impacts. Without appropriate measures to control these emissions, these impacts would be considered ***significant***.

Construction of the Project would involve demolition, excavation and site preparation, and building erection. Although these construction activities would be temporary, they would have the potential to cause both nuisance and health-related air quality impacts. PM_{10} is the pollutant of greatest concern associated with dust. If uncontrolled, PM_{10} levels downwind of actively disturbed areas could possibly exceed State standards. In addition, dust fall on adjacent properties could be a nuisance. If uncontrolled, dust generated by grading and construction activities represents a significant impact associated with Project development. Construction impacts would be a source of exhaust emissions from construction vehicles, which contribute to regional emission levels.

The Project is below the BAAQMD's screening size of 114 single-family dwelling units and therefore not anticipated to result in emissions of criteria pollutants over threshold levels. [6] However, because construction emissions were required to analyze the impact on sensitive users below, the results have been included here as well.

Construction emissions for the Project were computed using the URBEMIS2007 model. Construction was assumed to occur over an approximately 3-year period (April 2013 through March 2016). The specifics of the construction period are presented in Chapter 3: Project Description and in the URBEMIS results in Appendix B. Emissions from construction are shown in **Table 6.4**.

Table 6.4: Maximum Daily Regional Air Pollutant Emissions, Construction
(Unmitigated Pounds per Day)

Description	ROG	NO_X	PM_{10} *	$PM_{2.5}$ *
2013	8.01	51.80	2.94	2.70
2014	10.02	14.42	0.89	0.81
2015	9.76	13.34	0.82	0.75
2016	9.51	12.36	0.73	0.67
2010 BAAQMD Thresholds	*54*	*54*	*82*	*54*

* Applies to exhaust emissions only, not fugitive dust.

Source: Lamphier-Gregory compiled URBEMIS results included as Appendix B. Note that these emissions are based on a previous version of the site plan (included in Appendix A), which involved more grading. This table shows emissions marginally higher (worse) than would be modeled for the current site plan.

Construction-period emissions levels are below BAAQMD thresholds presented in Table 6.4. However, BAAQMD recommends implementation of construction mitigation measures to reduce construction-related emissions for all projects, regardless of the significance level of construction-period impacts. These basic measures are included in Mitigation Measure Air-1, below and would further reduce construction-period criteria pollutant impacts.

[6] Bay Area Air Quality Management District, *California Environmental Quality Act Air Quality Guidelines*, May 2011, Table 3-1.

Demolition and earth-moving activities can also result in fugitive dust, which contributes to particulate matter levels. Construction-period dust emissions of 8.81 $PM_{2.5}$ and 42.10 PM_{10} have been calculated using the URBEMIS2007 model (calculation sheets can be found in Appendix B). BAAQMD does not have a threshold of significance for fugitive dust impacts, but instead regards fugitive dust impacts as mitigated if appropriate management practices are implemented, as outlined in Mitigation Measure Air-1.

Mitigation Measure

Air-1: **Basic Construction Management Practices.** The Project shall demonstrate proposed compliance with all applicable regulations and operating procedures prior to issuance of demolition, building or grading permits, including implementation of the following BAAQMD "Basic Construction Mitigation Measures".

- All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
- All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
- All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
- Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

The BAAQMD significance thresholds for construction dust impacts are based on the appropriateness of construction dust controls. With implementation of the Basic Construction Mitigation Measures listed in Mitigation Measure Air-1, impacts related to construction period emissions would be considered ***less than significant*** with mitigation. Because construction-period emissions do not exceed applicable significance thresholds, additional construction mitigation measures would not be required to mitigate impacts.

Air Pollutants from Operational Activities

Impact Air-2: **Operational Emissions.** The Project would result in increased emissions from on-site operations and emissions from vehicles traveling to the site. However, the Project is below applicable threshold levels and the impact would be considered ***less than significant***.

Emissions from operation of the Project could cumulatively contribute to air pollutant levels in the region. These air pollutants include ROG and NOx that affect ozone levels (and to some degree – particulate levels), PM_{10} and $PM_{2.5}$. Emissions of air pollutants associated with the Project were predicted using the URBEMIS2007 model (Version 9.2.4), distributed by the Rimpo Associates (www.urbemis.com) and recommended for use by BAAQMD. This model predicts daily emissions associated with development projects by combining predicted daily traffic activity, associated with the different land use types, with emission factors from the State's mobile emission factor model (i.e. EMFAC2007).

The Project is well below BAAQMD's operational criteria pollutant screening size of 325 single-family dwelling units and therefore not anticipated to result in emissions of criteria pollutants over threshold levels during operations. [7] However, because quantification of operational emissions was required to analyze the impact related to greenhouse gas emissions (in Chapter 10), the results have been included here as well.

Trip generation rates used in URBEMIS2007 are based on the traffic model outputs discussed in Table 16.8 in Chapter 16: Traffic and Circulation in this EIR. The URBEMIS2007 model also predicts area source emissions associated with the proposed Project. Those sources, which include water and space heating, are minor compared to emissions associated with traffic.

Default parameters for Alameda County were used in the URBEMIS2007 model such as the temperature, trip types and lengths, and vehicle mix. While homes will be constructed over an approximately 3 year period starting in 2013 and ending in 2016, the year 2013 was used conservatively as the basis for this analysis. Area and mobile emissions associated with the proposed Project are reported in **Table 6.5**. These emissions are compared to the significance thresholds adopted by the BAAQMD.

Table 6.5: Maximum Daily and Annual Regional Air Pollutant Emissions, Operations

Description	ROG	NO_X	PM_{10}	$PM_{2.5}$
Project Emissions, Daily (pounds per day)	10.15	6.75	10.71	2.06
BAAQMD Daily Significance Thresholds	*54*	*54*	*82*	*54*
Project Emissions, Annual (tons per year)	1.82	1.39	1.95	0.37
BAAQMD Project Annual Significance Thresholds	*10*	*10*	*15*	*10*

Source: Lamphier-Gregory compiled URBEMIS results included as Appendix B.

[7] Bay Area Air Quality Management District, *California Environmental Quality Act Air Quality Guidelines*, May 2011, Table 3-1.

Daily and annual air emissions predicted with build-out of the proposed Project are reported in Table 6.5 above and compared against BAAQMD thresholds. The operational criteria pollutant emissions would be below the significance thresholds established by BAAQMD. As a result, the Project would have a ***less-than-significant*** impact on regional air quality.

Carbon Monoxide

BAAQMD presents the screening level that localized carbon monoxide concentrations should be studied at affected intersections where traffic is increased to more than 44,000 vehicles per hour (or 24,000 vehicles per hour where mixing is substantially limited, such as in a tunnel). This screening level represents the volume of traffic at which a significant impact related to carbon monoxide would be possible. Based on traffic volumes in the vicinity, it is not anticipated the Project will affect intersections of that volume (see Chapter 16 for additional details) and therefore, the impact related to carbon monoxide is ***less than significant***.

EXPOSURE OF SENSITIVE RECEPTORS TO SUBSTANTIAL POLLUTION CONCENTRATIONS

For the purpose of assessing impacts of a proposed Project on exposure of sensitive receptors to risks and hazards, the threshold of significance is exceeded when the Project-specific cancer risk exceeds 10 in one million, the non-cancer risk exceeds a Hazard Index of 1.0 (or cumulative risk of 100 in one million or a Hazard Index of 10.0 respectively is exceeded), and/or the annual average $PM_{2.5}$ concentration would exceed 0.3 $\mu g/m^3$. Examples of sensitive receptors are places where people live, play or convalesce and include schools, hospitals, residential areas and recreation facilities.

Construction Period Exposure

Impact Air-3: **Construction Period Exposure of Sensitive Receptors.** Construction activities would expose nearby sensitive receptors to toxic air contaminants during the construction period, but the maximum exposure risk would be below the thresholds of significance under BAAQMD criteria for cancer, chronic hazard, and $PM_{2.5}$ exposure. This would be a ***less than significant*** impact.

Due to the proximity of residential units, which are considered sensitive receptors when it comes to health risks, a Construction Health Risk Assessment was performed (included in Appendix B), which used the EPA dispersion model SCREEN3 to determine the potential health risks related to diesel exhaust from construction equipment.

For the maximum exposed individual, including conservative age sensitivity factor of 10 to account for young children, the inhalation cancer risk would be 9.43 in 1 million (compared to a threshold of 10 in 1 million), the maximum chronic hazard index would be 0.019 (compared to a threshold of 1.000) and the annual average $PM_{2.5}$ concentration would be 0.086 $\mu g/m^3$ (compared to the threshold of 0.300 $\mu g/m^3$). This is conservatively based on unmitigated emissions, not taking into account approximately 5% reductions in exhaust emissions that would result from implementation of basic construction measures included in Mitigation Measure Air-1, above.

Additionally, the Project vicinity is largely built-out or preserved in its natural state. There are no additional projects to take into account for cumulative localized construction-period impacts.

Exposure risks for the maximally exposed individual are below threshold levels; therefore, the impact related to construction-period exposure would be ***less than significant***.

Operational Period Exposure

Impact Air-4: **Operational Period Exposure of Sensitive Receptors.** The Project proposes to add new sensitive receptors to a currently undeveloped site. The exposure risk to on-site sensitive receptors would be below applicable threshold levels and therefore, the impact would be ***less than significant***.

Following construction, none of the proposed uses would be considered a significant stationary source of air toxins.[8] There would be no significant impact related to the operational period health risks with the Project as a source of air toxins.

New residential units are proposed at the Project site, which would be considered new sensitive receptors. The residential portion of the Project site is located over 3,000 feet north of I-580 and is not within 1,000 feet of any stationary sources of air toxins according to BAAQMD's Stationary Source Screening Analysis Tool.[9] Therefore, the health risk at this location for proposed residents is below threshold levels and the impact would be considered less than significant.

ODORS

Typical sources of objectionable odors include chemical plants, sewage treatment plants, large composting facilities, rendering plants, and other large industrial facilities that emit odorous compounds.[10] Development of the Project would not include any activities that are typical sources of objectionable odors. Land uses near the Project area are not those typically associated with objectionable odors. Therefore, the Project would have ***no impact*** in relation to odors.

CUMULATIVE AIR QUALITY IMPACTS

Additional analysis to determine cumulative air quality impacts of the Project is not necessary. In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels at which a Project's individual emissions would be cumulatively considerable. Because the Project emissions during construction and operation would not exceed these thresholds, they would not have a cumulatively considerable effect. There would be no additional significant cumulative air quality impacts.

[8] Bay Area Air Quality Management District. May 2011. *California Environmental Quality Act Air Quality Guidelines,* p. 4-2.

[9] Bay Area Air Quality Management District. Alameda May 2011. Stationary Source Screening Analysis Tool, available at: http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx.

[10] Bay Area Air Quality Management District. May 2011. *California Environmental Quality Act Air Quality Guidelines,* Table 3-3.

7

BIOLOGICAL RESOURCES

INTRODUCTION

This chapter provides information on biological resources on the Project site. A discussion of federal, state, and local laws, policies, and regulations that influence the protection of such biological resources is presented.

The discussion and analysis in this chapter is presented by Zander Associates based upon a recent query of the California Natural Diversity Database (CNDDB 2012) and an independent reconnaissance-level site visit conducted December 13, 2011 by Zander Associates as well as peer review of the following reports and documentation:

Biological Resources Analysis for the Garaventa Hills Estates Property, Alameda County, California, prepared by Olberding Environmental, Inc., for the applicant dated February 2011 and based upon field reconnaissance investigations conducted in November 2010 and January/February 2011. This document also includes the results of a California Natural Diversity Database (CNDDB) search. (Included in Appendix C)

U.S. Army Corps of Engineers Jurisdictional Delineation for the Garaventa Hills Estates Property, Alameda County, California prepared by Olberding Environmental, Inc. for the applicant, dated February 2011. And the confirmed jurisdictional determination from the USACE dated March 1, 2012. (Included in Appendix C).

Special-Status Plant Survey Report for the Garaventa Hills Estates Property, prepared by Olberding Environmental, Inc. for the applicant, dated August, 2011 and based upon focused surveys conducted on March 12, April 28, May 25, June 25, and August 15, 2011. (Included in Appendix C)

Mitigation Measures were developed, in part, based on the applicant's proposal for mitigating wetland and endangered/threatened species impacts as described by Olberding Environmental, Inc. in a letter to Scott Roylance, dated January 18, 2012. (Included in Appendix C)

Evaluation of Potential Hydrological Impacts to Garaventa Wetlands, prepared by ENGEO for this environmental analysis, dated March 7, 2012. (Included in Appendix G)

KNOWN CONCERNS

In the scoping meeting, neighbors expressed concern regarding whether development is prohibited because of sensitive environmental conditions including rare grasses. These concerns have been addressed in this analysis.

ENVIRONMENTAL SETTING

The site is situated on an undeveloped knoll surrounded by open grasslands to the north and west, Altamont Creek to the south, and residential development to the south and east. The Garaventa Wetland Preserve lies immediately west of the site and the grasslands to the north appear to be similar in composition to those of the Preserve.

The elevation ranges from approximately 600 feet in the center of the Project site, to approximately 536 feet in the extreme southwestern corner along Altamont Creek. The highest point lies along a ridgeline in the center of the Project site; this ridgeline forms a natural watershed divide, with runoff draining either towards the north or south. The dominant vegetation is non-native annual grassland with herbaceous riparian vegetation along Altamont Creek and one seasonal wetland in the western portion of the area. A description of each of these vegetation types is provided below.

VEGETATION

The dominant vegetation on the Project site is annual grassland consisting of species typical in grazed grassland communities. The annual grasses consist of non-native species including soft chess (*Bromus hordeaceus*), rip-gut brome (*Bromus diandrus*), hare barley (*Hordeum murinum* ssp. *leporinum*), wild oat (*Avena fatua*), and Italian rye grass (*Lolium multiflorum*). Forb (i.e., wildflower) species found intermixed with the grasses consist of non-native annual and biennial weeds such as prickly lettuce (*Lactuca serriola*), dove geranium (*Geranium molle*), red-stem filaree (*Erodium cicutarium*), Italian thistle (*Carduus pycnocephalus*), yellow-star thistle (*Centaurea solstitialis*), and black mustard (*Brassica nigra*). Native species observed in the grassland include needlegrass (*Nasella* sp.), California poppy (*Eschscholzia californica*), fiddleneck (*Amsinckia* spp.), soap plant (*Chlorogalum pomeridianum*.), red maids (*Calandrinia ciliata*), dove weed (*Croton setigerus*), vinegarweed (*Trichostema lanceolatum*), and pitgland tarweed (*Holocarpha virgata*) were observed on the site.

Altamont Creek contains herbaceous riparian (i.e., "streamside") habitat within a fairly confined channel. There is no shrub or tree layer associated with this feature, and the herbaceous ground layer along the banks consists largely of graminoids (i.e., grasses and grass-like plants) including California tule (*Schoenoplectus californicus*), Baltic rush (*Juncus balticus*), iris-leaved rush (*Juncus xiphioides*), tall flatsedge (*Cyperus eragrostis*) foxtail (*Setaria* sp.), creeping wild rye (*Leymus triticoides*), and sparse patches of salt grass (*Distichlis spicata*). Forbs observed included hedge-nettle (*Stachys* sp.), milkweed (*Asclepias fasicularis*), and dock (*Rumex crispus* and *R. conglomeratus*). The primary stream terrace on the northern bank of the creek supports a mix of upland and marginal wetland plants including rip-gut brome, soft chess, Mediterranean barley (*Hordeum marinum* var. *gussoneanum*), bird's-foot trefoil (*Lotus corniculatus*), Mediterranean lineseed (*Bellardia trixago*), annual fireweed (*Epilobium brachycarpum*), bull thistle (*Cirsium vulgare*), English plantain (*Plantago lanceolatum*), rose clover (*Trifolium hirtum*), and stinkweed (*Dittrichia graveolens*).

The USACE confirmed a single seasonal wetland in the western portion of the Project site (**Figure 7.1**). This feature is located at the toe of a slope below rock outcroppings, and appears to have been an old borrow pit. Hydrophytes observed along the edges of this feature included Mediterranean barley, Italian rye grass, curly dock (*Rumex crispus*), and seedlings of popcorn-flower (*Plagiobothrys stipitatus* var. *micranthus*.).

WILDLIFE

The annual grassland on the Project site provides habitat for small mammals such as California ground squirrel (*Spermophilus beecheyi*), field mouse (*Peromyscus sp.*), Botta's pocket gopher (*Thomomys*

Figure 7.1: On-Site Seasonal Wetland and Creek

Source: Olberding Environmental, April 2011

bottae), and California vole (*Microtus californicus*). These animals serve as prey for raptors such as red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), white-tailed kite (*Elanus leucurus*), and American kestrel (*Falco sparverius*). Aerial foragers such as white-tailed kite, American crow (*Corvus brachyrhynchos*) and turkey vulture (*Cathartes aura*) and songbirds such as Savannah sparrow (*Passerculus sandwichensis*) and western meadowlark (*Sturnella neglecta*) were observed on or over the Project site. Reptiles such as the gopher snake (*Pituophis melanoleucus*) and common garter snake (*Thamnophis sirtalis*) would also be expected to occur in the grassland on the Project site.

One adult resident burrowing owl (*Athene cunicularia*) was observed along the northern site boundary during the November 2010 surveys and a pair of burrowing owls was observed just north of the site during the December, 2011 field reconnaissance.

The aquatic habitat within Altamont Creek could provide habitat for the mallard duck (*Anas platyrhynchos*) and green heron (*Butorides sundevalli*) as well as wading birds such as the snowy egret (*Egretta thula*), great egret (*Ardea alba*), and great blue heron (*Ardea herodias*). The pacific tree frog (*Pseudacris regilla*) and western toad (*Bufo boreas*) could also be expected to occur in this area on the Property. The associated riparian vegetation does not differ substantially from the surrounding grasslands and so it is expected to provide habitat for the same suite of species found in those grasslands. Similarly, the seasonal wetland mapped in the western portion of the site serves as grassland habitat unless there is sufficient surface water or saturation to the surface to support aquatic invertebrates or amphibians.

SPECIAL STATUS SPECIES

For this assessment, special status species are defined as: those plants and animals listed, proposed for listing, or candidates for listing as threatened or endangered by the U.S. Fish and Wildlife Service (USFWS) under the Federal Endangered Species Act (ESA); those listed or proposed for listing as rare, threatened, or endangered by the California Department of Fish and Game (CDFG) under the California Endangered Species Act (CESA); plants occurring on Lists 1B or 2 of the California Native Plant Society (CNPS) *Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2011); animals designated as "Species of Special Concern" by the CDFG; birds protected under the Migratory Bird Treaty Act.

Plants

The CNDDB was queried for occurrences of special status plants in the vicinity of the Project site (Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 minute quadrangles)(**Figure 7.2**), generating a list of 43 different species. All but 15 of the species can be eliminated from consideration because they are restricted to habitats or soil types not found on the Project site. The remaining 15 species were further evaluated based on reconnaissance-level surveys of the Project site conducted in November 2010, January/February 2011, and December 2011. All but one of these species, Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*), were determined to have a low to moderate probability of occurring on the site due to the lack of suitable habitat and historic disking and grazing practices.

Focused surveys for special-status plants were conducted on March 12, April 28, May 25, June 25, and August 15, 2011, following the CDFG and CNPS published survey guidelines. No special status plants were observed on the Project site during these surveys.

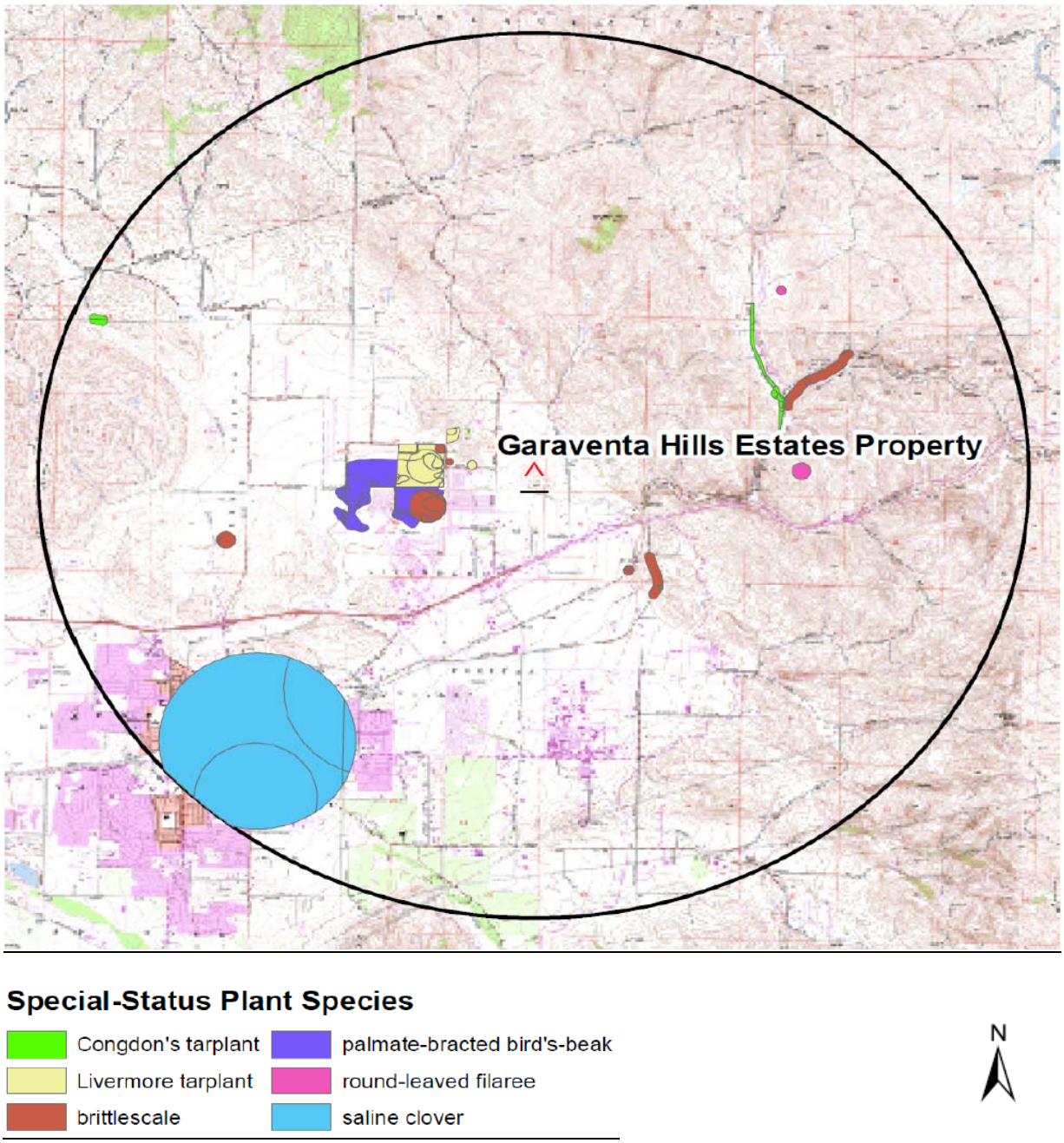


Figure 7.2: Special-Status Plant Species in the Vicinity

Source: Olberding Environmental, Biological Resources analysis, February 2011

Animals

The CNDDB has recorded occurrences of several special status animal species within a five-mile-radius of the property (Figure 7.3 and 7.4). Some of these species could use the property as occasional migrants or dispersants. For example, the American peregrine falcon (*Falco peregrinus anatum*), which is state-listed as endangered, the Merlin (*Falco columbarius*), prairie falcon (*Falco mexicanus*), golden eagle (*Aquila chrysaetos*), northern harrier (*Circus cyaneus*), and sharp-shinned hawk (*Accipiter striatus*), all state species of special concern, could occasionally forage on the property but are not expected to occur frequently or in large numbers. Other special status bird species such as Cooper's hawk (*Accipiter cooperi*), white-tailed kite (*Elanus leucurus*), California horned lark (*Eremophila alpestris actia*), and loggerhead shrike (*Lanius ludovicianus*) may also forage in the grasslands but are unlikely to nest on the Project site. None of these bird species is particularly rare in the San Francisco Bay Area and they are not restricted to habitats that are locally limited.

Based upon review of recorded occurrences of species in the vicinity and an initial assessment of the habitats present, six special status animal species were further evaluated for their potential to occur on the Project site. Each species is discussed in detail below:

Vernal Pool Fairy Shrimp (*Branchinecta lynchi*). Federal Listing Status: Threatened; State Listing Status: None. The vernal pool fairy shrimp (VPFS) is approximately three quarters of an inch in length. This species has an ephemeral life cycle and exists only in vernal pools or vernal pool-like habitats, such as; intermittent drainages, drainage ditches, oxbows and stock ponds that dry periodically. Vernal pool fairy shrimp do not occur in riverine, marine, or other permanent bodies of water. Fairy shrimp eggs become encysted during dry periods and hatch when seasonal wetlands refill. Long-distance dispersal of cysts is thought to be enabled by waterfowl and other migratory birds that ingest cysts, and by animals that provide for movement of mud and cysts in feathers, fur, and hooves (USFWS 2005) Because the cysts are dispersed by other animals, they can be carried into locations that will never provide suitable habitat, or into waters that provide conditions allowing individuals to hatch in some years, but where conditions are not suitable for maintaining viable populations. Threats to the vernal pool fairy shrimp include loss of habitat, agriculture, foot traffic, and off-road vehicles.

Several occurrences of VPFS have been recorded in the vicinity of the Project site within the last five years: the closest observation was in 2005 (Occurrence #411), roughly 0.3 mile southeast of the site (**Figure 7.3**). Although the Project site does not contain a complex of vernal pools and does not have the undulating landscape, where soil mounds are interspersed with basins, swales, and drainages, it is immediately adjacent to and within the watershed of such habitat to the north and west. Perhaps because of its proximity to known VPFS habitat, the USFWS has included the site within designated critical habitat for VPFS (VERFS 19C) (**Figure 7.4**). The seasonal wetland in the western portion of the Project is potentially suitable habitat for this species because VPFS occur in alkaline pools of varying depths, there are recorded occurrences of the species nearby, and the property lies within designated critical habitat for VPFS.

California Tiger Salamander (*Ambystoma californiense*). Federal Listing Status: Threatened; State Listing Status: Threatened. California tiger salamanders (CTS) are large (up to 8 inches in length), stocky, terrestrial salamanders. They usually have several white or pale yellow spots or bars on a black dorsal surface, and a lighter ventral side. During summer months, CTS aestivate in subterranean refuge sites, usually small mammal burrows, but also crevices in the soil. After winter rains have moistened the ground, the salamanders emerge from their refugia and migrate to breeding pools. Breeding pools are usually seasonal, but they must remain ponded long enough for metamorphosis to occur. Permanent ponds are also used for breeding, but such ponds may contain predators such as fish

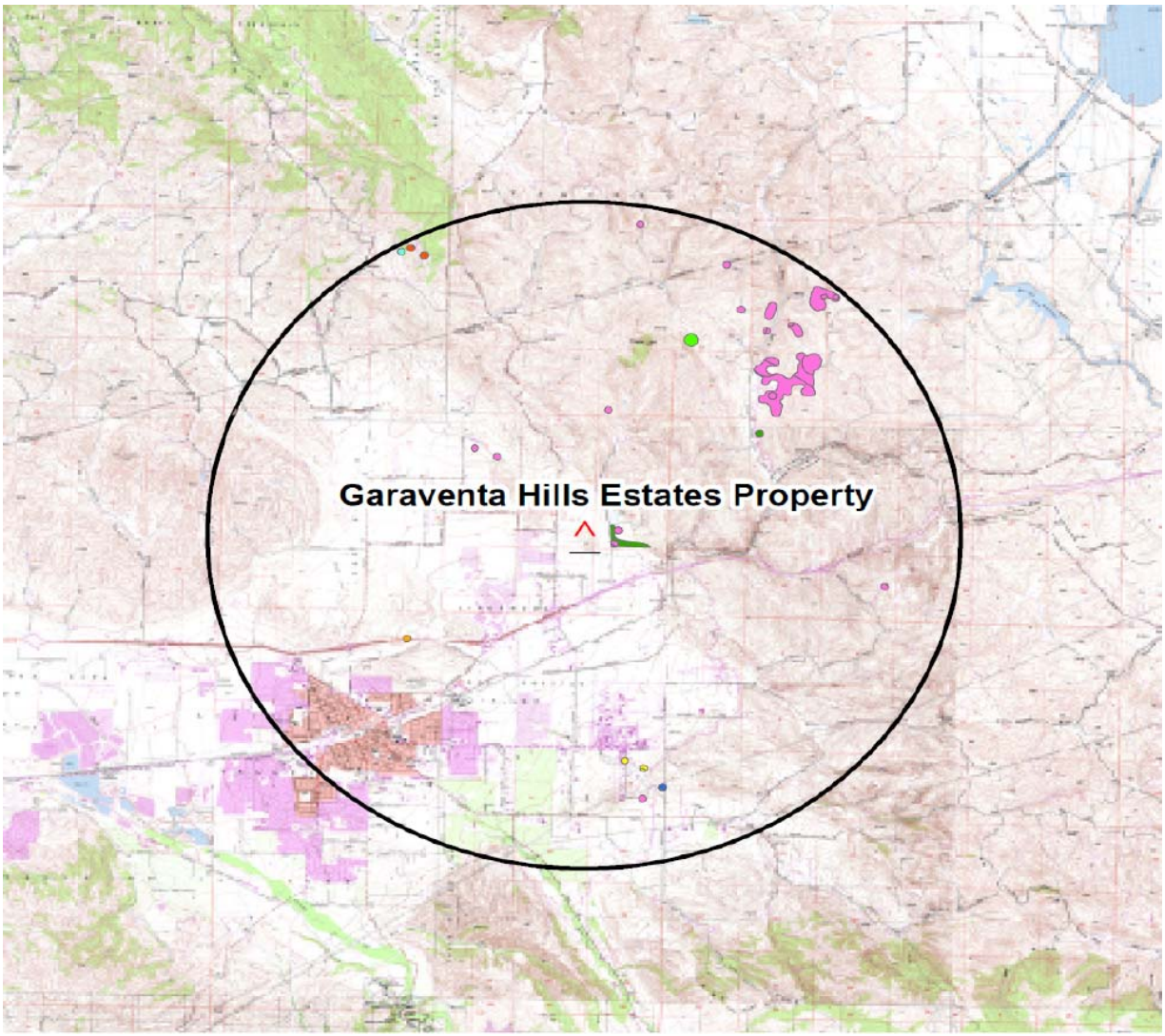


Figure 7.3: Special-Status Wildlife Species in the Vicinity

Source: Olberding Environmental, Biological Resources analysis, February 2011

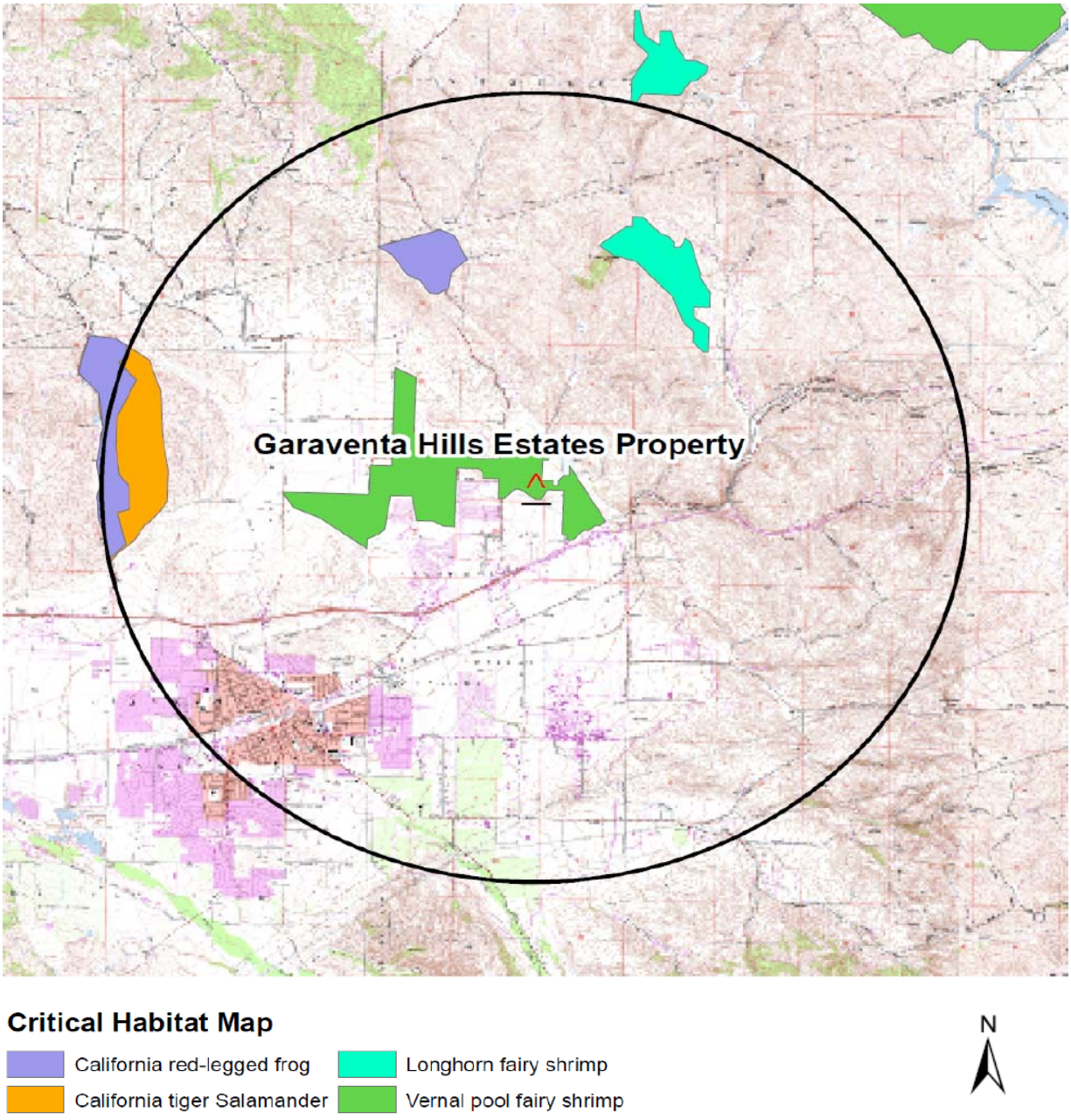


Figure 7.4: Critical Habitat in the Vicinity

Source: Olberding Environmental, Biological Resources analysis, February 2011

and bullfrogs, which can consume eggs and larvae and prevent successful breeding. Adults are known to move one mile or more between aestivation sites and breeding pools. Juveniles may wander and forage for even longer distances. Presence of California tiger salamander is most readily determined by springtime pond surveys for larvae or by rainy season nighttime observations and pitfall trap/drift fence arrays.

The California tiger salamander was listed as threatened by the USFWS in July 2004. The California Fish and Game Commission voted on March 3, 2010 to list CTS as threatened in California, subject to protection under the CESA. The USFWS designated Critical Habitat for the Central Population of California tiger salamander in August 2005.[1] No portion of the Project site is within this designated Critical Habitat.

California tiger salamanders have been documented at several nearby off-site locations within two miles of the Project site, including two occurrences just north and east of the site (**Figure 7.5**). Frick Lake, which is just northeast of the Project site, is also known to support CTS. If the seasonal wetland in the western portion of the Project site actually holds water for three to four months during the wet season, it may provide suitable breeding habitat for CTS. Nevertheless, suitable breeding habitat has been documented within 1.24 miles of the Project site and with little to no migratory barriers to the north, west, and east, and abundant ground squirrel activity on the Project site, it is expected that CTS could use the upland grasslands on the property. Consequently, the entire Project site is considered potential upland aestivation and dispersal habitat for CTS.

California Red-legged Frog (*Rana aurora draytonii*). Federal Listing Status: Threatened; State Listing Status: Species of Special Concern. The California red-legged frog (CRLF) is a medium-sized frog that is generally restricted to riparian habitats in California and northern Baja California. CRLF prefer deep (more than 3 ft deep), calm pools in creeks, rivers, or lakes below 4,500 ft in elevation. Habitat requirements include fresh emergent or dense riparian vegetation, especially willows or emergent vegetation adjacent to shorelines. Females attach eggs in a single cluster to a vegetation brace just under the surface of the water. CRLF can survive in seasonal bodies of water that are dry for short periods if a permanent water body or dense vegetation stands are nearby. Frogs may aestivate in a variety of habitats, including small mammal burrows, beneath leaf litter, in trees and logs that have fallen on the ground, inside pipes. CRLF often disperse from their breeding habitat to utilize various aquatic, riparian, and upland aestivation habitats in the summer, however, it is also common for individuals to remain in the breeding area on a year-round basis. CRLF have been found to disperse over 1.8 miles from breeding sites and can be found up to 300 feet away from aquatic habitats, though they typically remain within 200 feet of water.

The U.S. Fish and Wildlife Service (USFWS) listed southern populations of the California red-legged frog as threatened in 1996, due to continued habitat degradation throughout the species' range, and population declines. Critical Habitat was designated for the California red-legged frog in 2001, but was rescinded in 2002; Critical Habitat was then re-designated in April 2006 (USFWS 2006). On September 16, 2008, the USFWS issued a Proposed Rule to once again revise the critical habitat designation for CRLF and a Final Rule was issued March 17, 2010. No portion of the Project site is within the areas designated as Critical Habitat in the 2010 Final Rule.

[1] U.S. Fish and Wildlife Service, *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon*, 2005.

Figure 7.5: California Red-legged Frog and California Tiger Salamander in the Vicinity

Source: Zander Associates, February 2012

Several occurrences of CRLF are recorded within a two-mile radius of the Project site (Figure 7.5). There is no suitable CRLF breeding habitat on the Project site. The seasonal wetland in the western portion of the site does not appear to hold water long enough and does not support emergent aquatic vegetation necessary for successful breeding. Because the site is in close proximity to known occurrences and no substantial migratory barriers exist between these locations and the site, it is possible that CRLF could use the uplands on the property for dispersal and/or aestivation.

Western Spadefoot Toad (*Spea hammondii*). Federal Listing Status: None; California Species of Special Concern. Western spadefoot toads, from the family *Pelobatidae*, are distinguished from true toads (genus *Bufo*) by their cat-like eyes (due to vertically elliptical pupils), single black sharp-edged "spades" on their hind feet, teeth in their upper jaws, and smooth skin. Adults range in length from one and a half to two and a half inches long. They are dusky green or gray above, often with four irregular light-colored stripes on their back, with the central pair of stripes sometimes distinguished by a dark, hourglass-shaped area. A terrestrial species, western spadefoots enter water only to breed. They may utilize vernal pools or other temporary pools and may breed in the same ponds as CTS. Suitable upland habitat includes washes, floodplains, alluvial fans, and playas (Stebbins 2003), extending into foothills and mountains to an elevation of 1,360 m (4,462 ft) (Jennings and Hayes 1994). Western spadefoot may be active above ground on soil types ranging from loose sand to hardpan clay, although soil characteristics of burrow refugia are not known (Jennings and Hayes 1994). During dry periods, individuals typically excavate burrows into the ground at depths up to 3 feet, but they may also occupy burrows constructed by small mammals; whether these are used as short-term refugia during periods of surface activity is unknown (Jennings and Hayes 1994).

The CNDDB has a recorded occurrence of this species from 2004 (Occurrence #404), roughly 3.4 miles south of the Project site (Figure 7.3). The seasonal wetland could provide breeding habitat for western spadefoot and the species could use burrows in the uplands during dry periods. No western spadefoots were observed on the Project site during surveys conducted in 2010 and 2011.

Burrowing Owl (*Athene cunicularia*). Federal Listing Status: None; State Listing Status: Species of Special Concern. Burrowing Owls are small terrestrial owls that favor flat, open grassland or gentle slopes and sparse shrubland habitats. They prefer annual and perennial grasslands, typically with sparse, or nonexistent, tree or shrub canopies. In California, burrowing owls are found in close association with California ground squirrels. Ground squirrels provide nesting and refuge burrows, and maintain areas of short vegetation height, which provide foraging habitat and allow for visual detection of avian predators by burrowing owls. In the absence of ground squirrel populations, habitats soon become unsuitable for occupancy by owls. Burrowing Owls are semi-colonial nesters, and group size is one of the most significant factors contributing to site constancy by breeding Burrowing Owls. The nesting season, as recognized by the CDFG, extends from February 1 through August 31.

The CNDDB lists several occurrences of burrowing owl within the vicinity and there is suitable nesting and foraging habitat on the Project site (Figure 7.3). Burrowing owls were observed on or nearby the site during surveys conducted in 2010 and 2011 and therefore they are expected to forage and nest on the site.

American Badger (*Taxidea taxus*). California Species of Special Concern. This large member of the weasel family has a flat body with short legs ideally suited to digging burrows. Found in open plains, prairies, forests and grasslands, this species feeds on ground squirrels, mice, and gophers. Badgers mate between July and August, but do not give birth until March.

The CNDDB lists an occurrence of this species in July 2007 (Occurrence #410) east of San Ramon, roughly 7.6 miles northeast of the Project site. With little to no migratory barriers to the north, west,

and east of the Project site, it is expected that this species has the ability to freely migrate onto the Project site. Foraging and burrowing habitat for the badger exists throughout the Project site. However, no badgers or characteristic badger dens were observed on the Project site during surveys conducted between November 2010 and December 2011.

San Joaquin Kit Fox (*Vulpes macrotis mutica*). Federal Status: Endangered; State Status: Threatened. The San Joaquin kit fox (SJKF) is a small fox that typically occurs in annual grassland or mixed shrub/grassland habitats throughout low, rolling hills and valleys. The kit fox requires underground dens for temperature regulation, shelter, reproduction, and predator avoidance. Kit foxes commonly modify and use dens constructed by other animals and human-made structures (USFWS 1998). It was listed as endangered by the USFWS in 1967 and by the State of California in 1971

Since 1996, researchers from the California State University Stanislaus Endangered Species Recovery Program and others have conducted numerous surveys for kit foxes in Contra Costa and Alameda Counties. Based on historic records and recent surveys, the species' range appears to be restricted to the Altamont Hills and the western edge of the San Joaquin Valley. Although there is some grassland habitat viewed as suitable for kit foxes occurring in the North Livermore Valley, the Dublin area, and areas west of Vasco Road (Contra Costa County), kit foxes have not been recorded in these areas. The closest occurrence to the Project site was recorded in August 2002 (Occurrence # 58), 0.6 mile directly east of Brushy Peak and roughly 2.9 miles northeast of the Project site (Figure 7.3).[2]

With little to no migratory barriers to the north, west, and east of the Project site, it is expected that SJKF could migrate through and forage in the grasslands; denning is unlikely due to the amount of human and dog use on and around the site.

WETLANDS

Olberding Environmental conducted investigations of the Project site on January 13 and February 9, 2011, to determine the nature and extent of wetlands/waters potentially subject to U.S. Army Corps of Engineers (USACE) jurisdiction. The boundaries of all potential wetlands/waters observed during the initial investigation were further defined following the required methodology described in the 1987 Corps Wetlands Delineation Manual (1987 Manual) and Arid West Supplement to the 1987 Manual (Arid West Supplement). The USACE confirmed the extent of its jurisdiction on the Project site in a letter to Jeff Olberding of Olberding Environmental dated March 1, 2012 (included in Appendix C).

Two potential jurisdictional wetlands/waters were delineated on the Project site as a result of this investigation. The first is the seasonal wetland in the western portion of the site, which was determined to be approximately 0.004 acre in extent. The second is the portion of Altamont Creek that runs along the southern property boundary. The average width of the creek along this reach, measured bank-to-bank at the Ordinary High Water Mark is approximately eight feet. The total extent of USACE jurisdictional area for Altamont Creek on the Project site was determined to be 0.36 acre.

A map of the jurisdictional waters/wetlands as confirmed by the USACE is provided on Figure 7.1.

[2] H. T. Harvey & Associates, *Distribution of the San Joaquin Kit Fox in the North Part of its Range*, p. 32.

REGULATORY SETTING

FEDERAL

Federal Endangered Species Act

The federal Endangered Species Act (ESA) protects plant and wildlife species that are listed as threatened or endangered or proposed for such listing. As a fundamental element of this protection, Section 9 of the ESA prohibits killing, harming, or otherwise "taking" listed animal species. Taking includes such destruction or significant alteration of habitat that actually kills or injures listed animals. Sections 7 and 10 of the Act authorize the U.S. Fish and Wildlife Service (or, in some instances the National Marine Fisheries) to allow limited take of listed species incidental to otherwise lawful activities (e.g. development of land) provided that the species is not jeopardized and the impacts of the take are mitigated. The ESA does not prohibit the taking of listed plants on private land, but does provide for penalties if such plants are destroyed or removed in violation of state law. With respect to species proposed for listing, the ESA calls on federal agencies to confer with the USFWS if their actions may affect any such species.

For projects involving a federal action that may affect listed species, the federal authorizing agency is required to enter into a consultation process with the USFWS under Section 7 of the ESA. Under Section 7, the federal agency conducting, funding, or permitting an action (the lead federal agency) must consult with USFWS, as appropriate, to ensure that the proposed action will not jeopardize endangered or threatened species or destroy or adversely modify designated critical habitat. For projects without federal involvement on non-federal lands, a mechanism for incidental take of listed species along with assurances of long-term habitat protection is provided through Section 10 of the ESA. Section 10 (a)(1)(B) permits for take of listed species can be issued by the USFWS, typically through the applicant's preparation and implementation of a Habitat Conservation Plan (HCP).

Federal Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA; 16 U.S.C., §703, Supp. I, 1989) prohibits killing, possessing, or trading of migratory birds except in accordance with regulations prescribed by the Secretary of the Interior. The trustee agency that addresses issues related to the MBTA is the USFWS. Migratory birds protected under this law include all native birds and certain game birds (*e.g.*, turkeys and pheasants; *Federal Register* 70(2):372-377). This act encompasses whole birds, parts of birds, and bird nests and eggs. The MBTA protects active nests from destruction and all nests of species protected by the MBTA, whether active or not, cannot be possessed. An active nest under the MBTA, as described by the Department of the Interior in its 16 April 2003 Migratory Bird Permit Memorandum, is one having eggs or young. Nest starts, prior to egg laying, are not protected from destruction.

Nearly all local native bird species are protected by the MBTA.

CLEAN WATER ACT

The CWA was enacted as an amendment to the federal Water Pollution Control Act of 1972, which outlined the basic structure for regulating discharges of pollutants to waters of the United States. The CWA now serves as the primary federal law protecting the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands. CWA empowers EPA to set national water quality standards and effluent limitations and includes programs addressing both point-source and nonpoint-source pollution. Point-source pollution is pollution that originates or enters surface waters at a single, discrete location, such as an outfall structure or an excavation or construction site. Nonpoint-source pollution originates over a broader area and includes urban contaminants in stormwater run-off and

sediment loading from upstream areas. CWA operates on the principle that all discharges into the nation's waters are unlawful unless specifically authorized by a permit; permit review is CWA's primary regulatory

Section 404 of the CWA regulates the discharge of dredged and fill material into waters of the United States. Waters of the United States refers to oceans, bays, rivers, streams, lakes, ponds, and wetlands, including any or all of the following:

- Areas within the ordinary high water mark of a stream, including non-perennial streams with a defined bed and bank.
- Any stream channel that conveys natural run-off, even if it has been realigned.
- Seasonal and perennial wetlands, including coastal wetlands.

Applicants must obtain a permit from the USACE for all discharges of dredged or fill material into waters of the United States, including wetlands, before proceeding with a proposed activity.

Section 401 of the Clean Water Act (CWA) requires applicants for permits to discharge dredged or fill material into waters of the United States to obtain from the state a certification that the discharge does not violate state water quality standards. Therefore, certification that a proposed activity meets state water quality standards must be obtained before a Corps permit can be issued under Section 404, though some permits are issued on condition of receipt of said certification. States may choose to certify the Corps' nationwide permits generally or retain jurisdiction to review them individually. California has not provided state certification for certain NWPs that were reissued in 1996 (see 33 CFR as noticed in 61 FR No.241). Therefore, these NWPs are not considered "in effect" in California unless they have been individually certified by the SWRCB.

STATE

California Endangered Species Act

The California Endangered Species Act (CESA, Fish and Game Code of California, Chapter 1.5, Sections 2050-2116) prohibits the take of any plant or animal listed or proposed for listing as rare (plants only), threatened, or endangered. In accordance with the CESA, the CDFG has jurisdiction over state-listed species. The CDFG regulates activities that may result in "take" of individuals listed under the Act (*i.e.*, "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill"). Habitat degradation or modification is not expressly included in the definition of "take" under the Fish and Game Code. The CDFG, however, has interpreted "take" to include the "killing of a member of a species which is the proximate result of habitat modification."

California Fish and Game Code

The California Fish and Game Code includes regulations governing the use of, or impacts to, many of the state's fish, wildlife, and sensitive habitats.

Certain sections of the Fish and Game Code describe regulations pertaining to certain wildlife species. For example, Fish and Game Code §§3503, 2513, and 3800 (and other sections and subsections) protect native birds, including their nests and eggs, from all forms of take. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "take" by the CDFG. Raptors (*i.e.*, eagles, falcons, hawks, and owls) and their nests are specifically protected in California under Fish and Game Code §3503.5. Section 3503.5 states that it is "unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes (birds of prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto."

Non-game mammals are protected by Fish and Game Code §4150, and other sections of the Code protect other taxa.

The CDFG exercises specific authority over rivers, streams and lakes under California Fish and Game Code §1602. Under this section, those planning activities that will substantially divert, obstruct, or change the natural flow of a river, stream or lake, substantially change the bed, channel, or bank of a river, stream or lake, or use material from a streambed must first notify the CDFG and, if the CDFG identifies and existing fish or wildlife resource that would be affected, then obtain (through negotiation or arbitration) a streambed alteration agreement from the CDFG. The type of activities regulated under §1602 include re-channeling and diverting streams, stabilizing banks, implementing flood control projects, crossings of rivers or streams (including bridges and culverted crossings), diverting water, damming streams, mining gravel, and logging operations.

LOCAL

East Alameda County Conservation Strategy

The East Alameda County Conservation Strategy (EACCS) is a collaborative effort to preserve endangered species by developing and adopting a shared vision to guide long term habitat protection. The EACCS establishes guiding biological principles for conducting conservation in the eastern portion of the County. As a partner in the process, the City of Livermore relies on the EACCS as guidance for regional conservation, and environmental permitting for private and public development projects. The Conservation Strategy provides guidance on how these projects should avoid, minimize, and mitigate for project impacts on biological resources in East Alameda County.

A Final Draft of the EACCS was released May 27, 2011. On July 26, 2011, the City of Livermore accepted the EACCS as guidance for environmental permitting and regional conservation for endangered species in Eastern Alameda County (Resolution Number – 2011-147). The City also utilizes the Conservation Strategy as support for implementing the City Council's priority for Open Space Preservation.

The EACCS developed eighteen discrete units, or *conservation zones* (CZs), to identify locations for conservation actions in areas with the same relative ecological function as those areas where impacts occur. Conservation priorities are highlighted for each CZ to ensure that the relative importance of each feature is not lost during project-level discussion. However, according to the EACCS, the list of conservation priorities is not exhaustive and the conservation value of resources that will be lost to project development or gained through mitigation should be considered on a case-by case basis.

The Project is located within Conservation Zone 4. The primary resource in this CZ is the Springtown Alkali Sink and its associated species. Protection of the sink as well as watersheds that feed the sink is identified as a conservation priority in this CZ. The Conservation Priorities established for this zone that are applicable to the Project site include:

- Protection of vernal pool and longhorn fairy shrimp habitat.
- Protection of designated critical habitat for vernal pool and longhorn fairy shrimp.
- Surveys for vernal pool and longhorn fairy shrimp and protection of documented occurrences.
- Protection of known occurrences of Congdon’s tarplant and surveys of other potential habitat.
- Protection and restoration of Cayetano Creek, Arroyo Los Positas, and Altamont Creek.

The EACCS recommends avoidance and minimization measures as well as mitigation ratios for unavoidable impacts at the natural community and species level. It is expected that these measures would be used to guide development of project-level mitigation for sites within the EACCS study area.

IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

The California Environmental Quality Act (CEQA) and the CEQA Guidelines provide guidance in evaluating project impacts and determining which impacts will be significant. CEQA defines "significant effect on the environment" as "a substantial adverse change in the physical conditions which exist in the area affected by the proposed Project." Under CEQA Guidelines section 15065(a)(1) and Appendix G, a project's effects on biotic resources may be significant when the project would:

1. have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory

2. 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

3. have a substantial adverse effect on any riparian habitat or other sensitive natural community (*e.g.*, oak woodland) identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service

4. have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act

5. interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites

6. conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance

7. conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan

COMMON PLANT COMMUNITIES / WILDLIFE HABITAT

Impact Bio-1: **Loss of Annual Grasslands.** The Project will result in the permanent removal of up to 31.78 acres of non-native annual grassland habitat. An additional 1.18 acres will be temporarily disturbed for construction of the bridge and access road over Altamont Creek. Non-native annual grasslands are common throughout the region and removal of this plant community is not considered a significant impact unless special status species are known to use the habitat. Because the site has the potential to support several special status species, this impact would be considered ***potentially significant***.

The EACCS recommends a 3:1 replacement ratio for annual grasslands that do not support any focal species. Since the grasslands on the Project site have the potential to support several focal species (e.g. Congdon's tarplant, California tiger salamander, San Joaquin kit fox, California burrowing owl, American badger), the 3:1 mitigation recommendation is superseded by the species-specific ratios, discussed in more detail below.

Mitigation Measures Bio-3a, 3b, 3c, 4a, 4b, 4c, 5a, 5b, and 5c would reduce this impact to less than significant levels through mitigation specific to the special status species that the site could support.

The entire Project site is 31.78 acres, but only approximately 48% of the site will be developed with roadways and residential lots. However, some areas remaining in an undeveloped state will be encircled by development or be located adjacent to development such that it may no longer serve as habitat. The exact acreage to be mitigated will be determined through coordination with USFWS, as detailed in the above-listed Mitigation Measures.

With implementation of Mitigation Measures Bio-3a, 3b, 3c, 4a, 4b, 4c, 5a, 5b and 5c, impacts related to the loss of annual grassland would be reduced to ***less than significant*** through mitigation specific to the special status species that the site could support.

SPECIAL STATUS SPECIES AND HABITAT

Plants

No special status plants were observed on the Project site during appropriately-timed focused surveys. Therefore, the Project will not have an impact on any special status plant species.

Animals

The Project site provides potential habitat for several special status animal species, including; California tiger salamander, California red-legged frog, vernal pool fairy shrimp, San Joaquin kit fox, western spadefoot toad, California burrowing owl, American badger. Potential impacts on these species resulting from development of the site as proposed follows.

Vernal Pool Fairy Shrimp Habitat

Impact Bio-2: **Loss of Designated Critical Habitat for Vernal Pool Fairy Shrimp.** The Project will result in the permanent loss of up to 31.78 acres of grassland that is included within designated VPFS critical habitat. This is a ***potentially significant*** impact.

The Project site is within designated critical habitat for VPFS (USFWS 2006) and it is also within the Altamont Hills Core Area of the Livermore vernal pool region as defined in the recovery plan for the VPFS (USFWS 2005). One of the primary recovery strategies for VPFS as identified by USFWS is to protect habitat within the core areas. While the Project site itself does not provide suitable VPFS habitat, except perhaps for the small seasonal wetland identified in the western portion of the site,, it is immediately adjacent to and within the watershed of known occupied habitat. If the proposed development were to alter the hydrology of these adjacent lands, it could adversely affect occupied VPFS habitat offsite.

An evaluation of potential hydrologic impacts to offsite wetlands with construction of the Project was conducted by Engeo Incorporated (included in Appendix G). Engeo concluded that the Project will not

significantly impede or decrease water supplies to the vernal pools in the Preserve for the following reasons:

1. The timing and frequency of direct precipitation is the most critical factor influencing the hydrology of most vernal pools in California. The project has no impact on direct precipitation.
2. The Project is not proposing grading or construction activities directly within the limits of the offsite wetlands or the immediately adjacent area, which is likely to be a critical tributary area needed to supply the pools.
3. The natural buffer area proposed between the Project and the wetlands will help maintain function of the water exchange between the pools and the adjacent uplands.
4. The acreage of the entire watershed contributing to vernal pools is considerably larger than the Project area and is capable of generating significantly more water than is needed by the wetlands. This is regardless of the minor modifications to onsite drainage patterns that are an order of magnitude smaller than the total watershed.

Additionally, Engeo concluded that any increases in stormwater runoff or nuisance flows resulting from the Project will be detained onsite and will not increase flows to the adjacent wetlands and that the combination of buffer areas and the proposed storm drain layout with a detention/bioretention pond will adequately relieve the Project's potential for pollutant load increases to the wetlands.

Engeo recommended the following measures to ensure off-site wetlands would also not be impacted by construction activities during the construction period:

Mitigation Measures

Bio-2: **Construction-Period Protection of Offsite Wetlands and Vernal Pools.** The applicant shall implement the following measures to minimize the potential impact to off-site wetlands and vernal pools resulting from construction activities on the Project site.

a) Stormwater Best Management Practices shall be implemented during construction activities to avoid the potential for sediments and other pollutants to enter the offsite wetland areas.

b) Install fencing and signage identifying the limits of the wetlands and providing a physical barrier to keep construction equipment and personnel out of the sensitive habitat areas.

c) Schedule grading in close proximity to offsite vernal pools during the non-rainy season in order to minimize potential for sedimentation of the pools.

d) Fully stabilize the natural vegetated buffer between the grading area and the offsite wetlands during the early phases of construction so that it serves as a protective barrier for the wetlands.

Mitigation Measure Geo-5, which requires implementation of a construction-period stormwater pollution prevention plan including Best Management Practices for preventing construction-period stormwater pollution through soil stabilization, sediment control, wind erosion control, soil tracking control, non-storm water management, and waste management and materials pollution control, would also help to mitigate Impact Bio-2.

With implementation of Mitigation Measures Bio-2 and Geo-5, impacts related to the loss of VPFS habitat would be reduced to ***less than significant*** through implementation of measures to minimize the potential for disruption during construction activities.

Vernal Pool Fairy Shrimp

Impact Bio-3: **Potential Take of Vernal Pool Fairy Shrimp.** The Project will result in the permanent loss of approximately 0.004 acre of seasonal wetland that could be occupied by VPFS. This is a ***potentially significant*** impact.

Since VPFS is a federally listed species, it is afforded protection under the Federal Endangered Species Act. Section 9 of the ESA prohibits killing, harming, or otherwise "taking" listed animal species. Taking includes destruction or significant alteration of habitat such that it actually kills or injures listed animals. While the loss of approximately 0.004 acre of potential occupied habitat may not have a substantial adverse effect on VPFS as a species, any take of individual animals during construction is prohibited under Section 9 of the ESA and would be considered a significant impact.

Mitigation Measures

Bio-3a: **Conduct surveys to determine presence/absence of VPFS.** Complete surveys following protocol deemed acceptable by the USFWS to determine presence/absence of VPFS in the seasonal wetland on the Project site prior to initiation of construction. The presence of VPFS can be assumed instead of implementing the surveys required by this measure. If no VPFS are found, no further mitigation is required. If VPFS are found or assumed to be present, implement Mitigation Measures 2b and 2c.

Bio-3b: **Obtain Authorization from USFWS for take of VPFS.** If VPFS are found as a result of directed surveys or are assumed to be present, the Project applicant shall obtain authorization from USFWS for take of VPFS prior to filling or disturbance of the seasonal wetland. USFWS authorization may be obtained through Section 7 of the ESA as a component of the USACE permitting process (see wetland impacts below).

Bio-3c: **Obtain offsite compensatory habitat for loss of VPFS habitat if determined to be present.** If VPFS are found as a result of directed surveys or are assumed to be present, compensatory habitat shall be provided for loss of this habitat at a 9:1, 10:1 or 11:1 mitigation ratio depending on the location of the mitigation site, as recommended in the EACCS. Final replacement ratios shall be based on the assessed functions and values of an agency approved mitigation site.

With implementation of Mitigation Measures Bio-3a and/or Bio 3b, and Bio-3c, impacts on VPFS or their habitat would be reduced to ***less than significant***.

California Tiger Salamanders

Impact Bio-4: **Loss/Disturbance of Habitat for and Potential Take of Individual California Tiger Salamanders.** The Project will result in the permanent loss of up to 31.78 acres and temporary disturbance of 0.08 acre of potential upland aestivation habitat for CTS. In addition, loss of the 0.004 acre seasonal wetland could result in loss of onsite breeding habitat for CTS. This is a ***potentially significant*** impact.

CTS is both federally and state listed and is therefore protected under the ESA and the California Endangered Species Act (CESA). Section 9 of the ESA and Section 2080 of the CESA prohibit killing, harming, or otherwise "taking" listed animal species. Taking includes destruction or significant alteration of habitat such that it actually kills or injures listed animals. While the loss of approximately 32 acres of potential upland habitat may not have a substantial adverse effect on CTS in the area, any take of individual animals during construction is prohibited under Section 9 of the ESA and Section 2080 of the CESA and would be considered a significant impact.

The entire Project site is 31.78 acres, but only approximately 48% of the site will be developed with roadways and residential lots. However, some areas remaining in an undeveloped state will be encircled by development or be located adjacent to development such that it may no longer serve as habitat. The exact acreage to be mitigated will be determined through coordination with USFWS and CDFG, as detailed in the Mitigation Measures below.

Mitigation Measures

Bio-4a: **Obtain Authorization from USFWS and CDFG for potential take of CTS.** The Project applicant shall obtain authorization from USFWS and CDFG for potential take of CTS prior to initiation of any ground disturbance activities.

Bio-4b: **Obtain Offsite Compensatory Habitat for Loss/Disturbance of Potential Upland Aestivation Habitat for CTS.** The compensatory habitat shall be provided at a 2.5:1 to 3:1 ratio for the acres permanently lost and at a 1.5:1 ratio for areas temporarily disturbed, as recommended in the EACCS. Final replacement ratios shall be based on the assessed functions and values of an agency approved mitigation site. The mitigation site should be of sufficient quality and quantity to fully offset the permanent loss of habitat and should be permanently protected and managed in perpetuity with sufficient funding to maintain and enhance the quality of the site for CTS.

Bio-4c: **Implement Appropriate Measures during Construction to Minimize Potential Take of CTS.** Minimization measures specified in the authorizations obtained from USFWS and CDFG shall be implemented prior to and during construction: Such measures could include the following:

- Project applicant shall contract with a Designated Biologist approved by USFWS and CDFG to monitor construction activities.
- All earthwork in the construction area shall be confined to the period of June 15 to October 31, or as approved by USFWS and CDFG.
- A barrier with one-way ramps shall be constructed around the limits of grading in the fall prior to the initiation of construction. This barrier will allow CTS to move out of the construction area during the fall/winter and keep them from returning in the spring.
- Before any construction activities begin, the Designated Biologist will conduct a training session with construction personnel to describe the CTS and its habitat, the specific measures being implemented to minimize effect to the species, and boundaries of the construction area.
- The Designated Biologist shall complete walking surveys of the construction area prior to initiation of ground-disturbing activities each day during the construction period. If any CTS are discovered, the Designated Biologist shall

move the animal to a safe, nearby location as predetermined through consultation with USFWS and CDFG.

With implementation of Mitigation Measures Bio-4a, Bio 4b, and Bio-4c, impacts on CTS or their habitat would be reduced to ***less than significant***.

California Red-Legged Frogs

Impact Bio-5: **Loss of Habitat for and Potential Take of Individual California Red-Legged Frogs.** The Project will result in the permanent loss of up to 31.78 acres and temporary disturbance of 0.08 acre of potential upland habitat for CRLF. This is a ***potentially significant*** impact.

CRLF is a federally listed species and therefore take of the species is prohibited under Section 9 of the ESA. Taking includes destruction or significant alteration of habitat such that it actually kills or injures listed animals. While the loss of this amount of potential upland habitat may not have a substantial adverse effect on CRLF in the area, any take of individual animals during construction would be considered a significant impact.

The entire Project site is 31.78 acres, but only approximately 48% of the site will be developed with roadways and residential lots. However, some areas remaining in an undeveloped state will be encircled by development or be located adjacent to development such that it may no longer serve as habitat. The exact acreage to be mitigated will be determined through coordination with USFWS, as detailed in the Mitigation Measures below.

Mitigation Measures

Bio-5a: **Obtain Authorization from USFWS for Potential Take of CRLF.** The Project applicant shall obtain authorization from USFWS for potential take of CRLF prior to initiation of any ground disturbance activities.

Bio-5b: **Obtain Offsite Compensatory Habitat for Loss/Disturbance of Potential Upland Habitat for CRLF.** The compensatory habitat shall be provided at a 2.5:1 to 3:1 ratio for the acres permanently lost and at a 1.5:1 ratio for areas temporarily disturbed, consistent with the EACCS recommendations for the species. Final replacement ratios shall be based on the assessed functions and values of an agency approved mitigation site. The mitigation site can be the same as that obtained for Mitigation Measure Bio 4b, as long as there is sufficient area to provide habitat for both CRLF and CTS

Bio-5c: **Implement Appropriate Measures during Construction to Minimize Potential Take of CRLF.** Minimization measures specified in the authorizations obtained from USFWS shall be implemented prior to and during construction. Such measures are expected to be similar to those described for Mitigation Measure 4c.

With implementation of Mitigation Measures Bio-5a, Bio-5b, and Bio-5c, impacts on CRLF or their habitat would be reduced to ***less than significant***.

Burrowing Owls

Impact Bio-6: **Loss of burrowing owl habitat and potential harm to individual burrowing owls.** The Project will result in the permanent loss of up to 31.78 acres of grasslands that provide habitat for the burrowing owl. Additionally, individual

owls could be harmed during construction activities if they are occupying burrows on the site. This is a ***potentially significant*** impact.

Burrowing owls are a State Species of Special Concern and their nests, eggs, and young are protected by the Migratory Bird Treaty Act (16 USC 703) and Section 3503.5 of the California Fish and Game Code. Although these owls are common in the North Livermore area, they are declining throughout California due to loss of grassland habitat.

The entire Project site is 31.78 acres, but only approximately 48% of the site will be developed with roadways and residential lots. However, some areas remaining in an undeveloped state will be encircled by development or be located adjacent to development such that it may no longer serve as habitat. The exact acreage to be mitigated will be determined through coordination with CDFG, as detailed in the above-listed Mitigation Measures.

Mitigation Measure

Bio-6a: **Obtain Offsite Compensatory Habitat for Loss/Disturbance of potential burrowing owl habitat.** The compensatory habitat to be obtained as described for Mitigation Measures Bio-4b and 5b should also be determined as occupied or suitable for burrowing owls in order to compensate for potential habitat loss resulting from the Project.

Bio-6b: **Conduct a Pre-Construction Burrowing Owl Survey.** A pre-construction survey shall be conducted by a qualified biologist within 30 days prior to initiation of any ground-disturbing activities to ensure individual owls are not harmed. If the survey occurs during the breeding season (February 1 to August 31) and owls are observed on or within 250 feet of the area of disturbance, a 250-foot buffer should be established around the occupied burrow with construction fencing. The fenced area should remain in place for the duration of the breeding season while construction activities are occurring. If the survey is conducted outside of the breeding season and owls are observed, owl eviction may be allowed if authorized by CDFG.

With implementation of Mitigation Measures Bio-6a, and Bio-6b, impacts on burrowing owls and their habitat would be reduced to ***less than significant***.

American Badgers

Impact Bio-7: **Potential Harm to Individual American Badgers.** Although not observed on the Project site, there is potential for American badgers to use burrows on the property. Project construction activities could harm individual badgers if they occupy the site when grading begins. This is a ***potentially significant*** impact.

Mitigation Measure

Bio-7: **Conduct a Pre-Construction American Badger Survey.** A pre-construction survey shall be conducted by a qualified biologist no less than 14 days and no more than 30 days prior to the beginning of ground disturbance and/or construction activities or any Project activity likely to impact potential burrows. If occupied burrows are found, one of the following actions shall be implemented by the applicant:

1. Initiate an on-site passive relocation program, through which badgers are excluded from occupied burrows by installation of a one-way door in burrow

entrances, monitoring of the burrow for one week to confirm badger usage has been discontinued, and hand excavation and collapse of the burrow to prevent reoccupation; or

2. Have a qualified biologist actively trap and relocate badgers to suitable off-site habitat in coordination with the CDFG.

With implementation of Mitigation Measure Bio-7, impacts on American badgers would be reduced to ***less than significant***.

San Joaquin Kit Fox

Impact Bio-8: **Loss of potential foraging habitat and potential harm to individual San Joaquin Kit Fox**: The Project will result in the permanent loss of up to 31.78 acres of grassland within the historical range of SJKF. Additionally, there is a slight potential for kit fox to forage or den on the site. This is a ***potentially significant*** impact.

The compensatory habitat to be obtained as described for Mitigation Measures Bio-4b and 5b should also be suitable for SJKF, as long as it lies within the known range of the species, and will therefore compensate for potential habitat loss resulting from the Project.

The entire Project site is 31.78 acres, but only approximately 48% of the site will be developed with roadways and residential lots. However, some areas remaining in an undeveloped state will be encircled by development or be located adjacent to development such that it may no longer serve as habitat. The exact acreage to be mitigated will be determined through coordination with USFWS and CDFG, as detailed in the Mitigation Measures below.

Mitigation Measures

Bio-8a: **Obtain Offsite Compensatory Habitat for Loss/Disturbance of potential SJKF habitat.** The compensatory habitat to be obtained as described for Mitigation Measures Bio-4b and 5b should also be determined as occupied or suitable for SJKF in order to compensate for potential habitat loss resulting from the Project.

Bio-8b: **Conduct pre-construction surveys for San Joaquin kit fox**: The pre-construction survey should be conducted by a qualified biologist no less than 14 days and no more than 30 days prior to the beginning of ground disturbance and/or construction activities or any Project activity likely to impact the San Joaquin kit fox.

- If potential dens are present, their disturbance and destruction will be avoided.
- If potential dens are located within the proposed work area and cannot be avoided during construction, qualified biologist will determine if the dens are occupied or were recently occupied using methodology coordinated with the USFWS and CDFG.
- If unoccupied, the qualified biologist will collapse these dens by hand in accordance with USFWS procedures (U.S. Fish and Wildlife Service 1999).
- Exclusion zones will be implemented following USFWS procedures (U.S. Fish and Wildlife Service 1999) or the latest USFWS procedures available at the time. The radius of these zones will follow current standards or will be as

follows: Potential Den—50 feet; Known Den—100 feet; Natal or Pupping Den—to be determined on a case-by-case basis in coordination with USFWS and CDFG.

- Pipes will be capped and trenches will contain exit ramps to avoid direct mortality while construction area is active.

With implementation of Mitigation Measures Bio-8a and Bio-8b, impacts on SJFK and their habitat would be reduced to ***less than significant***.

Spadefoot Toad

Impact Bio-9: **Loss of Potential Habitat for and Potential Harm to Western Spadefoot Toad**: The Project will result in the permanent loss of 0.004 acre of potential breeding habitat for western spadefoot toad and up to about 31 acres of potential burrowing habitat. Additionally, there is a slight potential for individual western spadefoot toads to be harmed during construction activities. This is a ***potentially significant*** impact.

The western spadefoot was not observed on the Project site and although it has the potential to occur, it is much more likely to use the adjacent vernal pool/upland habitats in the lowlands adjacent to the site. Although the Project will remove potential habitat for the western spadefoot, it is not expected to have a substantial adverse effect on the species, especially considering that suitable habitat for the species will remain protected in the adjacent Garaventa Wetland Preserve. There is potential for harm of individual western spadefoot toads during construction. The following mitigation measure is recommended to minimize that potential harm.

Mitigation Measure

Bio-9: **Conduct a pre-construction survey for western spadefoot toad.** A survey for western spadefoot toad shall be conducted by a qualified biologist a maximum of one week prior to construction. The survey should include the potential breeding habitat and an area within 50 feet of that habitat. If a western spadefoot toad is found, the biologist shall move it to suitable habitat in a safe location outside of the construction zone. In the event that a western spadefoot toad is observed within an active construction zone, the contractor shall temporarily halt construction activities until a biologist has moved the toad to a safe location outside the construction zone, within similar habitat.

With implementation of Mitigation Measures Bio-9, impacts on western spadefoot would be reduced to ***less than significant***.

Nesting Birds

Impact Bio-10: **Disturbance of Nesting Birds.** Construction activities could adversely affect nesting birds protected by the Migratory Bird Treaty Act and/or Fish and Game Code of California. This is a ***potentially significant*** impact.

The federal Migratory Bird Treaty Act and Fish and Game Code of California protect special-status bird species year-round, as well as their eggs and nests during the nesting season. The list of migratory birds includes almost every native bird in the United States. On-site grasslands or adjacent trees along Altamont Creek could be used by protected birds.

Mitigation Measure

Bio-10: **Conduct a Pre-Construction Nesting Bird Survey.** Pre-construction surveys for nesting birds protected by the Migratory Bird Treaty Act of 1918 and/or Fish and Game Code of California shall be conducted within 30 days of initiation of construction activities. The survey area shall include the Project site and areas within 100 feet of the site. If active nests are found, the Project shall follow recommendations of a qualified biologist regarding the appropriate buffer in consideration of species, stage of nesting, location of the nest, and type of construction activity. The buffer shall be maintained until after the nestlings have fledged and left the nest. If there is a complete stoppage in construction activities for 30 days or more, a new nesting-survey shall be completed prior to re-initiation of construction activities.

With implementation of Mitigation Measure Bio-10, impacts on nesting birds would be reduced to ***less than significant.***

WETLANDS

The Project involves the permanent fill of U.S. Army Corps of Engineers (USACE) jurisdictional wetlands/waters and alteration of Altamont Creek for the construction of a bridge crossing needed for access to the Project site.

Impact Bio-11: **Fill of Jurisdictional Wetlands:** The proposed activity will permanently impact approximately 0.004 acre of seasonal wetland habitat and 0.053 acre (290 linear feet) of intermittent drainage channel habitat (Altamont Creek). Both of these areas are jurisdictional waters/wetlands. This is a **potentially significant impact**.

Altamont Creek is regulated by the USACE, the Regional Water Quality Control Board (RWQCB) and California Department of Fish and Game (CDFG). Field verification of the extent of Corps jurisdiction took place on April 11, 2011. Jurisdictional impacts will include the placement of approximately 350 cubic yards (cy) of clean earthen fill into jurisdictional waters in association with the proposed channel relocation activity. Relocation of the channel several feet to the north of its current location would allow for the construction of a pier supported bridge structure. In addition to the channel relocation activity, a small (0.004 acre) seasonal wetland would be graded in association with the construction of the Project.

Mitigation Measures

Bio11a: **Obtain authorization from USACE, CDFG and RWQCB for fill of wetlands and alteration of Altamont Creek.** The applicant shall obtain the necessary permits from the USACE, CDFG and RWQCB pursuant to §404 of the Clean Water Act, §1602 of the California Fish and Game Code, and §401 of the Clean Water Act, respectively.

Bio-11b: **Re-creation of Jurisdictional Waters along Altamont Creek.** The applicant shall create a new channel segment located several feet to the north of the existing channel alignment to replace the reach impacted by the bridge crossing. The new channel segment shall extend 310 linear feet and contain an average width of 8-10 feet, mimicking the channel dimensions of the impacted segment of Altamont Creek. The total jurisdictional area provided by the new channel is approximately 0.071 acre. Enhancement measures such as riparian planting would also take place if approved by Zone 7.

Bio-11c: **Re-creation of 0.004 Acre of Seasonal Wetland.** The applicant shall create a minimum of 0.004 acre of seasonal wetland habitat either onsite or offsite to replace the area lost through Project construction. Creation of this habitat shall be done in consultation with USFWS if the existing seasonal wetland is found to support VPFS (see Mitigation Measure Bio-4c).

With implementation of Mitigation Measures Bio-11a, Bio-11b and Bio-11c, impacts on jurisdictional wetlands would be reduced to ***less than significant***.

WILDLIFE CORRIDORS

Impact Bio-12: **Removal of a Portion of a Potential Wildlife Corridor.** The Project site is adjacent to existing residential development to the east and south and open space to the north and west. While it may currently be used as a wildlife corridor, development of the property would not disrupt that corridor, as open space will remain to the north and east. Consequently, the Project has a ***less than significant*** impact on wildlife corridors.

PLAN AND POLICY CONFLICTS

The site is within the area covered by the EACCS, a guidance document for regional conservation, and environmental permitting for private and public development projects in this portion of the County. There are no other conservation plans that cover the Project site. Project impacts and minimization and mitigation measures were evaluated considering recommendations in the EACCS. With implementation of Mitigation Measures Bio-1 through Bio-11b, the Project would be consistent with local policies or ordinances protecting biological resources and there would be ***no impact*** related to conflict with a biological plan or policy.

8

CULTURAL RESOURCES

INTRODUCTION

This chapter describes existing cultural resources at the Project site and describes whether implementation of the Project would cause a substantial adverse change in the significance of a historic or archaeological resource (as defined in Section 106 of the National Historic Preservation Act and Section 15064.5 of the California Environmental Quality Act [CEQA] Guidelines), directly or indirectly destroy a unique paleontological resource or site or unique geologic feature, or result in the disturbance of any human remains, including those interred outside of formal cemeteries.

The assessment of project impacts on historical resources under CEQA (CEQA Guidelines, Section 15064.5) is a two-step process: (1) determine whether the project site contains a historical resource as defined in CEQA;[1]if the site is found to contain a historical resource, then (2) determine whether the project would cause a substantial adverse change to the resource. The environmental setting section below describes the existing cultural resources in the Garaventa Hills Project area and assesses whether the properties are historical resources for the purposes of CEQA. The historical resources analysis included a literature review and field survey by qualified cultural resource personnel. The impact discussion that follows reviews the criteria for significant impacts on historical resources.

This chapter utilizes information from the following reports prepared for this Project:

Cultural Resources Assessment Report, Garaventa Hills Project, Livermore, Alameda County, California, dated January 9, 2012, prepared for this analysis by Matthew A. Russell and Aimee Arrigoni of William Self Associates, Inc. (included as Appendix D).

REGULATORY SETTING

CALIFORNIA ENVIRONMENTAL QUALITY ACT

CEQA requires that public or private projects financed or approved by public agencies must assess the effects of the project on historical resources. CEQA also applies to effects on archaeological sites, which may be included among "historical resources" as defined by Guidelines Section 15064.5, subdivision (a), or may be subject to the provisions of Public Resources Code Section 21083.2, which governs review of "unique archaeological resources." Historical resources may generally include buildings, sites, structures, objects, or districts, each of which may have historical, architectural,

[1] "Historical resources" includes, but is not limited to, any object, building, structure, site, area, place, record, or manuscript that is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California (CEQA Guidelines 15064.5). For the purposes of this section, the term "historical resources" is synonymous with "cultural resources."

archaeological, cultural, or scientific significance. Under CEQA, "historical resources" include the following:

1) A resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources (Public Resources Code, Section 5024.1, Title 14 CCR, Section 4850 et seq.).
2) A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the Public Resources Code or identified as significant in an historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code.
3) Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources (Public Resources Code, Section 5024.1, Title 14 CCR, Section 4852).

Section 15064.5 of CEQA also assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. These procedures are detailed under Public Resources Code (PRC) Section 5097.98.

Impacts to "unique archaeological resources" and "unique paleontological resources" are also considered under CEQA, as described under PRC Section 21083.2. A unique archaeological resource is an archaeological artifact, object, or site about which it can be clearly demonstrated that without merely adding to the current body of knowledge there is a high probability that it meets one of the following criteria:

a) The archaeological artifact, object, or site contains information needed to answer important scientific questions, and there is a demonstrable public interest in that information;
b) The archaeological artifact, object, or site has a special and particular quality, such as being the oldest of its type or the best available example of its type; or
c) The archaeological artifact, object, or site is directly associated with a scientifically recognized important prehistoric or historic event or person.

CALIFORNIA REGISTER OF HISTORIC RESOURCES

In considering impact significance under CEQA, the significance of the resource itself must first be determined. At the state level, consideration of significance as an "important archaeological resource" is measured by cultural resource provisions considered under CEQA Sections 15064.5 and 15126.4, and the draft criteria regarding resource eligibility for listing on the California Register of Historic Resources (CRHR). Generally under CEQA, a historical resource is considered significant if it meets the criteria for listing on the CRHR. These criteria are set forth in CEQA Section 15064.5, and defined as any historical resource that:

1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage (Criterion 1);
2) Is associated with lives of persons important in our past (Criterion 2);

3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values (Criterion 3); or

4) Has yielded, or may be likely to yield, information important in prehistory or history (Criterion 4).

In order to meet one or more of the criteria listed above, a cultural resource must possess integrity to qualify for listing in the CRHR. Integrity is generally evaluated with reference to qualities including location, design, materials, workmanship, setting, feeling, and association. A potentially eligible site must retain the integrity of the values that would make it significant. Typically, integrity is indicated by evidence of the preservation of the contextual association of artifacts, ecofacts, and features within the archaeological matrix (Criterion 4) or the retention of the features that maintain contextual association with historical developments or personages that render them significant (Criteria 1, 2, or 3). Evidence of the preservation of this context is typically determined by stratigraphic analysis and analysis of diagnostic artifacts and other temporal data (e.g., obsidian hydration, radiocarbon assay) to ascertain depositional integrity or by the level of preservation of historic and architectural features that associate a property with significant events, personages, or styles.

Integrity refers both to the authenticity of a property's historic identity, as shown by the survival of physical characteristics that existed during its historic period and to the ability of the property to convey its significance. This is often not an all-or-nothing scenario (determinations can be subjective); however, the final judgment must be based on the relationship between a property's features and its significance.

The criteria for listing historical resources in the California Register are consistent with those developed by the National Park Service for listing historical resources in the National Register, but have been modified for state use in order to include a range of historical resources which better reflect the history of California (Public Resources Code, Section 5024.1, Title 14 CCR, Section 4852).

The Public Resources Code, Section 5024.1, Title 14 CCR, Section 4852 provides special considerations for determining eligibility for listing in the California Register, including:

1) Historical resources achieving significance within the past fifty (50) years. In order to understand the historic importance of a resource, sufficient time must have passed to obtain a scholarly perspective on the events or individuals associated with the resource. A resource less than fifty (50) years old may be considered for listing in the California Register if it can be demonstrated that sufficient time has passed to understand its historical importance.

The fact that a resource is not listed in, or determined to be eligible for listing in the California Register of Historical Resources, not included in a local register of historical resources (pursuant to Section 5020.1(k) of the Public Resources Code), or identified in an historical resources survey (meeting the criteria in Section 5024.1(g) of the Public Resources Code) does not preclude a lead agency from determining that the resource may be an historical resource as defined in Public Resources Code sections 5020.1(j) or 5024.1.

Archaeological resources that do not meet the criteria for "historical resources" defined above, may meet the definition of "unique archaeological resources" as defined in Section 21083.2 of the Public Resources Code. If an archaeological resource is neither a unique archaeological nor a historical resource, the effects of the project on those resources will not be considered a significant effect on the environment. It is sufficient that the resource and the effects on it be noted in the EIR, but the resource need not be considered further in the CEQA process. CEQA requires that if a project results in an effect that may cause a substantial adverse change in the significance of an historical resource, or would

cause significant effects on a unique archaeological resource, then alternative plans or mitigation measures must be considered. Therefore, prior to assessing effects or developing mitigation measures, the significance of historical resources must first be determined. The steps that are normally taken in a historical resources investigation for CEQA compliance are as follows:

(1) Identify potential historical resources;

(2) Evaluate the eligibility of historical resources;

(3) Evaluate the effects of the project on eligible historical resources.

ENVIRONMENTAL SETTING

Background research for this cultural resources analysis consisted of a records search, literature review, contact with potentially interested parties, and a paleontological assessment. This research was conducted to identify cultural resources and paleontological resources in the Project area. The results were also used to help understand the archaeological, ethnographic, and historical setting of the Project area.

SAN FRANCISCO BAY AREA PREHISTORY, INCLUDING LIVERMORE VALLEY AND VICINITY

Cultural chronologies developed for Central California have gone through several permutations (see for example Beardsley 1948, 1954; Bennyhoff and Hughes 1987; Fredrickson 1973, 1974; Heizer and Fenenga 1939; Lillard and Purves 1936; Lillard et al. 1939; Milliken and Bennyhoff 1993; Ragir 1972; Schenck and Dawson 1929). Most recently, Milliken et al. (2007:99-123) developed what they term a "hybrid system" for the San Francisco Bay Area, combining an Early-Middle-Late Period temporal sequence with a pattern-aspect-phase cultural sequence.

Milliken et al.'s (2007) San Francisco Bay Area Cultural Sequence includes:

Early Holocene (Lower Archaic) from 8000 to 3500 B.C.
Early Period (Middle Archaic) from 3500 to 500 B.C.
Lower Middle Period (Initial Upper Archaic) from 500 B.C. to A.D. 430
Upper Middle Period (Late Upper Archaic) from A.D. 430 to 1050
Initial Late Period (Lower Emergent) from A.D. 1050 to 1550
Terminal Late Period, post-A.D. 1550

No archaeological evidence dating to pre-8000 B.C. has been located in the Bay Area. Milliken et al. (2007:99-123) posit that this dearth of archaeological material may be related to subsequent environmental changes that submerged sites, buried sites beneath alluvial deposits, or destroyed sites through stream erosion.

A "generalized mobile forager" pattern marked by the use of milling slabs and handstones and the manufacture of large, wide-stemmed and leaf-shaped projectile points emerged around the periphery of the Bay Area during the Early Holocene Period (8000 to 3500 B.C.). Beginning around 3500 B.C., evidence of sedentism, interpreted to signify a regional symbolic integration of peoples, and increased regional trade emerged. This Early Period lasted until ca. 500 B.C. (Milliken et al., 2007:114, 115).

Milliken et al. identify "a major disruption in symbolic integration systems" ca. 500 B.C., marking the beginning of the Lower Middle Period (500 B.C. to A.D. 430). Bead Horizon M1, dating from 200 B.C. to A.D. 430, is described by Milliken et al. as marking a 'cultural climax' within the San Francisco Bay Area (Milliken et al., 2007:115).

The Upper Middle Period (A.D. 430 to 1050) is marked by the collapse of the Olivella saucer bead trade in central California, abandonment of many Bead Horizon M1 sites, an increase in the occurrence of sea otter bones in those sites that were not abandoned, and the spread of the extended burial mortuary pattern characteristic of the Meganos complex into the interior East Bay. Bead Horizons M2 (A.D. 430 to 600), M3 (A.D. 600 to 800), and M4 (A.D. 800 to 1050) were identified within this period (Milliken et al., 2007:116).

The Initial Late Period, dating from A.D. 1050 to 1550, is characterized by increased manufacture of status objects. In lowland central California during this period, Fredrickson (1973, 1994) noted evidence for increased sedentism, the development of ceremonial integration, and status ascription. The beginning of the Late Period, (ca. A.D. 1000) is marked by the Middle/Late Transition bead horizon. The Terminal Late Period began circa A.D. 1550 and continued until European settlement of the area.

ETHNOGRAPHY OF LIVERMORE VALLEY AND VICINITY

This section provides a brief summary of the ethnography of the Project vicinity and is intended to provide a general background only. More extensive reviews of *Ohlone* ethnography are presented in Bocek (1986), Cambra et al. (1996), Kroeber (1970), Levy (1978), Milliken (1995), and Shoup et al. (1995).

The Project area lies within the region occupied by the *Ohlone* or *Costanoan* group of Native Americans at the time of historic contact with Europeans (Kroeber 1970:462-473). Although the term *Costanoan* is derived from the Spanish word Costaños, or "coast people," its application as a means of identifying this population is based in linguistics. The *Costanoans* spoke a language now considered one of the major subdivisions of the Miwok-Costanoan, which belonged to the Utian family within the Penutian language stock (Shipley 1978:82-84). Modern descendants of the *Costanoan* prefer to be known as *Ohlone*. The name *Ohlone* is derived from the *Oljon* group, which occupied the San Gregorio watershed in San Mateo County (Bocek, 1986:8). The two terms (*Costanoan* and *Ohlone*) are used interchangeably in much of the ethnographic literature.

Each language group was subdivided into smaller village complexes or tribal groups. These tribal groups were independent political entities, each occupying specific territories defined by physiographic features. Each group controlled access to the natural resources of its territory, which also included one or more permanent villages and numerous smaller campsites used as needed during a seasonal round of resource exploitation. *Chochenyo* or East Bay *Costanoan* was the language spoken by the estimated 2,000 people who occupied the "east shore of San Francisco Bay between Richmond and Mission San Jose, and probably also in the Livermore Valley" (Levy 1978:485).

Extended families lived in domed structures thatched with tule, grass, wild alfalfa, or ferns (Levy 1978:492). Semisubterranean sweathouses were built into pits excavated in stream banks and covered with a structure against the bank (Kroeber 1970:468).

Acorns of the coast live oak, valley oak, tanbark oak, and California black oak were an important staple in the *Ohlone* diet. Seeds and berries, roots and grasses, and the meat of deer, elk, grizzly, rabbit, and squirrel formed the *Ohlone* diet. Careful management of the land through controlled burning served to ensure a plentiful, reliable source of all these foods (Levy 1978:491).

The *Ohlone* usually cremated a corpse immediately upon death but, if there were no relatives to gather wood for the funeral pyre, interment occurred. Mortuary goods comprised most of the personal belongings of the deceased (Levy 1978:490).

The *Ssaoam* tribe of the *Ohlone* peoples was probably the most closely linked to the Project area. The *Ssaoam* lived in the surrounding dry hills and valleys around Brushy Peak and nearby Altamont Pass, which separated the Livermore Valley from the San Joaquin Valley (Milliken 1995:255). In the dry summer months *Ssaoam* populations may have dispersed and reconverged at various camps throughout the year. The triblet reportedly hosted trade feasts in the area, acting as brokers in a regional trade network with the *Volvons*, a tribelet of the Bay Miwok, and the *Tamcans* of the Northern Valley Yokuts. The *Ssaoam*'s ability to prosper may have had as much to do with their occupying this strategic trading location as with their ability to use the area's food and limited water resources (Brushy Peak Regional Preserve n.d.).

The arrival of the Spanish in 1772 led to a rapid and major reduction in native California populations. Diseases, declining birth rates, and the effects of the mission system had substantial impacts on aboriginal life ways. Brought into the missions, the surviving *Ohlone*, along with the *Esselen*, *Yokuts*, and *Miwok*, were transformed from hunters and gatherers into agricultural laborers (Levy 1978; Shoup et al. 1995). Following secularization of the mission system in the 1830s, numerous ranchos were established in the 1840s. Generally, the few Indians who remained were then forced, by necessity, to work on the ranchos.

In the 1990s, some *Ohlone* groups (e.g., the Muwekma, Amah, and Esselen further south) submitted petitions for federal recognition (Esselen Nation 2007;MuwekmaOhlone Tribe 2007). Many Ohlone are active in preserving and reviving elements of their traditional culture and are active participants in the monitoring and excavation of archaeological sites.

HISTORY OF LIVERMORE VALLEY AND VICINITY

The earliest historical accounts of the Livermore Valley come from the Spanish explorers who ventured into the region in the late 18th century. The Fages expedition of 1772 traveled from Monterey north along the eastern shore of San Francisco Bay into the delta region of the Central Valley (Cook 1957:131). From there they traveled south back to Monterey, passing through today's Livermore Valley. Other Spanish expeditions in the ensuing years passed near the Project area, including the 1811 expedition of Ramon Abella, the 1813 expedition of Jose Arguello, and the 1817 expedition of Narciso Duran and Luis Arguello (Beck and Haase 1974:21).

The founding of Mission San Jose in 1797 by Spain marked the start of European influence in the Livermore Valley (Praetzellis et al. 1997:15). Settlements were established inland for maintenance of the Mission system's expanding grazing lands, and reached nearly to the Livermore Valley. At that time, the control of the Missions was focused around the more accessible San Francisco Bay. It was not until after Mexico's secession from Spain in 1821 that land was granted to private citizens, a practice that increased significantly after the 1833 act of the Mexican legislature that established the secularization of the missions.

In 1839 the Project area was granted as part of a rancho (Willard 1988:18-19). Rancho Las Positas was granted to Don Salvio Pacheco in April that year, who in turn transferred his interest to Robert Livermore and Jose Noriega (Baker 1914:44). The Rancho consisted of an area of approximately 2 leagues (8,857 acres (Beck and Haase 1974:30).The Englishman Robert Livermore, originally a merchant marine by trade, was known amongst the landed families of the area with whom he had associated since his arrival in Monterey in 1829 (Praetzellis et al. 1997:25). He had married Josepha Higuera-Molina (daughter of a Santa Clara County ranchero), and Livermore had known Jose Noriega since his early days in the area; the two had met at Mission San Jose in 1830 (Praetzellis et al. 1997:25). Livermore moved to the valley that would later bear his name in 1839, and there he raised cattle for hides and tallow, as well as horses, and sheep. In 1844, Livermore planted a vineyard and

orchard, the first outside Mission San Jose (Baker 1914:45;Willard 1988:18-19). He also grew wheat, the first produced in the valley (Baker 1914:45). Livermore and Noriega filed their claim to Las Positas in February of 1852, and in February of 1854 the Board of Land Commissioners confirmed this (Baker 1914:37).

Following the U.S. takeover of Alta California from Mexico in 1848, rancho lands began to be divided up and generally overrun by Anglo immigration to the area that was coincident with the land boom following the Gold Rush of 1849. Rancho Las Positas suffered the fate of most Mexican land grants in northern California, with squatters taking quasi-legal title to lands, and the courts denying title to the original grantees (Hendry and Bowman 1940).

During the American Period, farming on a large-scale was introduced. During the mid-1860s, settlers began moving into the Livermore Valley in ever-increasing numbers. At the beginning of the American Period, cattle raising was still the most important enterprise in Livermore Valley. Soon thereafter, however, within eastern Alameda County and the Livermore Valley, growing wheat and barley, and later fruit trees (including oranges, lemons, peach, pear, plum, apple, and apricot) and grape vines, superseded the cattle industry.

Wheat became the dominant crop in Livermore Valley beginning in the mid-1850s, and Livermore Valley soon became one of the best grain and hay districts in the state. Livermore hay grown on the Altamont hills was highly regarded and was regularly shipped overseas. Even into the early 20th century, Livermore valley hay was still recognized as the "best in the world and is sent in immense quantities by rail and vessel to distant points." (Baker 1914:190-191). Although hay and grain continued to be produced well into the 20th century, it was quickly overtaken by wine grapes and other fruit, which became the valley's most important product (Baker 1914:34, 47, 178-180, 184, 186, 443).

History of the Project Site

Land patent records, which document the transfer of land ownership from the federal government to individuals, indicate that the S½SE¼ of Township 2S, Range 2E Section 26 (the legal land description of the parcel that includes the Project area) was purchased by George W. Harlan on February 5, 1875 (Bureau of Land Management n.d.). The land patent for the parcel that includes the Project area indicates that Harlan purchased both the 80-acre tract in question, as well as the adjacent 80-acre parcel in the N½NE¼ of Township 2S, Range 2E Section 35 at that time. This ownership is also reflected in the Official Map of Alameda County, prepared in 1874, which depicts the parcel including the Project area as owned by G.W. Harlan (Allardt 1874). It also suggests that Harlan occupied the land before it was formally sold to him by the U.S. Government.

A map of Alameda County published by Thompson & West (1878:53) depicts the 80-acre parcel that includes the Project area labeled "Mrs. Harlan, 80A." The adjacent 80-acre tract to the south, which was also purchased by George W. Harlan in 1875, is labeled as "Geo. May, 80A."

Mr. and Mrs. George W. Harlan are likely related to the large Harlan family that immigrated to California in 1846, many of whom settled further west in Alameda County. The most likely identification of the George W. Harlan listed in the land patent records is actually George Alonzo Harlan, who was listed on the 1870 United States Federal Census for Murray Township, Alameda County, as Geo. Harland, with his wife listed simply as Mrs. Harland (U.S. Census Bureau 1870). Harlan was a farmer with interests throughout Alameda County, although he and his wife, Mary, resided in Murray Township in the 1870s. They later moved to Centerville in Washington Township, Alameda County (California State Library n.d.). Mary died in 1895, while George passed away in 1911, both in Irvington, Alameda County. It is unknown when the Harlans sold their property in the

Livermore Valley, but records indicate that by the turn of the century the parcel had changed ownership.

The 80-acre parcel owned by Mrs. Harlan was acquired by the Anspacher Brothers sometime before 1900 (Nusbaumer and Boardman 1900). The Anspacher Brothers were originally commission merchants who amassed large amounts of land in the northern Livermore Valley through speculation during the final decades of the 19th century. Many of their properties were also acquired through loan defaults (Wiberg and Dean 2000:31). Before 1910, the property changed hands again and it was acquired by L.A. Myers and Company, indicated as owner on the 1910 Map of Murray Township (Haviland 1910).

By 1912, ownership of the parcel including the Project area had changed hands again as the Garaventa family acquired it. The Garaventa family moved to the Livermore Valley in the late-19th century. Domingo Garaventa moved to the United States from Italy in 1870 at about the age of 18, and he worked as a farm laborer in Livermore for a number of years. Garaventa's wife, Mary, came to this country from Italy in 1886, and they were married later that year. The Garaventas had five children, although only three survived to adulthood, including their daughter Amelia (born in 1886), and sons Louis (born in 1891) and Henry (born in 1897). During the 1880s, Garaventa bought 160 acres of farmland in the Green School District, which encompasses the Project area (Faulkner 1887:72). Later, in the 1890s, Garaventa bought additional farmland on the first of three parcels north of what became Interstate 580 (U.S. Census Bureau 1880, 1900; Garaventa Wetlands Preserve n.d).

Although no specific deeds or other transaction documents could be located for this Project, Garaventa presumably bought the parcel that includes the present Project area from L.A. Myers and Company around 1910. Domingo Garaventa passed away about that time, and his widow Mary became the head of household. The Garaventa's sons, Louis and Henry Garaventa, worked as laborers on the family farm while Amelia Garaventa worked as a milliner (hatmaker) (U.S. Census Bureau #1910). On the 1912 Map of Murray Township, the 80-acre parcel that includes the Project area, along with the adjoining 80-acre parcels to the west, south, and southwest, are indicated as owned by M. Garaventa—presumably Mary Garaventa (Haviland 1912).

Mary Garaventa passed away during the 1920s, and the land, commonly known as the Vasco Property, passed in equal ownership to Amelia, Louis, and Henry Garaventa (Superior Court of the State of California 1996). Louis and Henry Garaventa continued to farm in the valley—eventually the family owned one-third of Township 2 South Range 2 East (including the Project area), as well as 85 acres on the west side of what became Vasco Road (U.S. Census Bureau 1920, 1930; Garaventa Wetlands Preserve n.d.). The family farmed wheat, barley and oats on their lands until the 1940s when they moved elsewhere, although they retained ownership of the Vasco Property. Henry Garaventa's children, Alwin Garaventa and Valeta Albright (née Garaventa) inherited ownership of the land after Amelia, Louis, and Henry Garaventa all passed away during the 1970s (Superior Court of the State of California 1996; Garaventa Wetlands Preserve n.d.). Alwin Garaventa, Sharon Lee Albright, and Karen Jean Red Elk are the current landowners (ENGEO 2010: Appendix F).

Topographic maps and aerial images of the Project area date from the early-20th century. Maps and photographs of the Garaventa Hills Project area indicate the property was never developed, but has remained vacant grazing and farmland throughout its history. The earliest U.S. Geological Survey (USGS) map, the 1907 Tesla 15-minute USGS topographic map, indicates a single structure within the Project area, but the structure is not depicted on any later maps (USGS 1907 [Photorevised 1948]; USGS 1953 [Photorevised 1968 and 1981]). Historical research could not determine the purpose of this structure, and no traces of it were observed during the field survey (see below). The earliest aerial

image of the Project area, dating to 1940, shows vacant land with no visible structures, as do later aerial images from 1958 to 2005 (ENGEO 2010:Appendix F).

Methods

The effort to identify historical resources in the Project area included a records search and review of existing documents and reference materials, Native American consultation, and a field survey.

Staff at the California Historical Resources Information System, Northwest Information Center (NWIC) at Sonoma State University conducted a records search of the Project vicinity on December 6, 2011 (File No. 11-0601). The records search involved a review of records and maps on file at the NWIC. Information on previous archaeological studies within a ¼-mile radius of the Project area was provided. Relevant pages from the Office of Historic Preservation (OHP) Historic Properties Directory, which includes information regarding National Register of Historic Places, California Register of Historical Resources, California State Historical Landmarks, California State Points of Historical Interest, and historic building surveys, were included with the search results. Copies of the appropriate sections of the 1907 Tesla 15-minute and the 1953 Altamont 7.5-minute USGS topographic maps were also included in the results.

On November 28, 2011, WSA contacted the Native American Heritage Commission (NAHC) by letter to request information on known Native American sacred lands within the Project area and to request a listing of individuals or groups with a cultural affiliation to the Project area. As a response from the NAHC was not received, WSA resent the letter on December 16, 2011. A response from the NAHC was still not received. In response to a Notice of Preparation (NOP) sent to the NAHC by the City of Livermore, however, the NAHC provided a list of Native American contacts for the Project area. On December 16, 2011, WSA sent letters to the following 11 contacts identified by the NAHC, requesting comment on this Project: Jakki Kehl; Rosemary Cambra, Chairperson, Muwekma Ohlone Indian Tribe of the San Francisco Bay Area; Andrew Galvan, The Ohlone Indian Tribe; Katherine Erolinda Perez; Ramona Garibay, Representative, Trina Marine Ruano Family; Irene Zwierlein, Chairperson, Amah/Mutsun Tribal Band; Don Hankins; Joseph Mondragon, Tribal Administrator, Amah/Mutsun Tribal Band; Melvin Ketchum III, Environmental Coordinator, Amah/Mutsun Tribal Band; Jean-Marie Feyling, Amah/Mutsun Tribal Band; and Ann Marie Sayers, Chairperson, Indian Canyon Mutsun Band of Costanoan. No responses were received. WSA placed follow-up phone calls on January 3 and January 9, 2012.

Although the Project area was previously surveyed in 2000, that survey was part of a larger project and the survey was conducted at a much broader scale than the current survey. Investigators in 2000 surveyed the Project area using 20 to 40 m (65 to 130 ft.) transects (Wiberg and Dean 2000), as compared to the 10 m (33 ft.) transects used for the current Project. In addition, during historic background research for the Project, evidence was found on one of the historic maps that there may have been a structure present on the parcel in 1907. Because this structure was not specifically mentioned in the previous study, it was decided that the Project area should be re-surveyed for this Project.

To ensure that no significant cultural resources were missed during the previous survey, and as a means to evaluating potential impacts to cultural resources, WSA archaeologists, Matthew Russell, Ph.D. and David Buckley, B.A. conducted an intensive pedestrian survey of the entire 31.7-acre Project area on December 19, 2011. This intensive survey was designed to meet the requirements of Section 106 and was conducted using transect widths of no more than 10 meters (33 ft.). Ground surface visibility throughout the survey area was generally good, with greater than 50% visibility throughout the Project area. Areas of high visibility included drainage channels, exposed rock outcroppings, and abundant

rodent burrowing sites. Isolated cultural resources discovered during the survey were evaluated for significance (CRHR eligibility) in accordance with the criteria in CEQA Section 15064.5.

WSA's Paleontologist conducted and prepared a paleontological resources assessment of the Project area. The paleontologist identified the geological units within the Project area based on existing geological mapping, the ENGEO Phase I geotechnical report, and readily available data. This section addresses potential Project impacts to paleontological resources that may be present in the Project area.

Results

The records search indicated there are no recorded sites within ¼-mile radius of the Project area. No properties within ¼-mile of the Project area are listed in the Office of Historic Preservation (OHP) Historic Properties Directory, which includes information regarding National Register of Historic Places, California Register of Historical Resources, California State Historical Landmarks, California State Points of Historical Interest, and historic building surveys. There were no listings on the California Inventory of Historical Resources or the OHP Archaeological Determinations of Eligibility in the vicinity of the Project area. Two cultural resource studies have been undertaken that include the Project area, and one additional study has been conducted within ¼-mile of the Project area (Busby 1998; Hill 1998; Wiberg and Dean 2000). None of the previous studies identified cultural resources within the Project area.

The only Native American contacts who had comments on the Project were Mr. Hankins and Ms. Kehl. Mr. Hankins did not have specific comments about the Project area, but had general concerns about urban development in Livermore and its potential impact on nearby Native American sacred sites such as Brushy Peak and Vasco Caves. Ms. Kehl also did not have specific comments about the Project area, but requested to be informed about the opportunity to publically comment on the DEIR.

The areas adjacent to Altamont Creek were considered a high priority during the survey due to the possibility of prehistoric sites near the creek. The creek bank and adjacent areas in the vicinity of the proposed bridge over Altamont Creek, as well as the proposed realignment of the creek, were thoroughly examined.

No prehistoric cultural resources were observed during the field survey, and no new archaeological sites were recorded. Twentieth-century material observed during the survey included a plywood target used in aerial mapping that likely dates to the latter part of the 20th century, a barbwire fence dating to the first half of the 20th century, and a small concentration of debris observed at the bottom of an empty cow pond, including broken glass, cow bones, a steel wheel rim, a rubber shoe sole, and an aluminum can, dating to the mid-20th century. Twentieth-century features and debris were evaluated relative to eligibility criteria for the CRHR, and none are recommended as being potentially significant. No historical resources or unique archaeological resources are present within the Project area that are recommended as being potentially CRHR eligible.

The Project area is underlain by the fossiliferous late Miocene, marine San Pablo Group sandstone bedrock known to contain important, non-renewable paleontological resources of extinct marine vertebrate and invertebrate fauna. In addition, there are Pleistocene deposits in the Project area that overlie the San Pablo Group along angular unconformity. These deposits are known to contain significant non-renewable paleontological resources, including mammoth, mastodon, sabre cat and camel. The San Pablo Group bedrock and Pleistocene deposits within the Project area are regarded as having a "high potential" to contain significant fossils based on the Society of Vertebrate Paleontologists Guidelines (1995).

IMPACTS AND MITIGATION MEASURES

The following section describes potentially significant Project impacts to cultural and paleontological resources. Mitigation recommendations are made to avoid, minimize, or mitigate such impacts where feasible.

THRESHOLDS OF SIGNIFICANCE

Under the CEQA Guidelines, Appendix G – Environmental Checklist Form, a significant impact will occur if the proposed Project would:

1. Cause a substantial adverse change in the significance of a historical resources as defined in CEQA Guidelines Section 15064.5;
2. Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5;
3. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; or
4. Disturb any human remains, including those interred outside of formal cemeteries.

HISTORIC/ARCHAEOLOGICAL RESOURCES, GEOLOGIC/PALEONTOLOGICAL FEATURES AND HUMAN REMAINS

Impact Culture-1: Disturbance of Unidentified Archaeological Resources, Paleontological Resources or Human Remains. During earth-moving activities at the Project site, it is possible that unidentified archaeological resources, paleontological resources, or human remains could be uncovered and disturbed. This is a ***potentially significant*** impact.

There are no known recorded cultural resources within ¼-mile of the Project area, and the potential for identifying unrecorded historical resources is low.

There are no known unique geologic or paleontological features associated with the Project area, but the potential for identifying unrecorded resources is high.

There are no known human remains that would be disturbed by the proposed Project, and no formal cemeteries and no archaeological sites that may contain human remains have been located in the Project area.

Although the potential is low that ground-disturbing construction in the Project area could identify unrecorded historical resources or human remains at the site, the possibility cannot be discounted that such resources may be encountered. In addition, the potential that ground-disturbing construction in the Project area could identify unrecorded paleontological resources is high. If such resources are encountered and qualify as historical or unique archaeological or paleontological resources, then an adverse change in their significance would result in a significant impact. Should such resources be encountered, implementation of mitigation measures Culture-1a, Culture-1b, and Culture-1c would reduce this potential impact to a less-than-significant level.

Mitigation Measures

Culture-1a: **Halt Construction Activity, Evaluate Find and Implement Mitigation.** In the event that previously unidentified historical resources are uncovered during site preparation, excavation or other construction activity, all such activity within 25 feet of the discovery shall cease until the resources have been evaluated by a qualified archaeologist, and specific mitigation measures can be implemented to protect these resources in accordance with sections 21083.2 and 21084.1 of the California Public Resources Code.

Culture-1b: **Prepare Mitigation Plan, Halt Construction Activity, Evaluate Find and Implement Mitigation.** Because of the high potential for unique paleontological resources within the Project area, a qualified professional Paleontologist shall prepare a Paleontological Mitigation Plan outlining a paleontological monitoring plan and a salvage plan to be implemented during construction excavation and other ground-disturbing activities for the Project. The Paleontological Mitigation Plan should include the following: in the event that previously unidentified paleontological resources are uncovered during site preparation, excavation or other construction activity, all such activity within 25 feet of the discovery shall cease until the resources have been evaluated by a qualified Paleontologist, and specific mitigation measures can be implemented to protect these resources in accordance with sections 21083.2 and 21084.1 of the California Public Resources Code.

Culture-1c: **Halt Construction Activity, Evaluate Remains and Take Appropriate Action in Coordination with Native American Heritage Commission.** In the event that human remains are uncovered during site preparation, excavation or other construction activity, all such activity within 25 feet of the discovery shall cease until the remains have been evaluated by the County Coroner, and appropriate action taken in coordination with the Native American Heritage Commission, in accordance with section 7050.5 of the California Health and Safety Code or, if the remains are Native American, section 5097.98 of the California Public Resources Code.

Implementation of mitigation measures Culture-1a, Culture-1b, and Culture-1c will reduce the impacts associated with possible disturbance of unidentified archaeological resources, paleontological resources or unidentified human remains at the Project site to a level of ***less than significant***.

9

GEOLOGY AND SOILS

INTRODUCTION

This chapter summarizes geologic and geotechnical aspects of the site as they relate to the Project.

This chapter utilizes information from the following reports prepared for this Project or analysis:

Preliminary Geotechnical Recommendations Report: Proposed Garaventa Hills Estates, Livermore, California, prepared for the applicant by ENGEO Incorporated and dated November 30, 2010 and included in Appendix E.

Fault Rupture Hazard Study: Proposed Garaventa Hills Estates, Livermore, California, prepared for the applicant by ENGEO Incorporated and dated December 22, 2010 and included in Appendix E.

KNOWN CONCERNS

In the scoping meeting, neighbors expressed concern regarding unstable soils in the area, slope stability, and whether development is prohibited because of sensitive environmental conditions including an earthquake fault. These concerns have been addressed in this analysis.

ENVIRONMENTAL SETTING

SEISMIC HAZARDS

The site is in a region of high seismic activity and is expected to be subjected to major shaking during the design life of the Project. Seismic hazards commonly investigated for projects in the site vicinity include strong-ground shaking, soil liquefaction, and lateral spreading.

Strong Ground Shaking

The San Francisco Bay Area is a seismically active region. The Project site and region will likely be subjected to strong to violent seismically induced ground shaking within the design life of the development. The site is located in an area of active regional seismicity near active seismic sources.

According to a recent study completed by the Working Group on California Earthquake Probabilities (WGCEP)[1], which assesses the probability of earthquakes in the San Francisco Bay Area, there is a 59 percent probability that an earthquake of Magnitude 6.7 or greater will strike within the life of the Project improvements.

[1] Working Group On California Earthquake Probabilities (WGCEP), 2007, The Uniform California Earthquake Rupture Forecast, Version 2 (UCERF 2), U.S. Geological Survey Open-File Report 07-1437.

Liquefaction

Soil liquefaction is a condition in which saturated, granular soils undergo a substantial loss of strength and deformation due to pore pressure increase resulting from cyclic stress application induced by earthquakes. In the process, the soil acquires mobility sufficient to permit both horizontal and vertical movements if the soil mass is not confined. Soils most susceptible to liquefaction are saturated, loose, clean, uniformly-graded, and fine-grained sand deposits. If liquefaction occurs, foundations resting on or within the liquefiable layer may undergo settlements, called densification. This will result in reduction of foundation stiffness and capacity.

Lateral Spreading

Lateral spreading is a consequence of liquefaction, which results in the horizontal movement of soil on top of liquefied granular or sandy soils or weak clayey soils induced by strong seismic shaking. Lateral spreading can cause severe cracking and differential displacement of the ground surface. Areas most susceptible to lateral spreading are unengineered man-made fill and loose cohesionless alluvial deposits along streams and channels.

REGIONAL GEOLOGY AND SEISMICITY

Livermore is located in the Coast Ranges geomorphic province of California. The Coast Ranges are characterized by a series of northwest-trending valleys and mountain ranges. The bedrock in this region has been folded and faulted in a tectonic setting that is experiencing translational and compressional deformations of the Earth's crust.

A portion of the Project site is included in the Alquist-Priolo Earthquake Fault Special Studies Zone for the Greenville fault. The right-lateral strike-slip Greenville fault is mapped along the northeastern portion of the site. The Greenville fault is classified as a Holocene-active feature by the California Geological Survey.[2]

The Working Group on California Earthquake Probabilities (WGEP) (2007) evaluated the 30-year probability of a M6.7 or greater earthquake occurring on the known active fault systems in the Bay Area, including the Greenville fault. The WGEP calculated an overall probability of 63 percent for the Bay Area as whole, and a probability of 3 percent for the Greenville fault.

SITE GEOLOGY AND SOILS

The geologic conditions at the site have been characterized in the geotechnical study based on review of published geologic maps, examination of aerial photographs, review of previous nearby geotechnical explorations, and geologic reconnaissance, including borings that were performed in November 2010.

The site is generally hilly with downslopes that radiate from the hilltops within the approximate center of the site. Site elevations range from approximately 607 feet at the top of the southeastern hill to approximately 539 feet at the southwestern corner of the property.

Subsurface soils at the site generally consist of relatively thin deposits of residual and/or alluvial soils underlain by Briones of Ciebro Sandstone. Within the elevated hill areas, approximately 1 to 3 feet of

[2] State of California Department of Conservation, State of California Special Studies Zones (Delineated in compliance with Alquist-Priolo Special Studies Zones Act), Altamont Quadrangle, January 1, 1982.Available at: http://www.quake.ca.gov/gmaps/ap/ap_maps.htm.

moist, medium stiff to hard, dark brown sandy silt overlying Briones of Ciebro Sandstone was observed in the borings. In the more flat areas, approximately 8 to 13 feet of alluvial soils overlying very intensely weathered to weathered Briones of Ciebro Sandstone was observed in the borings.

Groundwater was only encountered in one boring, at the northeastern portion of the site. The depth to groundwater was recorded as approximately 10.5 feet to 6 feet below existing grade. Fluctuations in groundwater level should be expected to occur over time due to precipitation, changes in drainage patterns, and/or irrigation.

The proposed Project development, includes excavating into and grading the lower side slopes of the existing two hills to construct approximately 3:1 (horizontal:vertical) slopes, placement of fill across the developed portion of the site and 3:1 fill slopes along the property boundaries. The proposed residential structures will be relatively lightweight, timber-framed single-family units supported by a shallow foundation system.

REGULATORY SETTING

ALQUIST-PRIOLO EARTHQUAKE FAULT ZONING ACT

The California Legislature passed the Alquist-Priolo Earthquake Fault Zoning Act in 1972 to mitigate the hazard of surface faulting to structures for human occupancy.[3] The Act's main purpose is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The Act addresses only the hazard of surface fault rupture and is not directed toward other earthquake hazards. Local agencies must regulate most development in fault zones established by the State Geologist. Before a project can be permitted in a designated Alquist-Priolo Earthquake Fault Zone, the city or county with jurisdiction must require a geologic investigation to demonstrate that proposed buildings would not be constructed across active or potentially active faults.

CALIFORNIA SEISMIC HAZARDS MAPPING ACT

The California Seismic Hazards Mapping Act of 1990 (California Public Resources Code Sections 2690-2699.6) addresses seismic hazards other than surface rupture, such as liquefaction and seismically induced landslides. The Seismic Hazards Mapping Act specifies that the lead agency for a project may withhold development permits until geologic or soils investigations are conducted for specific sites and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils.

CALIFORNIA BUILDING CODE

Title 24 of the California Code of Regulations, also known as the California Building Standards Code, sets minimum requirements for building design and construction. In the context of earthquake hazards, the California Building Standards Code's design standards have a primary objective of assuring public safety and a secondary goal of minimizing property damage and maintaining function during and following seismic events.[4]

---

[3] California Division of Mines and Geology, 1997 revision, *Fault-Rupture Hazard Zones in California*, DMG Special Publication 42.

[4] Bonneville, David, New Building Code Provisions and Their Implications for Design and Construction in California (abstract), 2007, obtained from http://www.consrv.ca.gov/cgs/smip/docs/seminar/SMIP07/Pages/Paper12_Bonneville.aspx

NPDES PERMIT REQUIREMENTS

The 1972 amendments to the Federal Water Pollution Control Act (known as the Clean Water Act or CWA) provide the statutory basis for the National Pollutant Elimination System (NPDES) permit program and the basic structure for regulating the discharge of pollutants from point sources to waters of the United States. In 1987, amendments to the CWA added section 402(p), which established a framework for regulating non-point source (NPS) storm water discharges under the National Pollutant Elimination System (NPDES). Under the program, the Project applicant will be required to comply with two NPDES permit requirements.

The Project applicant will be required to comply with the National Pollutant Elimination System (NPDES) General Construction Permit Requirements, including a site-specific plan called the Stormwater Pollution Prevention Plan (SWPPP) for construction activities and Provision C.3 of the NPDES permit that requires the flow of stormwater and stormwater pollutants to be controlled. This relates to geology because sediment from construction dirt and erosion is considered a stormwater pollutant.

IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

According to CEQA Guidelines, exposure of people or structures to major geological hazards is considered a significant adverse impact. The potential geologic, geotechnical, and seismic effects of the proposed Project can be considered from two points of view: (1) construction impacts; and, (2) geologic hazards to people or structures. The basic criterion applied to the analysis of construction impacts is whether construction of the Project will create unstable geologic conditions that would last beyond the short-term construction period. The analysis of geological hazards is based on the degree to which the site geology could produce hazards to people or structures from earthquakes, ground shaking, ground movement, fault rupture, or other geologic hazards, features or events.

According to CEQA Guidelines, the Project would have a significant environmental impact if it were to result in:

1. The exposure of people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault;
2. The exposure of people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving strong seismic ground shaking or seismic-related ground failure, including liquefaction;
3. The exposure of people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving landslides;
4. Development located on a geologic unit or soil that is unstable (or that would become unstable as a result of the Project) and which could potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse;
5. Development located on expansive soil, creating substantial risks to life and property;
6. The loss of topsoil or development in an area of erodible soils; or

7. Development in areas where soils are incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

EARTHQUAKE FAULT

Impact Geo-1: **Earthquake Fault Zone.** The northeastern portion of the Project site is included in the Alquist-Priolo Earthquake Fault Zone for the Greenville fault. However, a focused geologic investigation has demonstrated that there are no active or potentially active fault traces at the site. The impact related to earthquake faults would be ***less than significant***.

As noted in the setting, the northeastern portion of the Project site is included in the Alquist-Priolo Earthquake Fault Special Studies Zone for the Greenville fault. Published geologic maps typically are interpreted from aerial photographs and topographic maps. Geologic features on such maps are inferred from lineaments that are visible from aerial photographs and topographic maps. Before a project can be permitted in a designated Alquist-Priolo Earthquake Fault Special Studies Zone, the city or county with jurisdiction must require a geologic investigation to demonstrate that proposed buildings would not be constructed across active or potentially active faults.

A focused Fault Rupture Hazard Survey was performed for the Project to satisfy this requirement, as included in Appendix E. Several subsurface investigations were completed in the general vicinity of the Project site to evaluate proposed developments with respect to local geotechnical and geologic conditions. This study concluded that Holocene surface rupture has not occurred at or in the vicinity of the Project site and that the risk of future surface rupture at the Project site is low. Furthermore, since the results of this study indicate that the potential for future surface rupture at the Project site is low, no fault setbacks are recommended.

Because geologic investigation found no active faults in the immediate vicinity of the Project, there would be no constraints to building at the Project site and the impact related to earthquake faults would be less than significant.

GROUND SHAKING AND SEISMIC-RELATED GROUND FAILURE AND LANDSLIDES

Impact Geo-2: **Seismic Hazards.** The Project is located in a seismically active region and likely to be subject to strong seismic shaking during the life of the improvements. The potential for liquefaction is considered to be low, though densification and lateral spreading is possible. The impact related to seismic hazards would be ***potentially significant***.

An earthquake of moderate to high magnitude generated within the San Francisco Bay Region could cause considerable ground shaking at the site; similar such events have occurred in the past. Ground lurching is a result of the rolling motion imparted to the ground surface during energy released by an earthquake. Such rolling motion can cause ground cracks to form in weaker soils. The potential for the formation of these cracks is considered greater at contacts between deep alluvium and bedrock. Such an occurrence is possible at the site as in other locations in the Bay Area. However, based on the relatively thin, stiff soils encountered on the site, cracking resulting from ground lurching is expected to be minor.

The potential for liquefaction is considered to be low on the majority of the site except for the layer of loose silty sand that was encountered at the northeastern corner of the site. This layer is susceptible to

liquefaction. Densification and lateral spreading of the loose alluvial deposits at the Project site is possible.

Mitigation Measure

Geo-2: **Compliance with a design-level Geotechnical Investigation report prepared by a Registered Geotechnical Engineer and with Structural Design Plans as prepared by a Licensed Professional Engineer.** Proper slope and foundation engineering and construction shall be performed in accordance with the recommendations of a Registered Geotechnical Engineer and a Licensed Professional Engineer. The structural engineering design, with supporting Geotechnical Investigation, shall incorporate seismic parameters compliant with the California Building Code.

The preliminary geotechnical report included recommendations that colluvial and loose alluvial soil materials to be removed as part of the remedial grading. Provided these materials are removed, the potential for liquefaction or densification of the soils is considered unlikely.

The preliminary geotechnical report also includes preliminary seismic design parameters based upon subsurface soil conditions encountered and local seismic sources and concludes that a well-designed and well-constructed structure will not collapse or cause loss of life in a major earthquake. Specific recommendations could be modified based upon a design-level plans and investigation.

Compliance with a design-level Geotechnical Investigation and Structural Design Plans, as required by mitigation measure **Geo-2** will reduce the potential impact of seismic hazards including liquifaction to a ***less than significant*** level.

UNSTABLE SOILS AND LANDSLIDES

Impact Geo-3: **Unstable Soils and Slope Stability**. The topography and soils at the Project site represents a concern for unstable soils and landslides if not properly mitigated. The impact related to unstable soils and landslides would be ***potentially significant***.

The Project site is identified as an area with marginal landslide susceptibility in the City's General Plan.[5] The stability of the Project site was analyzed in the Preliminary Geotechnical Recommendations Report.

Slope instabilities can be a significant hazard; however, they can generally be mitigated by proper grading. No known landslides or areas of instability were observed during field assessment and none are shown on the available regional geologic maps.

Differential settlement may occur within lots planned on fills above existing steep slopes. Differential building movements, although not seriously damaging, may become apparent for large differentials in fill thickness. Some residential lots in Project site will likely be entirely in cut or traversed by a cut-fill transition, which suggests significant variations in material properties and could lead to differential subgrade performance if not mitigated during site grading.

[5] City of Livermore, prepared by DC&E, City of Livermore General Plan 2003-2025, Adopted February 2004, as amended through June 2009, Public Safety Element, Figure 10-3.

Consolidation settlement of native soils may be significant if not properly mitigated. Settlement at the site could be generated from: (1) consolidation of the alluvial and colluvial deposits in the swale areas where fills will be placed, (2) compression of the deep fills due to their own weight, and (3) compression of soils beneath foundation systems due to building loads. Based on the exploration data, long-term post-construction settlement is estimated to be approximately 1 to 2 inches, with the exception of the previously mentioned loose silty sand layer in the northeastern corner of the site and limited colluvium deposits within drainage swales.

Mitigation Measure Geo-2 would also serve to mitigate Impact Geo-3 through requiring compliance with a design-level geotechnical investigation and recommendations.

The preliminary geotechnical report concludes the proposed soil and slope conditions would not result in significant risk of landslide at the site, though design-level specifics should be considered, as required in Mitigation Measure Geo-2.

The preliminary geotechnical report included recommendations that in building areas that are entirely in cut or located over cut-and-fill transitions be made more uniform through subexcavation or overexcavation and backfill with engineered fill. The current grading plan incorporates these recommendations.

Compliance with a design-level Geotechnical Investigation and Structural Design Plans, as required by mitigation measure **Geo-2** will reduce the potential impact of unstable soils and landslides to a ***less than significant*** level.

EXPANSIVE SOILS

Impact Geo-4: **Expansive Soils**. The Project proposes deep fill in some locations that could result in swell/settlement if not properly mitigated. The impact related to expansive soils would be ***potentially significant***.

Expansive soils shrink and swell as a result of moisture changes. This can cause heaving and cracking of slabs-on-grade, pavements, and structures founded on shallow foundations.

According to the preliminary grading plans, fills up to about 30 feet thick will be placed in the swales and low-lying areas. Studies have shown that engineered fills in residential development sites typically experience increases in moisture content after building construction due to increases in irrigation or natural conditions and to alternation of drainage pattern. This process may take about 5 to 10 years after irrigation commences, or even more, before the fill becomes fully wetted. The wetting process can cause settlement or swell (hydrocompression due to wetting) depending on soil type, compaction, moisture content, and the overburden pressures (fill thickness).

Based on laboratory test data conducted at the site and nearby sites with the same soil and rock formation, the swell potential for low confining pressures (shallow fill) is significantly reduced when the soil samples are compacted to a relatively lower compaction and at a higher moisture content, and the settlement potential for high confining pressures (deep fill) are compacted to a relatively higher compaction.

Mitigation Measure Geo-2 would also serve to mitigate Impact Geo-4 through requiring compliance with a design-level geotechnical investigation and recommendations.

The preliminary geotechnical report included recommendations that the swell potential of expansive soils be reduced by grading methods such as fill compaction at a high moisture content, and controlling the degree of compaction effort.

Compliance with a design-level Geotechnical Investigation and Structural Design Plans, as required by mitigation measure **Geo-2** will reduce the potential impact of expansive soils to a ***less than significant*** level.

EROSION OR LOSS OF TOPSOIL

Impact Geo-5: **Construction-Period Soil Erosion.** Grading and construction activities will expose soil to the elements, which would be subject to erosion during storm events. This is a ***potentially significant*** impact.

The sloped nature of the site, extent of grading activities, and fact that the relatively nutrient-poor bedrook could make re-establishment of stabilizing vegetation difficult all contribute to a high potential for erosion or loss of topsoil during construction activities if not properly mitigated.

Mitigation Measure

Geo-5: **Construction-Period Stormwater Pollution Prevention Plan (SWPPP).** The Project applicant shall prepare and implement a SWPPP for the proposed construction period. The SWPPP and Notice of Intent (NOI) must be submitted to the State Water Resources Control Board to receive a Construction General Permit. The plan shall address National Pollutant Discharge Elimination System (NPDES) requirements, include applicable monitoring, sampling and reporting, and be designed to protect water quality during construction. The Project SWPPP shall include "Best Management Practices" (BMPs) as required by the State and the Regional Water Quality Control Board for preventing stormwater pollution through soil stabilization, sediment control, wind erosion control, soil tracking control, non-storm water management, and waste management and materials pollution control.

The SWPPP shall take into account the following considerations recommended by the preliminary geotechnical report:

- Ponding of stormwater, other than within engineered detention basins, should not be permitted at the site, particularly during work stoppage for rainy weather. Before the grading is halted by rain, positive slopes should be provided to carry surface runoff to storm drainage structures in a controlled manner to prevent erosion damage.
- The tops of fill or cut slopes should be graded in such a way as to prevent water from flowing freely down the slopes. Due to the nature of the site soil and bedrock, graded slopes may experience severe erosion when grading is halted by heavy rain. Therefore, before work is stopped, a positive gradient away from the tops of slopes should be provided to carry the surface runoff away from the slopes to areas where erosion can be controlled. It is vital that no completed slope be left standing through a winter season without erosion control measures having been provided.
- Because the existing bedrock is relatively nutrient-poor, it may be difficult for vegetation to become properly established, resulting in a potential for slope erosion. Revegetation of graded slopes can be aided by retaining the organic-

rich strippings and spreading these materials in a thin layer (approximately 6 inches thick) on the graded slopes prior to the winter rains and following rough grading. When utilizing this method, it is sometimes possible to minimize hydroseeding.

Implementation of a construction-period stormwater pollution prevention plan, as required by mitigation measure **Geo-5** will reduce the impact of substantial soil erosion and loss of topsoil to ***less than significant*** level through the implementation of the SWPPP to stabilize soil and control sediment, wind erosion and soil tracking and performing applicable monitoring, sampling and reporting.

CAPABILITY OF SOILS TO SUPPORT SEPTIC TANKS

The Project site will be connected to the local sewer system and the Project does not propose to build any septic tanks or alternate waste disposal systems. Therefore, there is ***no impact*** related to soils incapable of supporting septic systems.

This page intentionally left blank

10

GREENHOUSE GAS EMISSIONS

INTRODUCTION

This chapter utilizes information from the following reports prepared for this Project or analysis:

Emissions Model and Construction Health Risk Assessment Results compiled by Lamphier-Gregory for this analysis in January and February 2012 (included in Appendix B).

ENVIRONMENTAL SETTING

Over the last several decades, evidence of human influences on climate change has become increasingly clear and compelling. There is indisputable evidence that human activities such as electricity production and transportation are adding to the concentrations of greenhouse gases that are already naturally present in the atmosphere. These heat-trapping gases are now at record-high levels in the atmosphere compared with the recent and distant past. Warming of the climate system is well documented, evident from increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level. The buildup of greenhouse gases in the atmosphere is very likely the cause of most of the recent observed increase in average temperatures, and contributes to other climate changes.[12]

GREENHOUSE GASES

Carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), ozone (O_3), and water vapor (H_2O) are the principal GHGs, and when concentrations of these gases exceed the natural concentrations in the atmosphere, the greenhouse effect may be enhanced. Without these GHGs, Earth's temperature would be too cold for life to exist. CO_2, CH_4, and N_2O occur naturally, as well as through human activity. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Emissions of CO_2 are largely byproducts of fossil fuel combustion, whereas CH_4 results from off gassing associated with agricultural practices and landfills. Man-made GHGs–with much greater heat-absorption potential than CO_2–include fluorinated gases, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6), which are byproducts of certain industrial processes.[3]

---

[1] U.S. EPA, 2010, *Climate Change Indicators in the United States.*

[2] "Global climate change" is a broad term used to describe any worldwide, long-term change in the earth's climate.

"Global warming" is more specific and refers to a general increase in temperatures across the earth, although it can cause other climatic changes, such as a shift in the frequency and intensity of weather events and even cooler temperatures in certain areas, even though the world, on average, is warmer.

[3] CalEPA, April 3, 2006, *Final 2006 Climate Action Team Report to the Governor and Legislature.*

The Global Warming Potential (GWP) concept is used to compare the ability of each GHG to trap heat in the atmosphere relative to carbon dioxide (CO_2), which is the most abundant GHG. CO_2 has a GWP of 1, expressed as CO_2 equivalent (CO_2e). Other GHGs, such as CH_4 and N_2O are commonly found in the atmosphere at much lower concentrations, but with higher warming potentials, having CO_2e ratings of 21 and 310, respectively. Trace gases such as chlorofluorocarbons and hydrochlorofluorocarbons have much greater warming potential. Fortunately, these gases are found at much lower concentrations and many are being phased out as a result of global efforts to reduce destruction of stratospheric ozone. In the United States in 2010, CO_2 emissions account for about 84 percent of the GHG emissions, followed by CH_4 at about 9 percent and N_2O at just under 5 percent.[4]

GHG EMISSIONS INVENTORIES

Global Emissions. Worldwide emissions of GHGs in 2004 were 49 billion tons of CO_2e per year. Global GHG emissions due to human activities have grown since pre-industrial times, with an increase of 70% between 1970 and 2004.[5]

U.S. Emissions. In 2008, the United States emitted about 7 billion tons of CO_2e, a 14 percent increase from 1990. Emissions per capita have remained nearly level since 1990, as emissions have increased at about the same rate as the population.[6]

State of California Emissions. In 2009, California's net emissions were approximately 453 million metric tons of CO_2e, or about 6.5 percent of the U.S. emissions. This large number is due primarily to the sheer size of California compared to other states. By contrast, California has the fifth lowest state-wide per capita GHG emission rates in the country. 2009 total net emissions represent a 1.3 percent decrease from 2000 and a 6.1 increase from 1990 emissions levels.[7]

Bay Area Emissions. BAAQMD most recently updated the GHG emission inventory in 2010 using a base year of 2007.[8] In the Bay Area, fossil fuel consumption in the transportation sector (on-road motor vehicles, off-highway mobile sources, and aircraft) is the single largest source of the Bay Area's GHG emissions, accounting for 36.41% of the Bay Area's 95.8 million tons of GHG emissions in 2007. Industrial and commercial sources were the second largest contributors of GHG emissions with about 36.40% of total emissions. Domestic sources (e.g., home water heaters, furnaces, etc.) account for about 7% of the Bay Area's GHG emissions, and energy production accounted for 15.9% percent. Off-road equipment and agriculture make up the remainder with approximately 3% and 1.2% of the total Bay Area 2007 GHG emissions, respectively.

Livermore Emissions. The City of Livermore conducted an inventory of GHG emissions with the Climate Change Element of their General Plan, adopted in 2009. According to the General Plan, the community of Livermore emitted approximately 692,000 metric tons of CO_2e in the year 2005. Vehicles on roads and state highways in Livermore are by far the largest source of Livermore's

---

[4] U.S. EPA, April 15, 2012, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2010*, Table 2-1: Recent Trends in U.S. Greenhouse Gas Emissions and Sinks.

[5] Intergovernmental Panel on Climate Change, November 2007, Climate Change 2007: Synthesis Report, Figure 2.1.

[6] U.S. EPA, 2010, *Climate Change Indicators in the United States*, p. 11.

[7] California Energy Commission (CEC), Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2009, December 2011.

[8] BAAQMD, February 2010, *Source Inventory of Bay Area Greenhouse Gas Emissions.*

community emissions (63%). Emissions from the built environment (residential, commercial, and industrial sectors) collectively account for around one-third (33%) of community emissions. The rest of Livermore's emissions are from waste sent to landfills (5%) by Livermore residents and businesses.

POTENTIAL EFFECTS OF GLOBAL CLIMATE CHANGE

Global Effects

Globally, climate change has the potential to impact numerous environmental resources through potential, though uncertain, impacts related to future air temperatures and precipitation patterns. Scientific modeling predicts that continued GHG at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. A warming of about 0.2°C (0.36°F) per decade is projected, and there are identifiable signs that global warming is taking place, including substantial ice loss in the Arctic. The projected effects of global warming on weather and climate are likely to vary regionally, but are expected to include the following direct effects, according to the IPCC.[9]

- Snow cover is projected to contract, with permafrost areas sustaining thawing.
- Sea ice is projected to shrink in both the Arctic and Antarctic.
- Hot extremes, heat waves, and heavy precipitation events are likely to increase in frequency.
- Future tropical cyclones (typhoons and hurricanes) will likely become more intense.
- Non-tropical storm tracks are projected to move poleward, with consequent changes in wind, precipitation, and temperature patterns. Increases in the amount of precipitation are very likely in high-latitudes, while decreases are likely in most subtropical regions.
- Warming is expected to be greatest over land and at most high northern latitudes, and least over the Southern Ocean and parts of the North Atlantic Ocean.

Potential secondary effects from global warming include global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity.

Effects on the State of California

According to CARB, some of the potential impacts in California of global warming may include loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years.[10] Several recent studies have attempted to explore the possible negative consequences that climate change, left unchecked, could have in California. These reports acknowledge that climate scientists' understanding of the complex global climate system, and the interplay of the various internal and external factors that affect climate change, remains too limited to yield scientifically valid conclusions on such a localized scale. Substantial work has been done at the international and national level to evaluate climatic impacts, but far less information is available on regional and local impacts. In addition, projecting regional impacts of climate change and variability

[9] International Panel on Climate Change (IPCC) *Special Report on Emissions Scenarios, 2000,* www.grida.no/climate/ipcc/emission/002.htm, accessed July 24, 2007.

[10] California Air Resources Board, December 2006, *Public Workshop to Discuss Establishing the 1990 Emissions Level and the California 2020 Limit and Developing Regulations to Require Reporting of Greenhouse Gas Emissions.*

relies on large-scale scenarios of changing climate parameters, using information that is typically at too general a scale to make accurate regional assessments.[11]

Below is a summary of some of the potential effects reported in an array of studies that could be experienced in California as a result of global warming and climate change:

- Air Quality – Higher temperatures, conducive to air pollution formation, could worsen air quality in California. Climate change may increase the concentration of ground-level ozone, but the magnitude of the effect, and therefore its indirect effects, are uncertain. For other pollutants, the effects of climate change and/or weather are less well studied, and even less well understood.[12] If higher temperatures are accompanied by drier conditions, the potential for large wildfires could increase, which, in turn, would further worsen air quality. However, if higher temperatures are accompanied by wetter, rather than drier conditions, the rains would tend to temporarily clear the air of particulate pollution and reduce the incidence of large wildfires, thus ameliorating the pollution associated with wildfires. Additionally, severe heat accompanied by drier conditions and poor air quality could increase the number of heat related deaths, illnesses, and asthma attacks throughout the State.[13]
- Water Supply – Uncertainty remains with respect to the overall impact of global climate change on future water supplies in California. For example, models that predict drier conditions (i.e., parallel climate model [PCM]) suggest decreased reservoir inflows and storage and decreased river flows, relative to current conditions. By comparison, models that predict wetter conditions (i.e., HadCM2) project increased reservoir inflows and storage, and increased river flows.[14]
- Hydrology – As discussed above, climate change could potentially affect the amount of snowfall, rainfall and snow pack; the intensity and frequency of storms; flood hydrographs (flash floods, rain or snow events, coincidental high tide and high runoff events); sea level rise and coastal flooding; coastal erosion; and the potential for salt water intrusion. Sea level rise can be a product of global warming through two main processes: expansion of seawater as the oceans warm, and melting of ice over land. A rise in sea levels could result in coastal flooding and erosion and could also jeopardize California's water supply. In particular, saltwater intrusion would threaten the quality and reliability of the state's major fresh water supply that is pumped from the southern portion of the Sacramento/San Joaquin River Delta. Increased storm intensity and frequency could affect the ability of flood-control facilities (including levees) to handle storm events.
- Agriculture – California has a $30 billion agricultural industry that produces half the country's fruits and vegetables. The California Climate Change Center (CCCC) notes that higher CO2 levels can stimulate plant production and increase plant water-use efficiency. However, if temperatures rise and drier conditions prevail, water demand could increase; crop-yield could be threatened by a less reliable water supply; and greater ozone pollution could render plants more susceptible to pest and disease outbreaks. In addition, temperature increases could change the time of year that certain crops, such as wine grapes, bloom or ripen, and thus affect their quality.[15]

---

[11] Kiparsky, M. and P.H. Gleick, July 2003, *Climate Change and California Water Resources: A Survey and Summary of the Literature*.

[12] U.S. EPA, 2010, *Climate Change Indicators in the United States*.

[13] California Climate Change Center (CCCC), July 2006, *Our Changing Climate: Assessing the Risks to California*, CEC- 500-2006-077.

[14] Brekke, L.D., et al, 2004, "Climate Change Impacts Uncertainty for Water Resources in the San Joaquin River Basin, California." *Journal of the American Water Resources Association*. 40(2): 149–164.

[15] CCCC, July 2006, *Our Changing Climate: Assessing the Risks to California*, CEC- 500-2006-077.

- Ecosystems and Wildlife – Increases in global temperatures and the potential resulting changes in weather patterns could have ecological effects on a global and local scale. In 2004, the Pew Center on Global Climate Change released a report examining the possible impacts of climate change on ecosystems and wildlife.16 The report outlines four major ways in which it is thought that climate change could affect plants and animals: (1) timing of ecological events; (2) geographic range; (3) species' composition within communities; and (4) ecosystem processes such as carbon cycling and storage.

REGULATORY SETTING

INTERNATIONAL AND FEDERAL

Kyoto Protocol.

The United States participates in the United Nations Framework Convention on Climate Change (UNFCCC) (signed on March 21, 1994). The Kyoto Protocol is a treaty made under the UNFCCC and was the first international agreement to regulate GHG emissions. It has been estimated that if the commitments outlined in the Kyoto Protocol are met, global GHG emissions could be reduced by an estimated 5 percent from 1990 levels during the first commitment period of 2008–2012. It should be noted that although the United States is a signatory to the Kyoto Protocol, Congress has not ratified the Protocol and the United States is not bound by the Protocol's commitments.

Climate Change Technology Program

The United States has opted for a voluntary and incentive-based approach toward emissions reductions in lieu of the Kyoto Protocol's mandatory framework. The Climate Change Technology Program (CCTP) is a multi-agency research and development coordination effort (which is led by the Secretaries of Energy and Commerce) that is charged with carrying out the President's National Climate Change Technology Initiative.[17]

U.S. Environmental Protection Agency (U.S. EPA)

To date, the U.S. EPA has not regulated GHGs under the Clean Air Act (discussed above) based on its assertion in *Massachusetts et al. v. EPA et al*[18] that the "Clean Air Act does not authorize it to issue mandatory regulations to address global climate change and that it would be unwise to regulate GHG emissions because a causal link between GHGs and the increase in global surface air temperatures has not been unequivocally established." However, in the same case (*Massachusetts v. EPA*), the U.S. Supreme Court held that the U.S. EPA can, and should, consider regulating motor-vehicle GHG emissions.

[16] Parmesan, C. and H. Galbraith, November 2004, *Observed Impacts of Global Climate Change in the U.S.,*.

[17] Climate Change Technology Program (CCTP), About the U.S. Climate Change Technology Program (web page), Washington, D.C., last updated April 2006, http://www.climatetechnology.gov/about/index.htm, accessed July 24, 2007.

[18] U.S. Supreme Court, *Massachusetts et. al. v. EPA et. al* (No. 05-1120, 415F 3d 50), April 2, 2007.

STATE OF CALIFORNIA

Senate Bill 97—Modification to the Public Resources Code

Pursuant to Senate Bill 97, the California Natural Resources Agency reviewed and adopted the amendments to the CEQA Guidelines on December 30, 2010 prepared and forwarded by the Governor's Office of Planning and Research (OPR). The Amendments became effective on March 18, 2010, including the addition of the GHG emissions environmental topic and checklist items.

AB 32 and the Air Resource Board's Climate Change Scoping Plan

In 2006, the governor of California signed AB 32, the Global Warming Solutions Act, into legislation. The Act requires that California cap its GHG emissions at 1990 levels by 2020.

In December 2008, ARB adopted its Climate Change Scoping Plan, which contains the main strategies California will implement to achieve reduction of approximately 169 million metric tons of CO_2e, or approximately 30% from the state's projected 2020 emission level of 596 million metric tons of CO_2e under a business-as-usual scenario (this is a reduction of 42 million metric tons CO_2e, or almost 10%, from 2002-2004 average emissions). The Scoping Plan also includes ARB-recommended GHG reductions for each emissions sector of the state's GHG inventory. The Scoping Plan calls for the largest reductions in GHG emissions to be achieved by implementing the following measures and standards:

- improved emissions standards for light-duty vehicles (estimated reductions of 31.7 million metric tons CO_2e);
- the Low-Carbon Fuel Standard (15.0 million metric tons CO_2e);
- energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems (26.3 million metric tons CO_2e); and
- a renewable portfolio standard for electricity production (21.3 million metric tons CO_2e).

ARB has not yet determined what amount of GHG reductions it recommends from local government operations; however, the Scoping Plan does state that land use planning and urban growth decisions will play an important role in the state's GHG reductions because local governments have primary authority to plan, zone, approve, and permit how land is developed to accommodate population growth and the changing needs of their jurisdictions (meanwhile, ARB is also developing an additional protocol for community emissions). ARB further acknowledges that decisions on how land is used will have large impacts on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emission sectors. The Scoping Plan states that the ultimate GHG reduction assignment to local government operations is to be determined (ARB 2008). With regard to land use planning, the Scoping Plan expects approximately 5.0 million metric tons CO2e will be achieved associated with implementation of SB 375, which is discussed further below.[19]

[19] Bay Area Air Quality Management District, May 2012, *California Environmental Quality Act Air Quality Guidelines,* Appendix C: Sample Air Quality Setting.

California Green Building Standards Code

The Green Building Standards Code (CALGreen), requiring all new buildings in the state to be more energy efficient and environmentally responsible, took effect on January 1, 2011. These comprehensive regulations are targeted to achieve major reductions in greenhouse gas emissions, energy consumption and water use to create a greener California.

CALGreen will require that every new building constructed in California:

- Reduce water consumption by 20 percent,
- Divert 50 percent of construction waste from landfills
- Install low pollutant-emitting materials
- Requires separate water meters for nonresidential buildings' indoor and outdoor water use
- Requires moisture-sensing irrigation systems for larger landscape projects
- Requires mandatory inspections of energy systems (e.g., heat furnace, air conditioner and mechanical equipment) for nonresidential buildings over 10,000 square feet to ensure that all are working at their maximum capacity and according to their design efficiencies.

Note that the previous City of Livermore Commercial and Residential Green Building Ordinance was repealed in favor of the CALGreen standards per ordinance 1925, as now incorporated into Livermore Municipal Code Chapter 15.26.

REGIONAL AND LOCAL

Bay Area Air Quality Management District

The Project site falls within the San Francisco Bay Area Air Basin and therefore under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). BAAQMD provides a document titled *California Environmental Quality Act Air Quality Guidelines* ("Guidelines"), which provides guidance for consideration by lead agencies, consultants, and other parties evaluating air quality impacts in the San Francisco Bay Area Air Basin conducted pursuant to CEQA. The document includes guidance on evaluating and mitigating greenhouse gas emissions impacts.

BAAQMD has recently updated these Guidelines in coordination with adoption of new thresholds of significance on June 2, 2010.[20] The most recent version of the Guidelines is dated May 2012. The updated CEQA Guidelines revised significance thresholds, assessment methodologies, and mitigation strategies for criteria pollutants, air toxics, odors, and greenhouse gas emissions.

City of Livermore Climate Change Element

In 2009, the Livermore City Council adopted the Climate Change Element of the Livermore General Plan, which includes a GHG inventory and policies to help reduce GHG emissions. The Climate Change Element is not a qualified GHG Reduction Strategy according to BAAQMD, but it forms the basis for development of the City's Climate Action Plan, which is ultimately intended to be adopted as a qualified GHG Reduction Strategy. Though the Climate Action Plan was not officially adopted by the

[20] Bay Area Air Quality Management District. June 2, 2010. News Release http://www.baaqmd.gov/~/media/Files/Communications%20and%20Outreach/Publications/News%20Releases/2010/ceqa_100602.ashx .

Livermore City Council at the time of this report, the measures included in this report align with the City's forthcoming Climate Action Plan.

The General Plan Climate Change Element includes Best Management Practices applicable to residential development projects with 50 or more units, such as the proposed Project, as discussed in more detail under the impact analysis below.

IMPACTS AND MITIGATION MEASURES

THRESHOLDS OF SIGNIFICANCE

Appendix G of the CEQA Guidelines (Environmental Checklist) contains a list of air quality effects that may be considered significant. Implementation of the Project would have a significant effect on the environment if it were to:

1. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment
2. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases

The CEQA Guidelines state that, where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the above determinations. BAAQMD updated their thresholds on June 2, 2010 and the BAAQMD Guidelines in May 2011, which have been used for this greenhouse gas emissions analysis, as detailed under each item below.

On March 5, 2012 the Alameda County Superior Court issued a judgment finding that BAAQMD had failed to comply with CEQA when it adopted its 2010 Thresholds. The court did not determine whether the Thresholds were valid on the merits, but found that the adoption of the Thresholds was a project under CEQA. The court issued a writ of mandate ordering BAAQMD to set aside the Thresholds and cease dissemination of them until BAAQMD had complied with CEQA.

This analysis is based upon these BAAQMD 2010 Thresholds. While it is possible to instead analyze the Project under BAAQMD's previous 1999 Thresholds, BAAQMD did not include GHG emissions thresholds in its 1999 Thresholds. No federal or state thresholds exist for GHG emissions yet the California Office of Planning and Research, in the updated CEQA Guidelines and a technical advisory[21], requires quantification of GHG emissions and a determination of significance. In the absence of other recommended thresholds, BAAQMD's 2010 GHG emissions thresholds are utilized in this analysis and the best available thresholds to provide a conservative analysis of potential impacts from GHG emissions. These thresholds are based upon current regulations, scientific understanding and methodologies and conform to the goals of AB32 and are therefore considered the most appropriate thresholds for a conservative CEQA analysis.

[21] OPR, Technical Advisory; CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review, June 19, 2008, available at: http://opr.ca.gov/docs/june08-ceqa.pdf.

GREENHOUSE GAS EMISSIONS

BAAQMD has determined that GHG emissions and global climate change represent cumulative impacts. No single project could generate enough GHG emissions to noticeably change the global average temperature, but the combination of GHG emissions from past, present, and future projects contribute substantially to the phenomenon of global climate change and its associated environmental impacts. In developing thresholds of significance for GHG emissions, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse GHG emissions impacts.[22]

BAAQMD provides two alternative quantitative thresholds, a brightline threshold of 1,100 metric tons of CO_2e per year to assess smaller projects or an efficiency-based threshold of 4.6 metric tons CO_2e per Service Population (SP) per year for larger projects. BAAQMD defines the SP as the number of residents and employees generated by the project. In this case, the number of residents is 218 (see Chapter 15 for additional details). Therefore, the Project is small enough that the brightline threshold is the larger of the two and the Project is assessed against the brightline threshold of 1,100 metric tons of CO_2e per year for this analysis.

Impact GHG-1: **Increased GHG Emissions.** Construction and operation of the proposed Project would be additional sources of GHG emissions, primarily through consumption of fuel for transportation and energy usage on an ongoing basis. This is a ***potentially significant*** impact.

Construction-period and operational emissions are discussed separately in more detail below.

Construction Period

BAAQMD does not have an adopted threshold of significance for construction-related GHG emissions, though recommends quantification using URBEMIS for proposed land use development projects and a determination regarding significance in relation to meeting AB 32 goals. Though construction-period emissions would be temporary only, BAAQMD's operational GHG emissions threshold of more than 1,100 metric tons per year of CO_2e is used as a conservative construction-period threshold of significance for the construction-period analysis.[23]

Temporary construction-related exhaust would be an additional source of GHG emissions that could contribute to regional greenhouse gas emissions. Sources of construction-related GHGs only include exhaust, for which the CO_2 emissions have been calculated using the URBEMIS2007 model with the same inputs used to calculate emissions of air pollutants and precursors (included in Appendix B). Construction-period CO_2e would total 1,269 metric tons[24] over an approximately three year period, resulting in approximately 423 metric tons CO_2e per year. This level of emissions is well below the threshold of significance of 1,100 metric tons per year and the impact would be less than significant.

[22] Bay Area Air Quality Management District, May 2011, *California Environmental Quality Act Air Quality Guidelines*, p. 2-1.

[23] Ibid, p. 8-7.

[24] URBEMIS short tons of CO_2 output was converted to CO_2e using a conversion factor of 100/95 (the general ratio of CO_2e from other GHGs relative to that from CO_2 emissions for exhaust) and to metric tons using the standard conversion factor of 0.907.

Operational Period

As discussed above, as a relatively small residential project, the Project would have a significant environmental impact if it would exceed BAAQMD's brightline GHG emissions threshold of 1,100 metric tons of CO_2e per year.

The Project's direct emissions refer to emissions produced from mobile sources (vehicles) and area sources such as natural gas used on-site for heating. Direct CO_2 emissions have been calculated using the URBEMIS2007 model, the inputs and results of which can be found in Appendix B. The BAAQMD GHG Model (BGM) was used to estimate the Project's carbon dioxide equivalent (CO_2e) emissions from direct and indirect emission sources, using the URBEMIS CO_2 emission results as an input using the base year of 2016, the anticipated completion of the Project. BAAQMD developed this model to calculate GHG emissions not included in URBEMIS, such as indirect emissions from electricity use and waste. The BGM also adjusts for state regulations not included in URBEMIS, specifically California's low carbon fuel rules, designed to increase the use of alternative fuels, and Pavley regulations, which regulate emissions from new passenger vehicles. A summary of the results are included in **Table 10.1** and the calculation sheets can be found in Appendix B. The only mitigation applied to the BGM was application of the City's 64% solid waste diversion rate due to composting and recycling efforts (see Chapter 17 for additional details).

TABLE 10.1: ANNUAL OPERATIONAL GHG EMISSIONS

Emissions Source	Proposed Project CO_2e (metric tons/year)
Transportation:	796.29
Area Source:	1.01
Electricity:	94.76
Natural Gas:	200.16
Water & Wastewater:	14.68
Solid Waste:	109.35
Total:	1,216.26

Source: Lamphier-Gregory results from BAAQMD's Greenhouse Gas Calculator v. 1.1.9 Beta available at http://www.urbemis.com/software/download.html.

Operation of the Project as proposed would result in the generation of GHG emissions of approximately 1,216.26 metric tons CO_2e per year. This is above the BAAQMD threshold of 1,100.00 metric tons CO_2e per year and would therefore be a significant impact.

GHG emissions can be reduced below significance levels through incorporation of the following mitigation.

Mitigation Measure

GHG-1: **Increased Energy Efficiency.** The Project shall demonstrate proposed energy efficiency at least 16% greater than Title 24 requirements prior to issuance of building permits.

Title 24 provides a performance path to compliance that sets a desired energy budget for the whole building to allow building designers the flexibility to choose how to cost-effectively satisfy the requirement through design decisions and by incorporating available energy-saving technologies.

With incorporation of Mitigation Measure GHG-1, the CO2e emissions resulting from electricity and natural gas usage would be reduced to 79.60 and 168.14 metric tons per year resulting in total annual operational emissions of 1,099.08 metric tons per year, below the threshold of 1,100.

Mitigation Measure GHG-1 would ensure that building energy efficiency exceeds the minimum requirements of Title 24 and reduces the impact of GHG emissions to levels that are ***less than significant*** with mitigation.

CONSISTENCY WITH GHG REDUCTION PLANS

As discussed in the setting above, the City has not yet adopted a qualified GHG Reduction Strategy, so consistency with such a plan cannot be analyzed. A Climate Action Plan that is intended to fulfill this role is currently being prepared, but is not yet adopted or available. In the interim, the Project can be assessed against the City's General Plan Climate Change Element.

Impact GHG-2: **Compliance with Livermore Climate Change Element.** The Project plans are not detailed enough at this stage to determine consistency with best management practices included in the Climate Change Element of the Livermore General Plan. This is a ***potentially significant*** impact.

The Climate Change Element largely includes policies intended to be implemented on a City-wide level or for City properties and processes. However, for all new developments of 50 residential units or greater, initial best management practices (BMPs) are presented to be utilized until completion of the Climate Action Plan, as outlined in mitigation measure GHG-2, below.

Mitigation Measure GHG-2: **GHG Emissions Reduction Best Management Practices (BMPs).** The Project shall demonstrate proposed compliance with City of Livermore General Plan Climate Change Element BMPs prior to issuance of building permits, including the following. If the City's Climate Action Plan is approved prior to issuance of permits, requirements of the Climate Action Plan can be substituted for the BMPs below.

- Climate BMP No. 1 – Energy-efficient buildings in compliance with the Livermore Green Building Ordinance.
- Climate BMP No. 2 – Use of energy-efficient appliances that meet Energy Star standards.
- Climate BMP No. 3 – Incorporate solar roofs into commercial development. Residential development to be "solar-ready" including proper solar orientation (south facing roof area sloped at 20° to 55° from the horizontal),clear access on the south sloped roof (no chimneys, heating vents, plumbing vents, etc.), electrical conduit installed for solar electric system wiring, plumbing installed for solar hot water system, and space provided for a solar hot water storage tank.
- Climate BMP No. 4 – Incorporate transit and bicycle/pedestrian connections into development.
- Climate BMP No. 5 – has been omitted as it applies only to Commercial/Industrial projects.

- Climate BMP No. 6 – has been omitted as it applies to parking lots and structures.
- Climate BMP No. 7 – In compliance with the Construction and Demolition Ordinance, recycle construction materials and divert construction waste from disposal as feasible.
- Climate BMP No. 8 – Include recycling facilities to provide for commercial and/or community recycling of plastic, paper, green waste, and food waste.
- Climate BMP No. 9 –Incorporate "heat island" treatments including cool roofs, cool pavements, and strategically placed shade trees.
- Climate BMP No. 10 –Use landscaping that meets the City's *Water Efficient Landscape Ordinance.*

It is anticipated the Project will be found to comply with the above BMPs, as discussed below:

Climate BMP No. 1 – Energy-efficient buildings in compliance with the Livermore Green Building Ordinance.

The proposed Project will be in compliance with the Livermore Green Building Standards (Municipal Code Chapter 15.26).

Climate BMP No. 2 – Use of energy-efficient appliances that meet Energy Star standards.

The proposed Project will use energy-efficient appliances that meet Energy Star standards.

Climate BMP No. 3 – Incorporate solar roofs into commercial development. Residential development to be "solar-ready" including proper solar orientation (south facing roof area sloped at 20° to 55° from the horizontal),clear access on the south sloped roof (no chimneys, heating vents, plumbing vents, etc.), electrical conduit installed for solar electric system wiring, plumbing installed for solar hot water system, and space provided for a solar hot water storage tank.

The proposed Project will include "solar ready" homes where feasible. Due to site constraints, not all lots will be properly oriented.

Climate BMP No. 4 – Incorporate transit and bicycle/pedestrian connections into development.

The site plan includes roadway and bicycle/pedestrian connections to residential development on the south and east. The site is not adjacent to transit routes and connection to the north and west are not available due to sensitive habitat.

Climate BMP No. 7 – In compliance with the Construction and Demolition Ordinance, recycle construction materials and divert construction waste from disposal as feasible.

The Project site is currently vacant, so there will be no demolition waste. Construction materials will be reduced at least 50% per the City's Green Building Standards Code (Municipal Code Section 15.26.090).

Climate BMP No. 8 – Include recycling facilities to provide for commercial and/or community recycling of plastic, paper, green waste, and food waste.

Livermore Sanitation residential service for single-family homes includes curb pick-up of organics and recyclables.

Climate BMP No. 9 –Incorporate "heat island" treatments including cool roofs, cool pavements, and strategically placed shade trees.

Heat island effects are more associated with larger paved areas and buildings than with single-family home development, which already includes permeable yard spaces and private landscaping. Consideration will be given to incorporation of cool roofs and cool pavements.

Climate BMP No. 10 –Use landscaping that meets the City's *Water Efficient Landscape Ordinance.*

Landscaping shall meet the City's Water Efficient Landscape Ordinance (Municipal Code Chapter 13.25).

With incorporation of Mitigation Measure GHG-2, the Project would be consistent with applicable GHG emissions reduction BMPs under the City's General Plan. The impact related to potential inconsistency with a GHG reduction plan would be reduced to ***less than significant***. (See the Air Quality section for a related analysis of the Project's consistency with the Clean Air Plan and Ozone Strategy related to criteria air pollutants.)

This page intentionally left blank

11

HAZARDOUS MATERIALS

INTRODUCTION

A hazardous material is a substance or combination of substances which, because of its quantity, concentration, or physical, chemical or infectious characteristics, may pose a substantial present or potential hazard to human health and safety, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

This chapter utilizes information from the following reports prepared for this Project or analysis:

Phase I Environmental Site Assessment Report, for the Proposed Garaventa Hills Estates, Livermore, California, prepared for the applicant by ENGEO, Incorporated, dated November 10, 2010 and included in Appendix F.

Geologic Review and Reconnaissance Regarding Oils Naturally Occurring Near Surface Hydrocarbons, prepared for the applicant by ENGEO, Incorporated, dated May 7, 2012 and included in Appendix F.

Response to Comments Regarding Naturally Occurring Near-Surface Hydrocarbons, prepared for the applicant by ENGEO, Incorporated, dated June 28, 2012 and included in Appendix F.

KNOWN CONCERNS

At the scoping meeting on December 7, 2011, a community member noted a history of oil seeps in the vicinity that have required extensive clean-up. This was taken into account in this analysis.

ENVIRONMENTAL SETTING

SITE USE HISTORY

Historical USGS topographic maps were reviewed for the Environmental Site Assessment to determine if discernible changes in topography or improvements pertaining to the Property had been recorded. The maps reflect site conditions in the years from 1907 through 1981, all of which show the Property as undeveloped.

In addition, aerial photographs taken during the period 1940 to 2005 were reviewed for information regarding past conditions and land use at the Property and in the immediate vicinity. The photographs show the Property as undeveloped. Sporadic rural residential parcels are shown adjacent to a road in the approximate current location of Laughlin Road, and residential homes are shown in the 1998 through 2005 maps. Interstate 580 is shown south of the Property in the 1958 through 2005 photos.

Current Site Use and Potential Contamination

The Environmental Site Assessment included a search of federal, tribal, state, and local databases regarding the Property and nearby properties to identify any known cases of environmental hazards or regulatory action within a 1½ mile radius of the Project site. The record search found nothing of concern within the radius search criteria. The ESA also included a site reconnaissance of the Property for the possibility of hazardous materials storage, surface staining or discoloration, debris, stressed vegetation, or other conditions that may be indicative of potential sources of soil or groundwater contamination. The site was also checked for evidence of fill/ventilation pipes, ground subsidence, or other evidence of existing or preexisting underground storage tanks. The site reconnaissance found no permanent structures on the Property, no hazardous substances, no storage tanks, no odors, no pools of potentially hazardous liquid, no drums or other hazardous substances. The site reconnaissance also noted no wells or septic systems on the Property.

The reconnaissance and records research did not find documentation or physical evidence of soil or groundwater impairments associated with the current or past use of the Property. A review of regulatory databases maintained by county, state and federal agencies found no documentation of hazardous materials violations or discharge on the Property. No documented soil and groundwater contamination associated with parcels near the Property was found from the records research. The Executive Summary of the Environmental Site Assessment concludes by stating that no further environmental studies are recommended.

Oil Seeps in the Vicinity

An oil seep was previously identified on the property adjacent to the Project site to the east, the Bear Creek Development. **Figure 11.1** shows the oil seep and test locations.

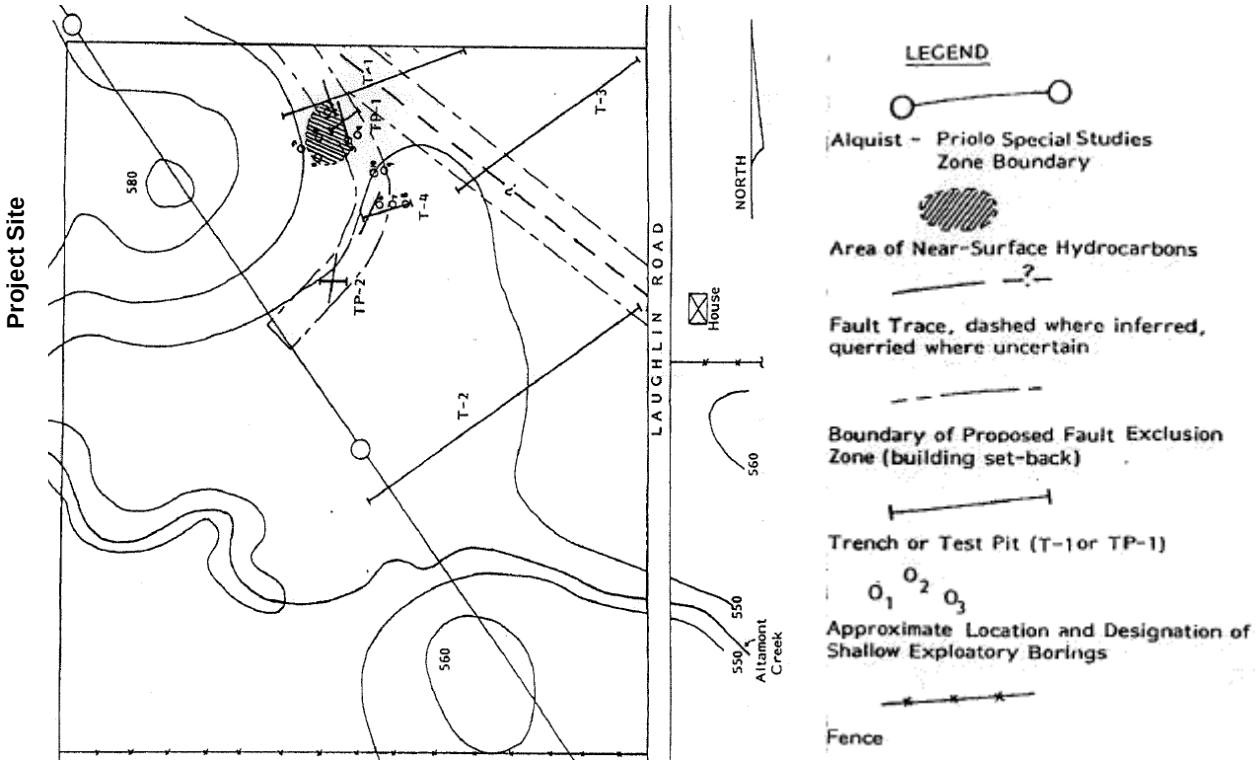


Figure 11.1: Location of Oil Seep on Adjacent Property

Source: Geologic and Seismic Hazards Investigation for adjacent property, BSK & Associates, Job No. P88138, April 1989. Provided by ENGEO. "Project Site" note added.

It is thought that the oil seeps present at the Bear Creek Development site are related to the interaction between the movement of the naturally-occurring oil deposits in the geologic strata (oil-bearing Greenville Sands) and the seasonally-fluctuating groundwater table beneath the site. This interaction causes the oil, which is lighter than water to be pushed up by seasonally rising groundwater levels. Based on trenching and test pits analyzed at the adjacent site (shown in Figure 11.1), the oil seepage seems to be very localized.

Based on review of soil characteristics, ENGEO concluded that the geologic structure is not continuous from the Bear Creek site oil seep to the Project site and that therefore, it is unlikely that there are oil-bearing Greenville Sands near-surface at the Project site. Supporting this conclusion, no evidence of near-surface oil or seepage was found at the Project site through site reconnaissance, surface borings, or deeper borings (down to 62 feet) performed at the Project site by ENGEO. However, oil seeps did not become apparent until five years after construction of the Bear Creek Development. Therefore, oil seeps may be expected to move laterally within one mile of the identified location or to rise to the surface within the next 5-10 years.

REGULATORY SETTING

FEDERAL AND STATE LEVEL

United States Environmental Protection Agency

The chief environmental regulator at the federal level is the United States Environmental Protection Agency (EPA), Region IX for Northern California. In California the department of Toxic Substances Control is chiefly responsible for regulating the safe, handling, use, and disposal of toxic materials in the state of California, while the State Water Resources Control Board regulates discharge of potentially hazardous materials into waterways and aquifers. Programs intended to protect workers from exposure to hazardous materials and from accidental upset are covered under the Occupational Health and Safety Administration (OSHA) at the federal level and at the state level through the California Department of Occupational Safety and Health (CAL/OSHA), as well as through the California Department of Health Services (DHS).

Resource Conservation and Recovery Act

The RCRA is the United States primary law governing the handling and disposal of solid hazardous waste. The RCRA is actually an amendment, made in 1976, to the solid waste disposal act of 1965, but the amendments were so comprehensive that it is generally referred to as a new act. The RCRA defines solid and hazardous waste, authorizes the Environmental Protection Agency (EPA) to set standards for facilities that generate or manage hazardous waste, and establishes a permit program for hazardous waste treatment, storage, and disposal facilities. The RCRA was last re-authorized by the Hazardous and Solid Waste Amendments of 1984. The authorization for appropriations under the Act expired September 30, 1988, but funding for the EPA's programs in this area has continued; the Act's other authorities do not expire.[1]

[1] McCarthy, J and Tiemann, M, Congressional Research Service Report RL30032 – Solid Waste Disposal Act/Resource Conservation and Recovery Act, National Council for Science and the Environment, obtained from http://www.cnie.org/NLE/CRSreports/BriefingBooks/Laws/h.cfm

Department of Transportation

Transportation of hazardous materials on the highways is regulated through the Federal Department of Transportation (DOT) and the California Department of Transportation (Caltrans). This includes a system of placards, labels, and shipping papers required to identify the hazards of shipping each class of hazardous materials. Existing federal and state laws address risks associated with the transport of hazardous materials. These laws include regulations outlined in the Hazardous Materials Transportation Act administered by the DOT. Caltrans is mandated to implement the regulations established by the DOT, which is published as the Federal Code of Regulations, Title 49, commonly referred to as 49 CFR. The California Highway Patrol (CHP) enforces these regulations. Regulations of hazardous materials and wastes include the manufacture of packaging and transport containers; packing and repacking; labeling; marking or placarding; handling; spill reporting; routing of transports; training of transport personnel; and registration of highly hazardous material transport.

State Water Resource Control Board

The State Water Resource Control Board (SWRCB) was created by the state legislature in 1967, with the joint authority of water allocation and water quality protection. The SWRCB runs Geo Tracker, a database of environmentally regulated facilities in California. Within the State of California there are nine regional water quality control boards. The mission of the regional boards is to develop and enforce water quality objectives and implementation plans that will best protect the state's waters, recognizing local differences in climate, topography, geology and hydrology. The City of San Carlos is under the purview of the San Francisco Bay Area Regional Water Quality Control Board.

Alameda County Department of Environmental Health

The Alameda County Department of Environmental Health (ACDEH) Certified Unified Program Agency (CUPA) is the administrative agency that coordinates and enforces numerous local, state, and federal hazardous materials management and environmental protection programs in Alameda County. The CUPA administers the following programs:

- Hazardous Materials Business Plan Program
- Hazardous Waste Generator Program
- Underground Storage Tank Program
- California Accidental Release Program
- Tiered Permitting Program
- Aboveground Storage Tank Program

The Department's mission is to ensure a safe and healthful environment through education, monitoring and enforcement of regulatory programs as well as ongoing services to the community.

As indicated below, hazardous waste programs in Livermore are the primary responsibility of the Livermore-Pleasanton Fire Department. However, hazardous waste programs are also governed by the Alameda County Hazardous Waste Management Plan. The purpose of the Alameda County Hazardous Waste Management Plan is to forecast the potential future waste generation in the County, to encourage an aggressive waste reduction strategy, and to establish acceptable siting criteria.

Livermore-Pleasanton Fire Department

The Hazardous Materials Division of the Livermore-Pleasanton Fire Department (LPFD) has primary responsibility for enforcing most regulations pertaining to hazardous materials in the City of Livermore. The LPFD also acts as first responder to hazardous materials incidents within the City.

IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The following thresholds for measuring a project's environmental impacts are based upon CEQA Guidelines thresholds:

1. Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?
2. Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?
3. Would the project produce hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?
4. Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?
5. Would the project be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport? Would the Project result in a safety hazard for people residing or working in the Project area?
6. For a project within the vicinity of a private airstrip, would the Project result in a safety hazard for people residing or working in the Project area?
7. Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?
8. Would the project expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

ROUTINE TRANSPORT, USE, AND DISPOSAL OF HAZARDOUS MATERIALS

Impact Haz-1: **Routine transportation, use or disposal of hazardous materials.** Construction activities routinely utilize fuels and oils in construction equipment that may be considered hazardous and residential operations do not generally utilize substantial amounts of hazardous materials. Compliance with applicable regulations would ensure that the impact is ***less than significant***.

The proposed Project entails site grading, trenching for the installation of underground utilities, street paving and future construction of 76 single family residences. It is likely that equipment used at the site during construction activities could utilize substances considered by regulatory bodies as hazardous, such as diesel fuel and gasoline. However, all construction activities would be required to conform to Title 49 of the Code of Federal Regulations, US Department of Transportation (DOT), State of California, and local laws, ordinances and procedures.

Residential uses do not generally utilize substantial amounts of hazardous materials. If hazardous materials are stored and/or used on site, the users would be required to conform to applicable regulations. Project operations are not anticipated to create a significant hazard to the public or environment through the routine transport, use or disposal of hazardous materials.

With conformance to applicable regulations regarding routine use and transport of hazardous materials, the impact of the Project would be less than significant.

HAZARDOUS MATERIALS EMISSIONS OR HANDLING NEAR SCHOOL

There are two K-5 elementary schools and one middle school within one-half mile of the Project site. Altamont Creek Elementary (K-5), located at 6500 Garaventa Ranch Road, is directly south of the Project site and only 300 feet away. Leo Croce Elementary (K-5) is located at 5650 Scenic Avenue, and Christensen Middle School, at 5757 Haggin Oaks Avenue, are both approximately ½ mile to the southwest and west, respectively.

The proposed residential development would not be considered one that generates hazardous emissions or handles hazardous materials and construction-period hazardous materials usage would be limited and follow applicable regulations (see above). There would be ***no impact*** related to hazardous materials near a school.

Potential hazards related to air emissions are discussed separately in Chapter 6.

HAZARDOUS MATERIALS ON THE SITE

Impact Haz-2: **Oil Seepage Possibility.** Because there are oil seepage issues on a nearby site, it is possible, though unlikely, that near-surface oil could exist on the Project site. The possibility of future oil seepage from near-surface oil is a ***potentially significant impact***.

The Environmental Site Assessment referenced previously found no documentation or physical evidence of soil or groundwater impairments associated with the use of the Property. A review of regulatory databases maintained by county, state, and federal agencies found no documentation of hazardous materials violations or discharge on the Property. A review of regulatory agency records and available databases did not identify contaminated facilities within the appropriate ASTM search distances that would be expected to impact the Property.

However, there is a known issue with oil seepage on a nearby site, as discussed in the setting. While reconnaissance and testing at the Project site has shown no evidence of oil near the surface, it is possible, though considered unlikely, that the oil is there but hasn't been discovered through the testing. The following Mitigation Measure is recommended to address this possibility:

Mitigation Measure

Haz-2: **Confirm Absence of Near Surface Oil or Implement Overexcavation.** The absence of naturally occurring oil should be confirmed during grading of the site. If oil is encountered during grading, the following overexcavation shall be implemented:

- The area where naturally occurring near surface oil is encountered shall be overexcavated a minimum of 10 feet below proposed finish grade and replaced with engineered fill. This will provide a low permeable fill cap to prevent the upward migration of oil.

- Where proposed storm drain lines cross areas where naturally occurring near surface oil is encountered, the area shall be overexcavated a minimum of 5 feet beyond the outside diameter of the proposed storm drain line. The excavation should be backfilled with engineered fill and the storm drain line trenched through the fill. The storm drain trench within the previously overexcavated and backfilled area should be lined with 20 mil visqueen prior to placement of shading and the storm drain line.
- In every case the utility lines shall be designed to be airtight to prevent potential oil from entering the utility lines.
- Any stormwater underdrains shall be shallow or eliminated in areas of potential oil seepage.
- If oil is encountered then an oil/water separator shall be installed to treat stormwater prior to entering the creek.
- A Community Facilities District, or other funding mechanism approved by the City, shall be formed in order to fund remedies to public infrastructure and utilities in the event oil seepage occurs after construction of the Project.

The absence of near-surface oils will be confirmed during grading through implementation of mitigation measure **Haz-2**, or in the unlikely event that oil is encountered, the affected area(s) will be overexcavated and backfilled to prevent seepage issues. Implementation of this measure will reduce the potential impact of near-surface oil to a ***less than significant*** level.

SAFETY HAZARDS DUE TO NEARBY AIRPORT OR AIRSTRIP

The Project site is located more than six miles northeast from the Livermore Municipal Airport and is outside its Airport Influence Area.[2] No formal review by the ALUC for safety concerns would be required and there is ***no impact*** related to airport hazards.

CONFLICT WITH EMERGENCY RESPONSE PLAN OR EMERGENCY EVACUATION PLAN

The Project proposes no substantive changes to the surrounding circulation and would not cause substantial traffic delays, which could otherwise slow emergency response. Therefore, the Project would have ***no impact*** relating to an adopted emergency response plan. See additional detail in Chapter 16: Transportation and Circulation.

EXPOSURE OF PEOPLE OR STRUCTURES TO WILDLAND FIRES

Impact Haz-3: **Construction at a Wildland-Urban Interface.** Wildland fire hazard is considered moderate in the undeveloped portions of Livermore and the surrounding area. Compliance with the Wildland-Urban Interface Code, as required during design review, would ensure that the impact is ***less than significant***.

Livermore's long dry summers in combination with rugged topography and flammable vegetation represent a risk of wildland fire hazards. The California Department of Forestry has determined the

[2] Alameda County Airport Land Use Commission, prepared by ESA, Livermore Municipal Airport: Draft Airport Land Use Compatibility Plan, December 2011, Figure 3-1.

wildfire risk on the undeveloped properties adjacent to the Project site to be moderate, similar to the risk throughout the area.[3, 4]

Recognizing this risk, the City of Livermore requires review of all proposed development in wildland-urban interface areas for conformity with the Wildland-Urban Interface Code in coordination with the Livermore-Pleasanton Fire Department. The Wildland-Urban Interface Code requires the use of defensible space around homes and use of fire-retardant materials.

Given that the surrounding area is only considered to have a moderate risk for wildland fire and is not identified as a high wildland fire severity zone, it is anticipated that the Project as proposed can be found to be compliance with Wildland-Urban Interface Code requirements during design review. Therefore, the impact related to wildland fires is ***less than significant*** with conformance with applicable regulations.

[3] City of Livermore, prepared by DC&E, City of Livermore General Plan 2003-2025, Adopted February 2004, as amended through June 2009, pp. 10-24 to 10-26.

[4] California Department of Forestry and Fire Protection, Fire Hazard Severity Zones in SRA, Alameda County, adopted November 7, 2007, available at: http://frap.cdf.ca.gov/webdata/maps/alameda/fhszs_map.1.pdf

12

HYDROLOGY

INTRODUCTION

This chapter utilizes information from the following reports prepared for this Project or analysis:

Preliminary Geotechnical Recommendations Report: Proposed Garaventa Hills Estates, Livermore, California, prepared for the applicant by ENGEO Incorporated and dated November 30, 2010 and included as Appendix E.

Hydraulic Summary of the Proposed Hawk Street Bridge over Altamont Creek, prepared for the applicant by WRECO and dated January 9, 2012 and included as Appendix G.

Preliminary Stormwater Treatment Plan and Details, prepared for the applicant by RJA and dated September 16, 2011 and included in Appendix G.

Bay Area Hydrology Model Project Report, prepared for the applicant by RJA and dated 11/8/2010 and included in Appendix G.

Evaluation of Potential Hydrological Impacts to Garaventa Wetlands, prepared by ENGEO for this environmental analysis, dated March 7, 2012. (Included in Appendix G)

ENVIRONMENTAL SETTING

The Project site is located in the City of Livermore. The regional climate is characterized by hot, dry summers and moist, mild to cool winters. Over 82 percent of the total annual precipitation occurs during the months of November through March with an average annual precipitation of just over 14 inches. Average daily temperatures range from highs in July and August in the high 80s (degrees Fahrenheit) and lows in December and January in the mid-50s.[1]

The area consists of shallow soils on top of sandstone creating relatively impervious hydrologic surface conditions, which facilitates a rapid response time and minimal infiltration. Precipitation falling on the site drains quickly in the form of surface flows and is not stored onsite for any significant amount of time.[2]

The site is generally hilly with downslopes that radiate from the hilltops within the approximate center of the site. Site elevations range from approximately 607 feet above mean sea level at the top of the

[1] Western Regional Climate Center, Period of Record Monthly Climate Summary for Weather Station: Livermore, California (044997), through 11/30/2011, available at: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca4997

[2] ENGEO, March 7, 2012, Evaluation of Potential Hydrological Impacts to Garaventa Wetlands, page 2.

southeastern hill to approximately 539 feet at the southwestern corner of the property. The depth to groundwater was recorded as approximately 10.5 feet to 6 feet below existing grade at the northeastern portion of the site and not encountered in other test borings. Fluctuations in groundwater level should be expected to occur over time due to precipitation, changes in drainage patterns, and/or irrigation.[3]

REGULATORY SETTING

The proposed Project must be constructed in accordance with several regulatory programs, laws, and regulations that aim to protect surface water resources. In some cases, Federal laws are administered and enforced by state and local government. In other cases, state and local regulations in California are stricter than those imposed by Federal law. This section summarizes relevant regulatory programs, laws, and regulations with respect to hydrology and water quality and how they relate to the proposed Project.

FEDERAL LAWS AND REGULATIONS

Clean Water Act

The Clean Water Act (CWA) was enacted by Congress in 1972 and amended several times since inception. It is the primary federal law regulating water quality in the United States, and forms the basis for several state and local laws throughout the country. Its objective is to reduce or eliminate water pollution in the nation's rivers, streams, lakes, and coastal waters. The CWA prescribed the basic federal laws for regulating discharges of pollutants as well as set minimum water quality standards for all waters of the United States. Several mechanisms are employed to control domestic, industrial, and agricultural pollution under the CWA. At the Federal level, the U.S. Environmental Protection Agency (EPA) administers the CWA. At the state and regional level, the CWA is administered and enforced by the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCB). The State of California has developed a number of water quality laws, rules, and regulations, in part to assist in the implementation of the CWA and related federally mandated water quality requirements. In many cases, the Federal requirements set minimum standards and policies and the laws, rules, and regulations adopted by the State and Regional Boards exceed them.

Federal Emergency Management Agency (FEMA)

FEMA is the Federal agency responsible for administration of the National Flood Insurance Program (NFIP). They oversee the hydrologic and hydraulic analysis that determines the magnitude of the flood risk in communities throughout the United States. Those analyses, performed under FEMA guidelines by private engineering firms and Federal, State and loval agencies, are based on standard engineering practices and yield the flood risk information showm on the NFIP maps.

The City of Livermore participates in the NFIP and has adopted floodplain management regulations that are aimed at reducing future flood losses and that meet the minimum standard of the NFIP.

FEMA recognizes that NFIP maps require changes from time to time as a result of anticipated development, floodplain and watershed changes, flood control or mitigation efforts, or updated assessments of flood risk. The City of Livermore is the designated local NFIP Administrator and enforces NFIP regulations.

[3] Preliminary Geotechnical Recommendations Report: Proposed Garaventa Hills Estates, Livermore, California, ENGEO Incorporated, November 30, 2010.

STATE LAWS AND REGULATIONS

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act established the SWRCB and the RWQCB as the principal state agencies having primary responsibility for coordinating and controlling water quality and water supply in California. The Porter-Cologne Act established the responsibility of the RWQCB for adopting, implementing, and enforcing water quality control plans (Basin Plans), which set forth the water quality standards of the state (i.e. beneficial uses of surface waters and groundwater) and the objectives or criteria necessary to protect those beneficial uses. The NPDES permits that are issued to each local jurisdiction must be consistent with the Basin Plans.

NPDES Permit Requirements

The CWA has nationally regulated the discharge of pollutants to the waters of the U.S. from any point source since 1972. In 1987, amendments to the CWA added section 402(p), which established a framework for regulating non-point source (NPS) storm water discharges under the National Pollutant Discharge Elimination System (NPDES). Under the program, the Project applicant will be required to comply with two NPDES permit requirements.

The NPDES General Construction Permit Requirements apply to clearing, grading, and disturbances to the ground such as excavation. The Project applicant is required to submit a Notice of Intent (NOI) with the State Water Resource Control Board's (SWRCB) Division of Water Quality. The NOI includes general information on the types of construction activities that will occur on the site. The applicant will also be required to submit a site-specific plan called the Stormwater Pollution Prevention Plan (SWPPP) for construction activities. The SWPPP will include a description of Best Management Practices (BMPs) to minimize the discharge of pollutants from the site during construction as well as appropriate monitoring, sampling and reporting.[4] It is the responsibility of the property owner to obtain coverage under the permit prior to site construction.

Provision C.3 of the City's General Discharge Permit (now called the Municipal Regional Permit or MRP) requires the quality and flow of stormwater and stormwater pollutants to be controlled from new development sites. This is implemented through local regulations, discussed below.

Sea Level Rise and Executive Order S-13-08

In November 2008, Governor Arnold Schwarzenegger issued Executive Order S-13-08. The order indicates that future potential sea level rise associated with climate change may have a substantial effect on coastal development, and provided for the formation of an independent panel to complete a California Sea Level Rise Assessment Report by December 1, 2010. This panel, the California Adaptation Advisory Panel to the State of California, published the required report in November 2010 titled *Preparing for the Effects of Climate Change – A Strategy for California*.[5] This study notes that the State has requested an assessment of defensible sea level rise projections for the West Coast from the National Research Council, but that this study has not yet been completed.

[4] California EPA, State Water Resources Board, Construction General Permit Fact Sheet, September 2009, as modified. http://www.swrcb.ca.gov/water_issues/programs/stormwater/constpermits.shtml

[5] California Adaptation Advisory Panel to the State of California, prepared by Pacific Council, *Preparing for the Effects of Climate Change – A Strategy for California*, November 2010.

In the interim, BCDC has proposed Bay Plan amendment language, which includes guidance for addressing future sea level rise scenarios associated with planning and permitting development in potentially susceptible areas in the San Francisco Bay Area. These scenarios are:

• sea level rise of 16 inches by 2050; and

• sea level rise of 55 inches by 2100.

These values represent the upper end of the range of sea level rise estimates and are consistent with preliminary state recommendations for 100-year sea level rise. These values are meant to ensure that projects take these potentially high estimates into account when planning infrastructure and development projects, prior to the release of official sea level rise projections.

LOCAL REGULATIONS

Zone 7, Alameda County Flood Control & Water Conservation District

The Project lies in the jurisdiction of Zone 7, Alameda County Flood Control & Water Conservation District (Zone 7). Zone 7 is a Special District, created by State legislation, encompassing eastern Alameda County to provide a mechanism to finance flood control projects in the eastern Alameda County area. The legislation requires that a flood control zone be formed over an entire watershed and a proposed funding source be determined before a flood control project is undertaken. Recent changes in the State Constitution require an election if a flood control zone is to be financed with property assessments or taxes. (Note: The County of Alameda Community Development Agency and Alameda County Flood Control District have land use jurisdiction and regulatory power over unincorporated Alameda County).

Alameda Countywide Clean Water Program

To comply with the Clean Water Act, the city of Livermore has joined with 15 other jurisdictions in Alameda County to form the Alameda Countywide Clean Water Program (ACCWP) in an effort to coordinate and implement local programs throughout the country to minimize and prevent urban runoff pollution. ACCWP holds a joint municipal regional NPDES permit from the San Francisco Bay RWQCB (permit no. CAS612008). The permit includes a comprehensive plan to reduce the discharge of pollutants to creeks, San Francisco Bay, and the ocean to the maximum extent possible.

San Francisco Bay Water Quality Control Plan (Basin Plan)

The San Francisco Bay RWQCB is responsible for the development, adoption, and implementation of the Water Quality Control Plan for the San Francisco Bay region. The Basin Plan is the master policy document that contains descriptions of the legal, technical, and programmatic bases of water quality regulation in the San Francisco Bay Region.

The Basin Plan defines beneficial uses for surface waters and groundwater in its corresponding jurisdiction. The beneficial uses of groundwater in the Livermore Valley include municipal and domestic supply, industrial process supply, industrial supply, and agricultural supply.[6]

[6] California Regional Water Quality Control Board, San Francisco Bay Region, San Francisco Bay Basin (region 2) Water Quality Control Plan (Basin Plan), as amended through December 31, 2010, Table 2-2.

City of Livermore

As the designated NFIP administrator, the City enforces community floodplain regulations. Revisions to the NFIP maps and/or proposed improvements that impact the floodplain would require the approval of a Letter of Map Change, which include Letters of Map Revision (LOMR), Letters of Map Amendment (LOMA) and Conditional Letters of Map Revision (CLOMR).

Livermore Municipal Code

The Municipal Code contains water-efficient landscaping design guidelines, grading and excavation guidelines, stream development and maintenance provisions, and flood damage prevention guidelines. Under the Municipal Code, no development shall occur without full compliance with the terms set forth in the Municipal Code and other applicable regulations. Additionally, developers must submit a copy of the Notice of Intent to the City for approval before issuance of grading permits.

A summary of pertinent water quality codes and provisions are listed below.

Water Efficient Landscape: 13.25.050 Submittal requirements. A. For projects subject to the provisions of this chapter, the property owner or property owner's authorized agent must submit a landscape design documentation package meeting the requirements of subsection B of this section prior to issuance of a permit and a landscape installation certification package meeting the requirements of subsection C of this section following landscape installation.

B. Landscape Design Documentation Package. The property owner shall submit a landscape design documentation package consisting of items in subsections (B)(1) through (6) of this section for review and approval with any permit application for the project. A complete landscape design documentation package must be submitted to the city in compliance with the requirements of this chapter and approved in order to be eligible for the issuance of a permit. The package must be prepared by an architect or landscape architect licensed by the state in good standing and it must include the following items, which are detailed in LMC 13.25.060:

1. Landscape design documentation package checklist (see LMC 13.25.060(A));

2. Water budget and hydrozone calculations (see LMC 13.25.060(B));

3. Soil management plan (see LMC 13.25.060(C));

4. Landscape design plan (see LMC 13.25.060(D));

5. Irrigation design plan (see LMC 13.25.060(E)); and

6. Grading plan (see LMC 13.25.060(F)).

C. Landscape Installation Certification Package. Following installation and prior to occupancy, the property owner shall submit a landscape installation certification package consisting of items in subsections (C)(1) through (4) of this section for review and approval. A complete landscape installation certification package must be submitted to the city in compliance with the requirements of this chapter and approved in order to be eligible for a final inspection sign-off or certificate of occupancy. The package must be prepared by an architect, landscape architect, or landscape contractor licensed by the state in good standing and it must include the following items, which are described in more detail in LMC 13.25.070:

1. Landscape installation certification and checklist (see LMC 13.25.070(A));

2. Irrigation evaluation (see LMC 13.25.070(B));

3. Irrigation scheduling parameters (see LMC 13.25.070(C));

4. Landscape and irrigation maintenance schedule (see LMC 13.25.070(D)). (Ord. 1926 § 4 (Exh. B), 2010; Ord. 1860 § 5, 2009; Ord. 1399 § 1, 1992)

Sections 13.25.060 and 13.25.070 further detail landscape design documentation package elements and landscape installation certification package elements, respectively.

Chapter 13.26: Water Conservation establish voluntary and mandatory water conservation measures, best management practices, and use penalties to encourage wise water use and to minimize the effect of shortages.

13.45.040 Discharge in violation of permit. No person shall cause a discharge that would result in or contribute to a violation of NPDES Permit No. CA 0029831, a copy of which is in the office of the city clerk, either separately considered or when combined with other discharges. Liability for any such discharge shall be the responsibility of the person(s) causing or responsible for the discharge, and such persons shall defend, indemnify and hold harmless the city in any administrative or judicial enforcement action relating to such discharge. (Ord. 1379 § 1, 1992).

Chapter 16.12: Flood Control Regulations are intended to promote the public health, safety and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed to:

A. Restrict or prohibit uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or flood heights or velocities;

B. Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;

C. Control the alteration of natural floodplains, stream channels and natural protective barriers which help accommodate or channel floodwaters;

D. Control filling, grading, dredging and other development which may increase erosion or flood damage;

E. Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas;

F. Ensure that potential buyers are notified that property is in an area of special flood hazard; and

G. Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions. (Ord. 1843 § 1, 2008; Ord. 1426 § 1, 1994)

IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The following thresholds for measuring hydrology impacts are based upon CEQA Guidelines thresholds:

1. Would the project violate any water quality standards or waste discharge requirements?
2. Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the

local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

3. Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?
4. Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner, which would result in flooding on- or off-site?
5. Would the project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?
6. Would the project otherwise substantially degrade water quality?
7. Would the project place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?
8. Would the project place within a 100-year flood hazard area structures, which would impede or redirect flood flows?
9. Would the project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of climate-induced sea level rise or the failure of a levee or dam?
10. Would the project cause inundation by seiche, tsunami, or mudflow?

VIOLATE WATER QUALITY STANDARDS OR WASTE DISCHARGE REQUIREMENTS OR OTHERWISE SUBSTANTIALLY DEGRADE WATER QUALITY

Non-point source pollutants (NPS) are washed by rainwater from roofs, landscape areas, and streets and parking areas into the drainage network. NPS can include sediment, nutrients, bacteria and viruses, oil and grease, organics, pesticides, and gross pollutants (floatables). An increase in NPS pollutants could have adverse effects on wildlife, vegetation, and human health. NPS pollutants could also infiltrate into groundwater and degrade the quality of potential groundwater sources.

Impact Hydro-1: **Construction-Period Erosion and Siltation.** Construction of the proposed Project would involve grading activities that would disturb soils at the site. Such disturbance would present a threat of soil erosion by subjecting unprotected bare soil areas to runoff during construction, which could result in siltation to receiving waters. This is a ***potentially significant*** impact.

Mitigation Measure Geo-5, which requires implementation of a construction-period stormwater pollution prevention plan including Best Management Practices for preventing construction-period stormwater pollution through soil stabilization, sediment control, wind erosion control, soil tracking control, non-storm water management, and waste management and materials pollution control, would also mitigate Impact Hydro-1.

Therefore, applicable regulations for stormwater treatment would be met through implementation of a stormwater pollution prevention plan during construction as outlined in Mitigation Measure **Geo-5** and the resulting impact related to water quality would be considered ***less than significant***.

Impact Hydro-2: Surface Water Contamination from Existing Oil on Groundwater. Construction of underdrains beneath swales and storm drain systems that are not water tight can potentially allow oil laden groundwater to seep in and deliver contaminated water to the creek.

Naturally occurring oil has risen to the surface of the groundwater in the adjacent development within one mile of the Project site. Oil has surfaced during high groundwater events and has infiltrated the stormdrain system.

Mitigation Measure Haz-2 requires implementation of a monitoring program and remediation plan if oil is discovered in the storm drain or swale underdrain system and would mitigate Impact Hydro-2.

Implementation of an oil monitoring program and remediation plan as outlined in Mitigation Measure **Haz-2** would reduce the impact related to oils degrading water quality to a ***less than significant*** level.

GROUNDWATER SUPPLIES AND GROUNDWATER RECHARGE

As noted in the Setting above, the soils at the site create relatively impervious hydrologic surface conditions, which facilitate minimal infiltration through the soil and into the groundwater. Precipitation falling on the site drains quickly in the form of surface flows, largely to the adjacent Altamont Creek.

Stormwater from the site would continue to flow to Altamont Creek, though will be diverted through on-site stormwater treatment and collection elements such as bio-retention on each lot and a detention basin at the southeast corner of the site that ultimately discharges into the creek, as discussed in more detail under the flooding below.

The site soil also limits the ability of groundwater to rise above it. However, groundwater was observed ten feet below the surface indicating that water does rise to the surface. Within one mile of the site, oil has been observed floating on the surface of the groundwater and during periods of high groundwater has infiltrated the storm drain system. There is potential for groundwater with naturally occurring oil to drain to the creek. Thus, measures are necessary to identify and remedy any naturally occurring oil in the groundwater before it reaches the storm drain and is delivered to the creek. Similarly, measures are also necessary to identify, monitor and prohibit naturally occurring oil from infiltrating the storm drain system. This is related to water quality, as opposed to impacts to groundwater supplies and recarge and is discussed above.

The Project site does not represent a major groundwater recharge source and does not substantially change the flow of stormwater from the site. There is ***no impact*** related to groundwater supplies or recharge.

ALTER THE EXISTING DRAINAGE PATTERN RESULTING IN EROSION OR SILTATION OR FLOODING ON- OR OFF-SITE

Impact Hydro-3: Altered Streambed and Runoff. The Project will modify the collection and treatment of stormwater before release into Altamont Creek and will require re-alignment of Altamont Creek at the site of the proposed Hawk Street bridge. While the Project would alter the existing drainage pattern and flow of stormwater along the creek, such changes would not result in increased erosion, siltation or on- or off- site flooding. This is a ***less than significant*** impact.

The Project involves development of a currently undeveloped site. As discussed above, stormwater that currently sheet flows off the site toward Altamont Creek would instead be captured by the onsite stormwater treatment and collection system and ultimately released into Altamont Creek from a new outfall pipe. Small portions of the site currently drain directly to the north and east. Undeveloped buffer areas at these boundaries will continue to drain in these directions, as discussed in more detail in Chapter 7: Biological Resources.

As part of the stormwater information to be included with design-level application submittals, the Project applicant is required to submit hydraulic computations to establish no increased run off from the site. Preliminary calculations indicate that the on-site system is adequate to serve this purpose. The treatment system will ensure no siltation results from stormwater releases from the site.

The Project also includes construction of a bridge that will require re-alignment of Altamont Creek. Fill proposed in the realigned section of the channel will reduce the conveyance capacity of the channel, which could result in higher water levels in the vicinity of the bridge. A detailed Hydrologic Study of the proposed bridge and flood conditions was performed (included in Appendix G). According to the study, the proposed changes would result in localized increases in water surface elevations between 121 feet upstream to 22 feet downstream from the bridge, with the greatest increase of 0.82 feet at 14 feet upstream during a 100-year storm event.

Whenever a creek is realigned, a floodplain/hydrology analysis is required and a Letter of Map Revision/Conditional Letter of Map Revision is required for FEMA approval, as discussed in more detail in the Regulatory Setting section above. This approval process is occurring in parallel with this environmental analysis and project approvals and is required before this Project can proceed.

Although the proposed Project will increase the water surface elevations under the proposed bridge in the proposed condition, the increase is less than one foot in the floodplain and there are no increases to the floodway as required by FEMA. The water level would be contained within the banks of the channel and the proposed bridge would meet the Zone 7 Water Agency's design criteria. The proposed realignment of Altamont Creek and installation of Hawk Street bridge would have a localized impact on the water surface level that would not impact the ability of the creek to contain flood waters within its existing floodway.

EXCEED CAPACITY OF STORMWATER DRAINAGE SYSTEM.

Redevelopment of the site will result in changes in the route of water flow on site, including diversion through bio-retention units at each lot and a detention basin on the site, however the net runoff from the site is expected to be similar prior to and following development. In addition, water from the site is transported directly from the site to the Altamont Creek and does not enter downstream stormwater system infrastructure. As part of the stormwater information to be included with application submittals with the Planning Permit Application and the Building Permit Application, the Project applicant is required to submit hydraulic computations to establish no increased run off from the site to comply with C.3 provisions through the MRP requirements. Preliminary calculations show that the currently proposed on-site system is adequate for this purpose. ***No impact*** associated with increases in peak runoff is anticipated and no mitigation is necessary.

FLOOD ZONE HAZARDS

The Hydrological Study of the proposed bridge and flood conditions also corrected the 100-year floodplain (The developer will need to process a Conditional Letter of Map Revision followed by a Letter of Map Revision to update the FEMA map.) The mapped floodplain is shown in **Figure 12.1**.

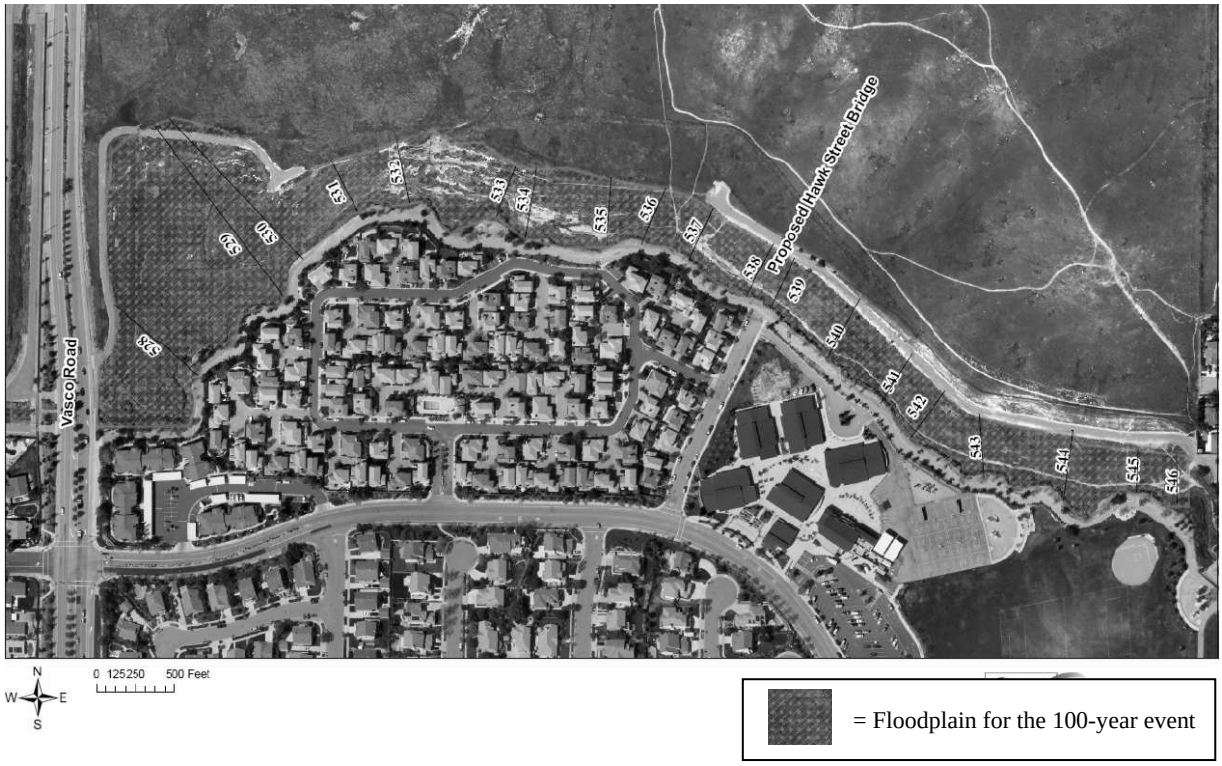


Figure 12.1: 100-Year Event Floodplain in the Project Vicinity
Source: WRECO, January 9, 2012, Hydraulic Summary of the Proposed Hawk Street Bridge over Altamont Creek

As shown in Figure 12.1, the developed portion of the Project site would be outside the 100-year flood zone (and outside the coastal flood zone, as the site is not located near the coast). Accordingly, there would be ***no impact*** related to flood zone hazards.

FLOODING AS A RESULT OF THE FAILURE OF A LEVEE OR DAM OR INUNDATION BY SEICHE, TSUNAMI, MUDFLOW OR CLIMATE-CHANGE INDUCED SEA LEVEL RISE.

According to maps published by the Association of Bay Area Governments (ABAG), the Project is not located downstream of a dam, nor are there any levees near the Project site.[7]

The city of Livermore, including the Project site, is not susceptible to inundation by coastal hazards, such as tsunamis, extreme high tides, or sea level rise, due to the elevation of the area and the distance from the margin of the San Francisco Bay and Pacific Ocean. The Project site is not located in an area with a history of mudflows nor close enough to an enclosed large body of water to be susceptible to a seiche.[8]

Therefore, there would be ***no impact*** resulting from a dam or levee failure or inundation by seiche, tsunami, mudflow of sea level rise.

[7] ABAG, Dam Failure Inundation Map, available at http://quake.abag.ca.gov/.

[8] City of Livermore, prepared by DC&E, City of Livermore General Plan 2003-2025, Adopted February 2004, as amended through June 2009, Chapter 10, Public Safety Element.

13

LAND USE AND PLANNING

INTRODUCTION

This chapter describes existing land uses, adopted General Plan land use classifications, and zoning designations of the Project site and evaluates the Project's consistency with applicable policies as they relate to environmental effects.

SETTING

General Plan

The 2003 General Plan is the City of Livermore's blueprint for development and conservation through 2025. The purpose of the General Plan in part is to shape the future physical development of Livermore and to preserve and enhance Livermore's current quality of life, so that the City can remain a community with a mix of land uses providing varied job and housing opportunities while maintaining its surrounding agriculture and open space.

The 2003 General Plan land use designation for the Project site is "UL-1" (Urban Low Residential 1-1.5 dwelling units per acres). Initially, the Project site was part of the Maralisa development project and shared the same "ULM" (Urban Low Medium Residential 2-3 dwelling units per acre) General Plan land use designation. The Maralisa project was constructed in the late nineties and consisted of 312 units south and east of the Project site. The Project site was not developed at that time due to unknown environmental constraints, but the Maralisa project moved forward and was constructed with a density of 2.2 units per acre.

During the City's General Plan Update in 2003, the General Plan land use designation for the site was changed from ULM to its current UL-1. Though the site's environmental sensitivity was unknown at this time, the land use designation was changed in part due to the site's potential environmental constraints. The current 2003 General Plan continues to designate the Project site for residential development.

Livermore Development Code

The Livermore Development Code implements the General Plan through the establishment of zoning districts with enforceable development standards. The Project site's current zoning is "PD" (Planned Development). The PD zone is applied to areas of the City appropriate for residential planned development projects that require more flexible design standards. The flexibility allows a developer to address geologic, topographical, and environmental factors.

The current zoning designation also reflects the Project site's inclusion in the "PUD" (Planned Unit Development) for the "Maralisa" project, which has otherwise been developed to the south of Altamont Creek. The Maralisa PUD notes that a portion of the density for the Project site was transferred to other properties within the PUD south of Altamont Creek, and to remain consistent with the General Plan

designation for the overall property (3 dwelling units per acre) the maximum number of units allowed on the Project site is 76 units. However, the Project site was not developed with the rest of the Maralisa project due to unknown environmental constraints.

The following General Plan goals, objectives and policies would be applicable to the Project (note that this is not intended to be a complete list or determination of consistency):

GOAL LU-1. Protect the unique qualities of Livermore, which include a historic Downtown, a variety of residential neighborhoods, vineyards, ranches, natural habitats and open space.

OBJECTIVE LU-2.1. Develop and phase new housing at a rate that can be absorbed by public infrastructure and in a manner that fits within Livermore's character.

POLICY LU-1.1.P2. Residential development shall be limited to those areas within the "UGB" (Urban Growth Boundary).

POLICY LU-1.1.P3. The City shall annex all lands currently under County jurisdiction and within the UGB prior to development in areas designated for urban uses.

The proposed Project is within the Urban Growth Boundary, adjacent to established urban areas, and already annexed into the City.

POLICY LU-1.1.P4. The City shall encourage the use of the planned development concept where possible to decrease construction costs, provide open space, increase the variety of housing types and provide integrated very low-, low-, and moderate-income housing.

POLICY LU-1.2. P1. Where possible, neighborhood and community commercial uses shall be integrated with public uses in similar areas as comprehensively designed service centers that include public facilities, day care centers, multi-purpose meeting places, health care facilities, housing for the elderly, transportation centers, and schools.

The Project was originally planned as part of the Maralisa planned development. While the Project itself consists of single-family homes and open space, the Maralisa development included a mix of housing types, a school, and a neighborhood park.

POLICY LU-2.1.P1. The City shall ensure that the management of community growth will assure that the natural amenities and environmental qualities which are among its greatest assets can be successfully improved, preserved, and enhanced.

POLICY LU-2.1.P4. The quality and design of residential facilities shall also be an important component of the City's population growth policies. It shall be the continuing responsibility of the City to monitor these factors to assure compliance with the goals and policies of the Plan.

POLICY LU-2.1.P13. All residential growth shall be consistent with the policy that a proposed development must be in the best interest of the community as a whole, considering that our goal is to achieve balance in our community, which shall be understood to mean:

(a) A geographical balance of the physical population on the terrain.

(b) That the adverse impact of the residential growth on air quality be balanced by factors such as reduced vehicle miles traveled (VMT) because of shopping facility locations and local employment of the residents.

(c) That the ratio of the industrial-commercial tax base versus that residential tax base will become more favorable.

(d) The need to provide more very-low and low income housing.

(e) Compliance with the goals and policies set forth in this plan.

POLICY CC-1.1.P6. The City shall maintain an area of non-urbanized land surrounding Livermore to serve as a buffer between communities. Uses that are considered compatible with this area include agriculture, grazing, open space, recreation, and reclaimed sand and gravel extraction.

POLICY CC-1.2.P2. Development in woodland, grassland, or grassland/woodland areas shall employ colors and materials which are in harmony with, rather than contrast to, the vegetation cover of the site.

The Project site is acknowledged in the General Plan as a planned site for residential development and therefore assumed to be part of the managed community growth and not intended as non-urbanized land. The Project will undergo design-level review of the site plan, architecture and landscape architecture to ensure compliance with the City's Design Standards and Guidelines and applicable policies and regulations.

POLICY LU-2.1.P2. The City shall strive to achieve a balanced relationship between residential development and commercial and industrial development to provide local employment and to realize an adequate tax base.

The Project will add residential units to a jobs-heavy area thereby contributing to the balance of the two, as discussed in more detail in Chapter 15: Population, Services and Recreation.

POLICY LU-2.1.P3. Future growth shall not exceed the community's capability to provide services. School classroom facilities, sewage treatment capacity, treated domestic water, public parks and recreation, and public safety services shall be the principal factors considered.

The Project would not result in significant impacts to utilities or public services and facilities, as discussed in more detail in Chapter 15: Population, Services and Recreation and Chapter 17: Utilities.

POLICY LU-2.1.P6. It shall be the residential growth policy of the City to plan for an average residential population growth fixed range between 140 and 700 dwelling units annually (based on 0.5 to 2.5 percent of 2002 housing units).

The Project would be consistent with the City's residential growth policy, as discussed in more detail in Chapter 15: Population, Services and Recreation.

GOAL LU-4. Ensure that new development mitigates significant environmental, design, and infrastructure impacts.

OBJECTIVE LU-4.1. Prevent development from occurring where the location or the physical or biological characteristics of the site would make the land use inappropriate.

POLICY LU-4.1.P1. Impacts to wetland and biological resources shall be calculated on a gross acreage basis and shall include areas of steep slopes, streets, floodways, and parks dedications that could result in losses of wildlife and plant habitat on a parcel.

POLICY LU-4.1.P2. The City shall encourage the clustering of development in order to minimize its overall footprint in areas of ecological sensitivity, such as hillsides, alkali springs, creek corridors, and watersheds.

The Project would not result in significant impacts to off-site wetlands and would mitigate the loss of the small on-site seasonal wetlands and potential habitat for sensitive species. The Project represents the final portion of development originally planned as part of the Maralisa project, adjacent to development to the south and east and leaves the on-site knoll areas and boundary slopes in place by placing homes on the lower lying portions of the project site, as discussed in more detail in Chapter 7: Biological Resources.

POLICY LU-4.2.P1. New development shall be designed to respect and enhance Livermore's existing development and natural environment.

The Project is similar in character to adjacent residential development to the south and east and retains the existing knolls on site, as discussed in more detail in Chapter 4: Aesthetics.

GOAL CC-2. Maintain high standards of urban design in Livermore.

OBJECTIVE CC-2.1. Maintain and enhance Livermore's urban design quality and encourage high quality design in all new development and redevelopment.

POLICY LU-4.2.P2. The use of "green construction" and land development techniques shall be encouraged as a means to reduce the environmental impacts of construction activity.

POLICY LU-4.2.P3. Encourage all additions and new development to follow green building practices for design, construction, and operation and to incorporate as many LEEDTM prerequisites and credits as feasible.

POLICY CC-2.1.P5. "Green building" practices shall be encouraged in new development and redevelopment. Green buildings are those that utilize methods and materials that are more environmentally benign than conventional methods or products. Examples include:

(a) High levels of insulation throughout construction including walls, floors, ceilings, and openings;

(b) Windows with high levels of insulation;

(c) Windows and eaves designed for passive solar heating;

(d) Construction using sustainable and recycled materials;

The California Green Building Standards Code (CALGreen) became effective following the adoption of the General Plan. The Project will be required to be consistent with CALGreen, as discussed in more detail in Chapter 10: Greenhouse Gas Emissions.

POLICY CC-1.1.P1. The City shall allow no structural development in hillside areas involving skylines, ridgelines, or silhouettes.

GOAL CC-4. Protect and enhance public views within and from established scenic routes, including views of arroyos.

OBJECTIVE CC-4.1. Protect public views from scenic routes and corridors.

POLICY CC-4.10.P1. As a means of preserving natural "ridge skylines," no major ridgeline shall be altered to the extent that an artificial ridgeline results. Minor grading below the skylines, ridgelines, or silhouettes may be authorized to accommodate development or activities otherwise consistent with these policies.

The Project site includes knolls, but not the prominent hillsides surrounding the Livermore area. The Project would not significantly impact skylines, ridgelines or silhouettes of the hillside areas, as discussed in more detail in Chapter 4: Aesthetics.

POLICY CC-1.1.P2. The City shall permit no intensive development of the hills. Development including roads, buildings and other structural or land coverage shall be located, sited and designed to fit and be subordinate to the natural landforms. Under no circumstances shall development create uniform, geometrically terraced building sites which are contrary to the natural landforms and which detract, obscure or negatively effect the visual quality of the landforms.

The Project site includes knolls, but not the prominent hillsides surrounding the Livermore area. Project roadways and lots are located on the lower lying portions of the property to retain the geography of the knolls, as discussed in more detail in Chapter 4: Aesthetics.

POLICY CC-1.1.P7. Open space shall be used to protect and enhance local community character and identity, and to guide the physical shape and direction of urban growth to preserve the rural characteristics of the area.

The Project includes open space buffers at the boundaries and retains the knolls as open space. The Project site is acknowledged in the General Plan as a planned site for residential development and therefore assumed not to be part of the intended rural areas surrounding the developed areas.

POLICY CC-1.1.P9. Open space shall be used as a buffer between incompatible land uses within urban or essentially undeveloped areas.

The Project includes open space buffers at the boundaries adjacent undeveloped areas.

POLICY CC-4.1.P1. Development shall not be allowed to obscure, detract from, or negatively affect the quality of the views from designated scenic routes.

POLICY CC-4.1.P2. The City shall maintain in open space that portion of the hills which is seen from the freeway and which is within the I-580 Scenic Corridor as shown in Figure 4-1. Any development within the I-580 Scenic Corridor is subject to the policies set forth under Goal CC-4 and the conditions set forth in Section C, I-580 Scenic Corridor Implementation.

POLICY CC-4.1.P3. The City shall permit no development to wholly obstruct or significantly detract from views of any scenic area as viewed from a scenic route.

The Project would be visible from Altamont Park, the city-designated scenic rout at Vasco Road, and I-580; however, the Project would not significantly impact views from these areas, as discussed in more detail in Chapter 4: Aesthetics.

POLICY CC-1.1.P11. The City shall preserve and enhance, or work with and support the efforts of other agencies, as appropriate (e.g., with joint grant applications, sharing of staff resources and legal services), to preserve and enhance the following natural amenities:

(a) Ridgelines

(b) Oak Woodlands and Grasslands

(c) Grasslands

(d) Riparian Woodland

(e) Arroyos and Creeks

(f) Knolls

(g) Brushy Peak

(h) Arroyo Mocho/Cedar Mountain

(i) Corral Hollow

(j) Sycamore Grove

(k) Hilltops (NLUGBI)

(l) Slopes (NLUGBI)

(m) Viewscapes (NLUGBI)

(n) Frick Lake

(o) Springtown Alkali Sink

The Project preserves the creek and retains the on-site knolls while developing lower lying grassland. The City will ultimately determine consistency, but it should be noted that the Project site is acknowledged in the General Plan as a planned site for residential development.

POLICY CC-1.3.P1. The importance of views of the nighttime sky unimpaired by inappropriate intensities of light and glare shall be acknowledged as a significant scenic resource in Livermore.

The Project would not significantly contribute to light and glare impacts, as discussed in more detail in Chapter 4: Aesthetics. The Project will undergo design-level review of the site plan, architecture and landscape architecture to ensure compliance with applicable policies and regulations.

POLICY CC-2.1.P1. All new development and redevelopment shall be subject to design review.

POLICY CC-2.1.P2. High-quality design shall be provided in the areas of community design, site design, building design, and landscape design to ensure that compatibility exists between new and existing development.

POLICY CC-2.1.P3. The architectural design and site layout of new development and redevelopment should consider the context and character created by existing land uses.

POLICY CC-2.1.P4. Design requirements and amenities shall be encouraged in new development and redevelopment, including, but not limited to:

(a) Interconnected street layout;

(b) Clustering of buildings;

(c) Landscaping on each lot;

(d) Visual buffers;

(e) Facilitating pedestrian activity; and

(f) Distinctiveness in architectural design.

POLICY CC-2.1.P6. New residential, commercial, and mixed-use neighborhoods shall promote comfortable, safe, and human-scaled design, pedestrian-oriented design features, and connections to pedestrian, bikeway and site amenities shall be incorporated into these new neighborhoods.

POLICY CC-2.1.P7. In new residential developments, the use of traditional site design and architectural elements such as a grid street layout, narrower streets, street trees, detached sidewalks, traditional house designs, reduced setbacks, and garages to the rear or sides of properties, shall be encouraged where found consistent with the neighborhood character.

POLICY CC-4.8.P1. Site planning, architectural, and landscape architectural design review shall be required so that development will be attractive from the highway and roads, and a harmonious relationship will exist among the various elements of proposed and existing developments and the visual qualities of the scenic route. Careful consideration shall be given to natural land contours and to appearances which will enhance scenic qualities from the scenic routes.

POLICY CC-4.8.P2. Originality in landscape and construction design should be encouraged.

POLICY CC-4.8.P3. Landscape and construction design should be in keeping with the Cityscape and natural skyline and reflect the density, movement, and activities of the population.

POLICY CC-4.9.P1. Alteration of natural or artificial land contours should not be permitted without a grading permit as a means of preserving and enhancing the natural topography and vegetation in developable areas.

POLICY CC-4.10.P2. Access roads should be located and designed to keep grading to a minimum.

The Project will undergo design-level review of the site plan, architecture and landscape architecture to ensure compliance with applicable policies and regulations. The Project includes roadway interconnections, and pedestrian/bicycle amenities. Roadways and lots are located on the lowest lying portions of the site enabling the knolls to remain. The rear and side elevations of some of the new homes will be visible from neighboring properties and Altamont Creek Neighborhood Park. Thus, architecture will be “four-sided” with high quality design and attention to details on all four elevations. The Landscape Plans will include view fencing and retaining walls with natural materials that will soften the visual appearance of the Project and provide an attractive transition along the edge of the Project’s edges.

POLICY CC-4.13.P1. All public trail easements should remain free and clear of any structures other than planting and trail improvements, except where they are required by public necessity or as a means of providing desired amenities (such as benches, tables, water fountains, public art, and restrooms) as specified by LARPD.

The Project site is privately owned, but the public has traversed the property, including the knolls, via informal paths. The Project includes paths along the knolls that will be open to the public.

POLICY CC-4.14.P1. Except for agricultural crops, no vegetation should be removed without permission of the local jurisdiction, as a means of preserving scenic quality.

POLICY CC-4.15.P1. Alteration of streambeds or bodies of water and adjacent vegetation should be permitted only with approval of the local jurisdiction, as a means of preserving the natural scenic quality of stream courses, bodies of water, vegetation, and wildlife in the Valley.

POLICY CC-4.15.P2. Development adjacent to streams, canals, reservoirs, and other bodies of water should be in a manner that will preserve the natural scenic qualities of the area, or when scenic qualities are minimal shall be designed and treated so as to result in naturalistic forms. Zone 7 has adopted Interim Design Standards and Practices for future construction improvements of

channels. Any development with arroyos and creeks fall under these standards and are subject to Zone 7's review to ensure there are no impacts to Zone 7 facilities.

POLICY CC-4.10.P3. The I-580 Scenic Corridor is defined as the area which is within 3,500 feet on each side of the centerline of I-580, and visible from the I-580 roadway. Development in the I-580 Scenic Corridor must preserve, to the largest degree feasible, the view of the ridgelines as seen from the I-580 Scenic Corridor roadway. To that end, no development, structures or man-made objects except plantings erected for landscaping purposes may obscure any portion of the ridgeline as seen from the I-580 Scenic Corridor roadway, except as provided in Community Character Element Section IV.C (I-580 Scenic Corridor Implementation). Landscaping, including trees, shall be planted in a manner such that when mature, it does not create a wall-like effect that substantially obscures views of the ridgeline.

POLICY CC-4.12.P1. In both urban and rural areas, normally permitted uses of land should be allowed in scenic routes, except that panoramic views and vistas should be preserved and enhanced through:

(1) Supplementing zoning regulations with special height, area, and side yard regulations.

(2) Providing architectural and site design review.

(3) Prohibiting and removing billboards, signs not relevant to the main use of the property, obtrusive signs, automobile wrecking and junk yards, and similar unsightly development or use of land.

POLICY CC-4.16.P1. Views from scenic routes will comprise essentially all of the remainder of the Valley beyond the limits of the I-580 Scenic Corridor. The I-580 Scenic Corridor is intended to establish a framework for the observation of the views beyond; therefore, in all areas in the Valley extending beyond the scenic routes, scenic qualities should be preserved through retaining the general character of natural slopes and natural formations, and through preservation and, where desirable, enhancement of water areas, water courses, vegetation and wildlife habitats.

POLICY CC-4.16.P2. Development of lands adjacent to scenic routes should not obstruct views of scenic areas, and development should be visually compatible with the natural scenic qualities.

The Project will undergo design-level review of the site plan, architecture and landscape architecture to ensure compliance with applicable policies and regulations and will be required to obtain a grading permit. The Project would be visible from Altamont Park, the city-designated scenic route at Dalton Road, Vasco Road, and I-580. However, only a small portion of the southeast corner of the property is within the Scenic Corridor. This portion of property is lower lying and will not include structures that are inconsistent with the Scenic Corridor view angle policies and grading limitations.

GOAL CIR-1. Identify and develop a circulation system consistent with the Land Use Element

OBJECTIVE CIR-1.1. Plan, manage, and develop the local roadway system to support the Land Use Element.

POLICY CIR1.1.P2. Development projects shall be reviewed for impacts on the adjacent circulation system. Identified impacts shall be addressed and mitigated to the greatest extent feasible.

POLICY CIR 3.4.P1. The City shall ensure the safe and convenient movement of pedestrians throughout the City and within neighborhoods.

GOAL CIR-1. Identify and develop a circulation system consistent with the Land Use Element

OBJECTIVE CIR-4.1. Maintain adequate levels of service for all areas of the City.

The Project's traffic-related impacts, including pedestrian and bicycle impacts are fully analyzed in Chapter 16: Transportation and Circulation, which utilizes the standards presented in the General Plan Circulation Element. The mitigated Project would be consistent with policies of the General Plan Circulation Element.

GOAL INF-1. Provide sufficient water supplies and facilities to serve the City in the most efficient and financially sound manner, while maintaining the highest standards required to enhance the quality of life for existing and future residents.

OBJECTIVE INF-1.1. Plan, manage and develop the public water treatment, storage and distribution systems in a logical, timely and appropriate manner.

POLICY INF 1.1.P1. Potable water shall be available to the City's residents and businesses.

POLICY INF 1.1.P2. The City shall maintain a water system capable of sustaining required fire flows at all times. The City shall work with California Water Service Company to insure its system also meets required fire flows.

POLICY INF 1.1.P5. Development will not result in a reduction of water quality below those standards set forth in State and federal laws and regulations.

POLICY INF 1.2.P2. The approval of new development shall be conditioned on the availability of sufficient water supply, storage and pressure requirements from the City, California Water Service Company and Zone 7 for the project as applicable.

POLICY INF 2.1.P1. Municipal sewer treatment shall be available to the City's residents and businesses.

POLICY INF 2.1.P3. The approval of new development shall be conditioned on the availability of adequate long-term capacity of wastewater treatment, conveyance and disposal sufficient to service the proposed development.

POLICY INF 3.2.P1. All new development projects shall be responsible for constructing a stormwater collection system and contributing stormwater collection fees to construct additional necessary facilities. These fees include the City storm drain fees as well as Zone 7 regional storm drainage fees.

POLICY OSC 2.1.P1. Require the implementation of Best Management Practices (BMPs) to minimize erosion, sedimentation, and water quality degradation resulting from the construction of new impervious surfaces.

POLICY OSC 2.1.P2. The City shall take all necessary measures to regulate runoff from urban uses to protect the quality of surface and ground water.

The Project would have adequate utilities and service systems and would not result in significant impacts to utilities or water quality, as discussed in more detail in Chapter 12: Hydrology and Chapter 17: Utilities.

GOAL OSC-1. Conserve the value and function of Livermore's open space as a biological resource.

OBJECTIVE OSC-1.1. Maintain biodiversity within the Planning Area with special emphasis on species that are sensitive, rare, declining, unique or represent valuable biological resources.

OBJECTIVE OSC-1.2. Minimize impacts to sensitive natural habitats including alkali sinks, riparian vegetation, wetlands and woodland forest.

POLICY INF 3.2.P1. Stream modifications should only be allowed for development in order to better contain flood flows, re-route stormwater to restore creek conveyance capacity and enhance

groundwater recharge, stabilize creek beds and banks and control erosion, remove sediment and debris, provide public access for maintenance and emergency vehicles, provide for trails and recreational facilities, restore creek natural habitat and wetlands areas and provide for water filtration.

POLICY INF 3.2.P2. Any stream modifications and flood control structure improvements shall be done in accordance with appropriate engineering design, resource agency approvals, and current environmental restoration best management practices.

The Project includes undeveloped buffer areas at the sloping boundaries and grading to direct flow from developed areas into the on-site stormwater treatment and collection elements to avoid erosion and sedimentation, as discussed in more detail in Chapter 12: Hydrology and Water Quality and Chapter 9: Geology and Soils. The Project will be required to comply with proper slope engineering (Mitigation Measure Geo-2).

POLICY OSC 1.2.P2. Use and development of riparian areas should enhance the appearance of the creekside environment and protect and enhance native vegetation.

POLICY OSC 1.2.P3. Require appropriate setbacks, to be determined in coordination with resource agencies, LARPD, EBRPD, and other responsible agencies, adjacent to natural streams to provide adequate buffer areas that ensure the protection of plant and animal communities.

The Project would modify the creek to construct a bridge in accordance with appropriate engineering design and best management practices and with appropriate approvals to be consistent with access requirements, but will otherwise allow for natural habitat along the streambed, as discussed in more detail in Chapter 3: Project Description, Chapter 7: Biological Resources and Chapter 12: Hydrology.

POLICY OSC 1.1.P4. The City shall require all projects that impact a federal or State listed threatened or endangered species, federal or State listed candidate species, State species of special concern, or State designated sensitive habitats, to mitigate for identified impacts in a way consistent with mitigation and avoidance measures published and distributed by the federal and/or State resource agencies at the time of the specific plan or project-level review. Monitoring requirements also shall be consistent with published requirements for each species or habitat. For listed or candidate species, species of special concern, or sensitive habitats for which no mitigation or avoidance measures have been published, the City shall require evidence of coordination with the responsible agencies prior to acceptance of mitigation or avoidance measures or monitoring requirements.

POLICY OSC 1.1.P6. The City shall preserve and maintain Frick Lake and the Springtown Alkali Sink area as important wildlife and plant habitats through preservation of open space in and around these areas.

POLICY OSC 1.2.P6. The City shall require all development to comply with State and federal regulations to preserve and protect the habitats of rare and endangered species.

POLICY OSC 1.2.P7. The City shall require project proponents to identify and map sensitive biological and wetland resources on each development parcel and identify the measures necessary to avoid and/or minimize impacts on sensitive biological and wetland resources prior to approving the development. Mitigation for impacts to sensitive biological and wetland resources shall replace the functions and values of the resources as well as gross acreage.

POLICY OSC 1.2.P8. The City shall require development to avoid take of species listed as threatened, endangered, or candidate under federal and state endangered species acts by implementing measures determined in consultation with the U.S. Fish and Wildlife Service and the California Department of Fish and Game.

The mitigated Project would not result in significant impacts to biological resources, as discussed in more detail in Chapter 7: Biological Resources.

> POLICY OSC 5.1.P2. Require developers to provide land or in lieu fees for parks, as governed by the terms of the Quimby Act.

The Project would be required to pay appropriate in lieu fees, as discussed in more detail in Chapter 15: Population, Services and Recreation.

> POLICY OSC 6.1.P1. The City shall require project developers to develop and implement a construction-period air pollution control plan, consistent with dust and emission abatement actions outlined in the CEQA handbook of the Bay Area Air Quality Management District.

The Project would implement BAAQMD-recommended construction-period air pollution control measures, as discussed in more detail in Chapter 6: Air Quality.

> POLICY N 1.1.P3. The City shall maintain a pattern of land uses that separates noise-sensitive land uses from major noise sources to the extent possible.
>
> POLICY N 1.1.P4. The City shall use the Land Use Compatibility Guidelines for Exterior Noise (measured in dBA CNEL or Ldn) contained in Table 9-7 in this Element to direct the siting, design, and insulation of new development to reduce exposure to excessive noise. Where warranted, the City shall employ discretionary review of new development to ensure that the community will be protected from excessive noise levels. The City shall evaluate potential noise impacts and recommend mitigation measures through discretionary review procedures such as environmental review, design review, and evaluation of use permits.

The Project is not located near major noise sources, nor is it considered a major noise source. The Project's noise-related impacts are fully analyzed in Chapter 14: Noise, which utilizes the standards presented in the General Plan Noise Element. The Project would be consistent with policies of the General Plan Noise Element.

> POLICY PS-1.1.P1. Urban development within earthquake fault zones and areas of high landslide susceptibility, shown in Figure 10-3, shall be conditioned upon the preparation of site-specific geotechnical investigations.
>
> POLICY PS-1.1.P3. No structure proposed for human occupancy shall be placed across the trace of any active or potentially active fault within the Planning Area. The Greenville fault and Las Positas fault shall be assumed active, and the Livermore fault shall be assumed potentially active, unless and until proven otherwise.

A portion of the Project site is located within the mapped Earthquake Fault Special Studies Zone for the Greenville fault. Being in this zone requires further study prior to development. The required geologic investigation found no active faults in the immediate vicinity of the Project and therefore no fault-related constraints to building at the Project site. This is discussed in more detail in Chapter 9: Geology and Soils.

> POLICY PS-2.1.P3. The City shall require new development and significant redevelopment projects to prepare drainage studies to assess storm runoff impacts on the local and regional storm drain and flood control system, and to develop recommended detention and drainage facilities to ensure that increased risks of flooding do not result from development. The drainage study shall include an analysis and recommended mitigations for projects that would increase peak runoff flows and increase runoff volume and for all projects where such increased flow and/or volume is likely to cause increased erosion of creek beds and banks, silt pollutant generation, or other impacts to beneficial uses.

A hydrologic study was completed for the Project demonstrating that the Project would neither be located in a flood zone nor would it cause flooding elsewhere, as discussed in more detail in Chapter 12: Hydrology and Water Quality.

IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The following thresholds for measuring environmental impacts are based on CEQA Guidelines thresholds:

1. Would the project physically divide an established community?
2. Would the project conflict with any applicable land use plan, policy or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect?
3. Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?

Conflicts with applicable plans, policies or regulations do not inherently result in a significant effect on the environment within the context of CEQA. As stated in Section 15358(b) of the CEQA Guidelines, "[e]ffects analyzed under CEQA must be related to a physical change."

Further, Appendix G of the Guidelines (Environmental Checklist Form) makes explicit the focus on *environmental* policies and plans, asking if the Project would "conflict with any applicable land use plan, policy, or regulation . . . *adopted for the purpose of avoiding or mitigating an environmental effect*" (emphasis added). Even a response in the affirmative, however, does not necessarily indicate the Project would have a significant effect, unless a physical change would occur as noted in the above paragraph.

DIVISION OF AN ESTABLISHED COMMUNITY

The Project site is located within the North Livermore Urban Growth Boundary that provides a clear and permanent boundary for urban uses within the City's Planning Area. The site has a residential General Plan land use designation and an Allocated Residential existing use designation in the City's 2003 General Plan. Thus, the City's intention for the site is for residential development that is compatible with residential development to the west, south and east of the Project site. The Project would more directly connect development to the east with development to the south through construction of a bridge over Altamont Creek. The Project has ***no negative impact*** related to division of an established community.

CONFLICTS WITH LAND USE PLAN AND ZONING

Impact Plan-1: **Increased Density.** The City's 2003 General Plan identifies the existing use at the site as Allocated Residential and the land use designation as Urban Low Residential 1-1.5 dwelling units per acres. The development proposed is of a higher density than currently allowed under the existing General Plan. The current General Plan designation would allow a maximum of 47 units on the property. Therefore, a General Plan Amendment is required in order to allow the proposed Project. However, the Planned Unit Development for the Maralisa development states that a portion of the density for the Project site was transferred to properties south of Altamont Creek, and the maximum number of units permitted on the Project site is 76 units. The Project site was not developed as a phase of the Maralisa project since environmental

constraints were unknown at that time. Subsequent detailed environmental analysis indicates that the site could be developed without significant impacts to the environment and can support this infill development at a density originally envisioned under the Urban Low Medium Residential designation. The proposed Project would be generally consistent with the goals and policies of the General Plan though would require consideration General Plan Amendment to allow the proposed density. This is a ***less than significant*** impact.

Compliance with regulations targeted at aesthetics, biology, noise, and traffic are discussed in more detail in those sections. The Project would not conflict with plans or policies in any way that could have an adverse environmental impact. The Project will need to receive project approvals mentioned above and in detail in Chapter 3: Project Description, including Site Plan Design Review to ensure substantial conformance with all applicable design standards and guidelines.

CONFLICT WITH CONSERVATION PLAN

The site is within the area covered by the East Alameda County Conservation Strategy. Project impacts and minimization and mitigation measures included in Chapter 7: Biological Resources are consistent with the East Alameda County Conservation Strategy. There are no other conservation plans relevant to the Project site. There would be ***no impact*** related to conflict with a conservation plan.

This page intentionally left blank

14

NOISE

INTRODUCTION

This report presents the environmental noise and vibration assessment for Project, prepared by Illingworth and Rodkin. The following Introduction, Regulatory Setting and Setting presents background information on community noise and vibration, applicable regulatory standards, and a description of the existing setting. The Impacts and Mitigation Measures section presents the assessment of noise and vibration impacts and the measures necessary to reduce the impacts.

BACKGROUND INFORMATION OF NOISE

Noise Defined. Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its loudness. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 14.1.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level or dBA.* This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 14.2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The

accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level, CNEL*, is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels. The *Day/Night Average Sound Level, L_{dn}*, is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Hearing Loss. While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise, but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise.

The Occupational Safety and Health Administration (OSHA) has a noise exposure standard which is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over eight hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

Sleep and Speech Interference. The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noise of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA L_{dn}. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12-17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is therefore possible when exterior noise levels are about 57-62 dBA L_{dn} with open windows and 65-70 dBA L_{dn} if the windows are closed. Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial. Levels of 75-80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed, those facing major roadways and freeways typically need special glass windows.

Annoyance. Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 55 dBA L_{dn}. At an L_{dn} of about 60 dBA, approximately 2 percent of the population is highly annoyed. When the L_{dn} increases to 70 dBA, the percentage of the population highly annoyed increases to about 12 percent of the population. There is, therefore, an increase of about 1 percent per dBA between an L_{dn} of 60-70 dBA. Between an L_{dn} of 70-80 dBA, each decibel increase increases by about 2 percent the percentage of the population highly annoyed. People appear to respond more adversely to aircraft noise. When the L_{dn} is

60 dBA, approximately 10 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 2 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 3 percent increase in the percentage of the population highly annoyed.

FUNDAMENTALS OF GROUNDBORNE VIBRATION

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One is the Peak Particle Velocity (PPV) and another is the Root Mean Square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. The RMS velocity is defined as the average of the squared amplitude of the signal. The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration. In this section, a PPV descriptor with units of mm/sec or in/sec is used to evaluate construction generated vibration for building damage and human complaints. Table 14.3 displays the reactions of people and the effects on buildings that continuous vibration levels produce. The annoyance levels shown in Table 14.3 should be interpreted with care since vibration may be found to be annoying at much lower levels than those shown, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying.

Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high noise environments, which are more prevalent where groundborne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

Construction activities can cause vibration that varies in intensity depending on several factors. The use of pile driving and vibratory compaction equipment typically generate the highest construction related ground-borne vibration levels. Because of the impulsive nature of such activities, the use of the peak particle velocity descriptor (PPV) has been routinely used to measure and assess ground-borne vibration and almost exclusively to assess the potential of vibration to induce structural damage and the degree of annoyance for humans.

The two primary concerns with construction-induced vibration, the potential to damage a structure and the potential to interfere with the enjoyment of life are evaluated against different vibration limits. Studies have shown that the threshold of perception for average persons is in the range of 0.008 to 0.012 in/sec PPV. Human perception to vibration varies with the individual and is a function of physical setting and the type of vibration. Persons exposed to elevated ambient vibration levels such as people in an urban environment may tolerate a higher vibration level.

Structural damage can be classified as cosmetic only, such as minor cracking of building elements, or may threaten the integrity of the building. Safe vibration limits that can be applied to assess the potential for damaging a structure vary by researcher and there is no general consensus as to what amount of vibration may pose a threat for structural damage to the building. Construction-induced vibration that can be detrimental to the building is very rare and has only been observed in instances where the structure is at a high state of disrepair and the construction activity occurs immediately adjacent to the structure.

TABLE 14.1 DEFINTIONS OF ACOUSTICAL TERMS IN THIS REPORT

Term	Definitions
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

TABLE 14.2 TYPICAL NOISE LEVELS IN THE ENVIRONMENT

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock band
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	70 dBA	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60 dBA	
		Large business office
Quiet urban daytime	50 dBA	Dishwasher in next room
Quiet urban nighttime	40 dBA	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20 dBA	
		Broadcast/recording studio
	10 dBA	
	0 dBA	

TABLE 14.3: REACTION OF PEOPLE AND DAMAGE TO BUILDINGS AT VARIOUS CONTINUOUS VIBRATION LEVELS

Velocity Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.02	Barely perceptible	Vibration unlikely to cause damage of any type to any structure
0.08	Distinctly perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
0.1	Strongly perceptible	Virtually no risk of damage to normal buildings
0.3	Strongly perceptible to severe	Threshold at which there is a risk of damage to older residential dwellings such as plastered walls or ceilings
0.5	SEVERE - VIBRATIONS CONSIDERED UNPLEASANT	Threshold at which there is a risk of damage to newer residential structures

Source: Transportation- and Construction-Induced Vibration Guidance Manual, California Department of Transportation, June 2004.

REGULATORY SETTING

STATE CEQA GUIDELINES

There are no State laws directly applicable in the assessment of noise associated with new projects. The California Environmental Quality Act (CEQA) includes qualitative guidelines for determining significance of adverse environmental noise impacts. A project will typically have a significant impact if it would:

(a) Expose people to or generate noise levels in excess of established in the local general plan, noise ordinance, or applicable standards of other agencies.

(b) Expose people to or generate excessive ground-borne vibration or ground-borne noise levels.

(c) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

(d) Result in a substantial temporary or periodic increase in the ambient noise levels in the project vicinity above levels existing without the project.

(e) Where projects within an area covered by an airport land use plan or within two miles of a public airport or public use airport when such an airport land use plan has not been adopted, or within the vicinity of a private airstrip, expose people residing or working in the project area to excessive aircraft noise levels.

(f) For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

CITY OF LIVERMORE GENERAL PLAN

The City of Livermore has adopted goals, objectives, and policies related to community noise in the Noise Element of the General Plan. The following policies apply to this Project and can be used to determine the consistency of the Project with the Noise Element.

Goal N-1 Minimize the exposure of community residents to excessive noise.

Objective N-11: Establish appropriate noise levels, design standards, and noise reduction techniques for all areas to minimize the adverse effects of noise.

P1. The City shall emphasize noise considerations when making land use decision.

P2. Noise analysis shall be measured in dBA CNEL or dBA L_{dn} as defined in this element.

P3. The City shall maintain a pattern of land uses that separates noise-sensitive land uses from major noise sources to the extent possible.

P4. The City shall use the land use compatibility guidelines for exterior noise (measured in dBA CNEL or L_{dn}) contained in Table 9-7 [Table 14.4] in this Element to direct the siting, design, and insulation of new development to reduce exposure to excessive noise. Where warranted, the City shall employ discretionary review of new development to ensure that the community will be protected from excessive noise levels. The City shall evaluate potential noise impacts and recommend mitigation measures through discretionary review procedures, such as environmental review, design review, and evaluation of use permits.

P5. Review development proposals with respect to land use compatibility guidelines for exterior noise in Table 9-7 [Table 3] as follows:

(a) Normally Acceptable: If the noise level is within the "normally acceptable" level, noise exposure would be acceptable for the intended land use. Development may occur without requiring an evaluation of the noise environment unless the use could generate noise impacts on adjacent uses.

(b) Conditionally Acceptable: If the noise level is within the "conditionally acceptable" level, noise exposure would be conditionally acceptable; a specified land use may be permitted only after detailed analysis of the noise environment and the project characteristics could determine whether noise insulation or protection features are required. Such noise insulation features may include measures to protect noise-sensitive outdoor activity areas (e.g., at residences, schools, or parks) or may include building sound insulation treatments such as sound rated windows to protect interior spaces in sensitive receptors.

(c) Normally Unacceptable: If the noise level is within the "normally unacceptable" level, analysis and mitigation are required. Development should generally not be undertaken unless adequate noise mitigation options have been analyzed and appropriate mitigations incorporated into the project to reduce the exposure of people to unacceptable noise levels.

(d) Clearly Unacceptable: If the noise level is within the "clearly unacceptable" level, new construction or development should not be undertaken unless all feasible noise mitigation options have been analyzed and appropriate mitigations incorporated into the project to adequately reduce exposure of people to unacceptable noise levels.

P6. Not applicable.

P7. The City shall work with LARPD to locate new neighborhood parks such that the existing and anticipated future noise environment is conducive to passive and active outdoor recreational activities, whenever possible.

Objective N-1.2 Adopt design standards and identify effective noise attenuation programs to present noise or reduce noise to acceptable level.

P1. When crafting mitigation programs for adverse noise exposure from new development, the City shall encourage the use of noise attenuation programs that avoid constructing sound walls.

P2. The City shall require applicants for new noise sensitive development, such as private school schools, residences, and private hospitals, in areas subject to noise levels greater than 65 dBA CNEL to obtain the services of a professional acoustical engineer to provide a technical analysis and to design mitigation measures to attenuate noise to acceptable levels.

P3. The City shall require the control of noise at the source for new development deemed to be noise generators through site design, building design, landscaping, hours of operation, and other techniques.

P4. The City shall require operational limitations and feasible noise buffering for new uses that generate significant noise impacts near sensitive uses.

P5. During all phases of construction, the City shall take measures to minimize the exposure of neighboring properties to excessive noise levels from construction-related activities.

P6. Not applicable.

P7. The City shall seek to reduce impacts from ground-borne vibration associated with rail operations by requiring that habitable buildings are sited at least 100 ft. from the centerline of the tracks whenever feasible. An interior noise level of up to 45 dBA, with windows closed, must not be exceeded.

P8. It shall be the responsibility of new development or new land uses to be consistent with noise standards appropriate and sensitive to adjacent land uses.

Objective N-1.4 Reduce noise levels from traffic, which is the single largest continual source of unacceptable noise in the City.

P4. The City shall require exterior noise in backyards to be "normally acceptable" at a maximum of 60 dBA CNEL for single-family development and a maximum of 65 dBA CNEL for multi-family development.

P5. The City will consider sound walls as a means of noise mitigation along proposed and existing roadway segments and railroad rights-of-way only after other noise attenuation programs, such as building construction, larger landscaped berms, and distances have been considered to reduce noise to appropriate levels in residential areas.

Objective N-1.5 Reduce the level of noise generated by mechanical and other noise-generating equipment by means of public education, regulation, and/or political action.

P1. The City shall require that industrial and commercial uses shall be designed and operated so as to avoid the generation of noise effects on surrounding sensitive land uses (e.g., residential, churches, schools, hospitals) from exceeding the following noise levels for exterior environments:

(a) 55 dBA L_{50} (7:00 AM to 10:00 PM)
(b) 45 dBA L_{50} (10:00 PM to 7:00 AM)

P2. In order to allow for temporary construction, demolition, or maintenance noise and other necessary short-term noise events, the stationary noise standards in Policy N-1.5.P1, above, may be exceeded within the receiving land use by:

(c) 5 dBA for a cumulative period of no more than 15 minutes in any hour,
(d) 10 dBA for a cumulative period of no more than 5 minutes in any hour,
(e) 15 dBA for a cumulative period of no more than 1 minute in any hour.

P3. In order to allow for temporary construction, demolition, or maintenance noise and other necessary short-term noise events, the stationary noise standards in Policy N-1.5.P1, above, shall not be exceeded within the receiving land use by more than 15 dBA for any period of time

P4. The following sources of noise are exempt from the standard in N-1.5.P1: motor vehicles on public streets; trains, emergency equipment; vehicles, devices and activities; temporary construction; maintenance, or demolition activities conducted between the hours of 7:00 AM and 8:00 PM.

LIVERMORE MUNICIPAL CODE

The City of Livermore has adopted a Noise Ordinance in Chapter 9.36 of the Livermore Municipal Code. The Noise Ordinance establishes requirements to muffle internal combustion engines, prohibit certain plainly audible noises, and regulate allowable hours for the use of impact tools such as pile drivers, jackhammers, etc. The ordinance does not establish quantitative noise limits.

ALAMEDA COUNTY AIRPORT LAND USE PLAN

The Alameda County Airport Land Use Plan regulates noise around airports in Alameda County. Policies adopted by the Airport Land Use Commission are considered in noise and land use planning decisions. In 2004, the California legislature passed AB 2776. AB2776 requires disclosure of all existing and proposed airports within two statute miles of a residential subdivision. The disclosure documents must also include a statement regarding noise from aircraft overflights if the subdivision is

located within an airport influence area (AIA). The Alameda County ALUC also created an airport protection area (APA) around Livermore Airport. The APA area was established to ensure continued safety in the airport region and to avoid potential noise incompatibilities within the airport and encroaching residential uses. The APA extends for about a distance of one mile from the runways at Livermore Municipal Airport.

TABLE 14.4: Livermore Land Use Compatibility Guidelines for Exterior Noise

Land Use	Normally Acceptable[a] (dBA)	Conditionally Acceptable[a] (dBA)	Normally Unacceptable[a] (dBA)	Clearly Unacceptable[a] (dBA)
Residential-Low Density, Single-Family, Duplex, Mobile Homes	≤ 60	55-70	70-75	> 75
Residential Multi-Family	≤ 65	60-70	70-75	> 75
Transient Lodging, Hotels, Motels	≤ 65	60-70	70-80	> 80
School, Library, Church, Hospital, Nursing Home	≤ 70	60-70	70-80	> 80
Auditorium, Concert Hall, Amphitheater	• •	< 70	• •	> 65
Sports Arena, Outdoor Spectator Sports	• •	< 75	• •	> 70
Playground, Neighborhood Park	≤ 70	• •	70-75	> 75
Golf Course, Water Recreation, Cemetery	≤ 75	• •	70-80	> 80
Office Building, Business Commercial, Professional, Retail	≤ 70	70-75	> 75	• •
Industrial, Manufacturing, Utilities, Agricultural	≤ 75	70-80	> 75	• •

[a] Where dBA levels overlap between these categories, determination of noise level acceptability will be made on a project-by-project basis. dBA is measured in CNEL or Ldn (see N-1.1.P4)

Source: Livermore General Plan Table 9-7.

SETTING

EXISTING NOISE ENVIRONMENT

The Project site is located north of Interstate 580 and east of Vasco Road and west of Laughlin Road in the City of Livermore. The site is an undeveloped parcel bordered by open space along the northern, western, and immediate eastern boundaries and is adjacent to other existing residential developments to the south and east. Altamont Creek forms the southern boundary of the site. Noise sensitive receptors include residences bordering the southeast corner of the site in the vicinity of Bear Creek Drive, residences and an elementary school generally to the south of the south across Altamont Creek, and residences to the northeast of the Project site in the vicinity of Brookview Court.

A noise survey was completed to quantify noise levels at the Project site and its vicinity. Noise levels were monitored over a nearly 48-hour period beginning at 11:30 AM on December 13, 2011. This measurement, designated LT-1, was made along the Altamont Creek Trail near the terminus of Hawk Street. Measurement locations are shown on **Figure 14.1**. General aviation aircraft were the primary source of noise affecting the environment at the Project site. Distant vehicular traffic on Interstate 580 was heard. Activities at the school site and neighborhood noises also contribute to the noise environment in the area. Average noise levels during the daytime ranged from 47 to 56 dBA L_{eq}. Average noise levels during the nighttime ranged from 46 to 59 dBA L_{eq}. The measured 24-hour average noise levels 61 CNEL and 57 CNEL. The results of the noise measurements are summarized on **Figures 14.2 and 14.3**.

Short-term measurements were made at two locations at midday on December 13, 2011. Location ST-1 was located on the Project site across Altamont Creek from the school playground. The average noise level during the 10-minute measurement beginning at 11:40 AM was 47 dBA L_{eq}. Noise levels ranged from 42 dBA to 58 dBA, with the highest noise level caused by general aviation aircraft.

Measurement Location ST-2 was at the end of Bear Creek Road near No. 6682. General aviation aircraft was the most significant source of noise during the measurement. Children could be heard on the playground, and distant traffic from Interstate 580 was also audible in the background. Noise levels were measured from 12 noon until 12:20 PM. The average noise level was 49 dBA L_{eq}. Noise levels ranged from 45 dBA to 58 dBA. The highest noise levels, again, resulted from general aviation aircraft over-flights.

Livermore Airport has established noise exposure contours for existing (year 2000) and projected (year 2020) aircraft operations. The contours show that the 60 dBA CNEL and 65 dBA CNEL noise exposure contours are located south of I-580. The Project site is located more than two miles from Livermore Municipal Airport.

Figure 14.1: Noise Measurement Locations

Figure 14.2: Noise Levels at LT-1
Altamont Creek Trail Behind School
December 13-14, 2011

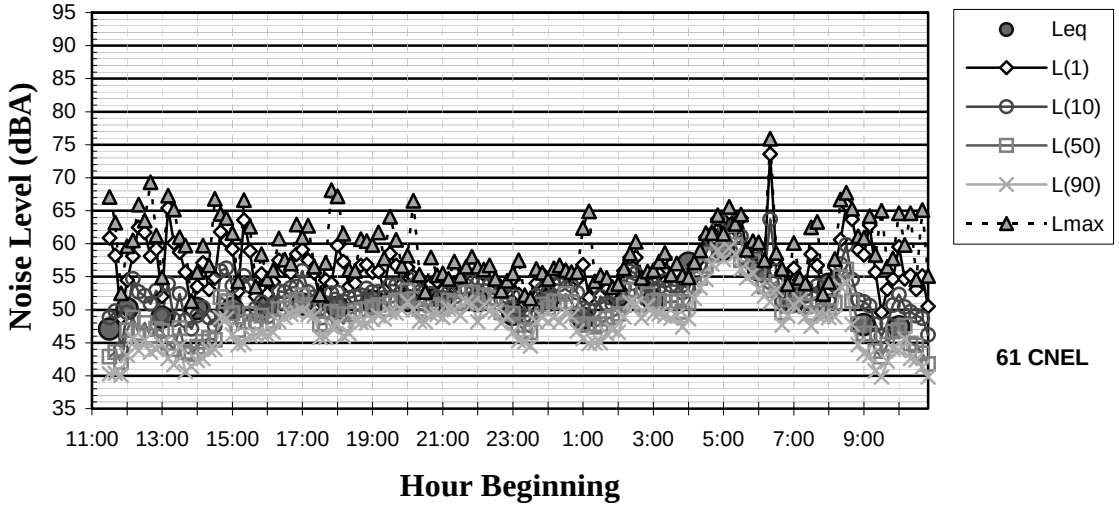
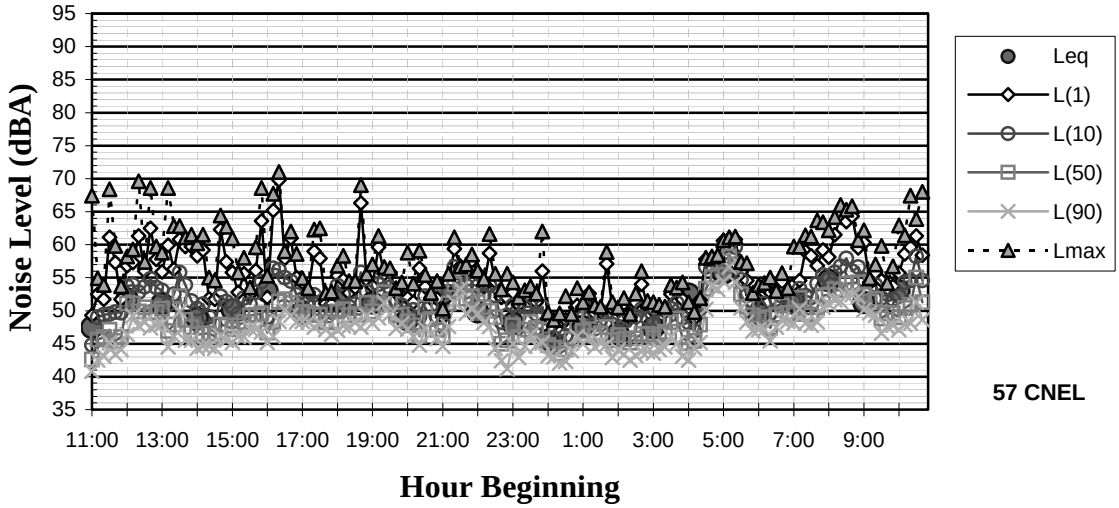


Figure 14.3: Noise Levels at LT-1
Altamont Creek Trail Behind School
December 14-15, 2011



IMPACTS AND MITIGATION MEASURES

This section assesses the significance of noise impacts and presents measures to mitigate noise impacts that would result from the development of the Project. The order of impacts generally follows the CEQA checklist questions set forth in the Regulatory Background Section of this report.

THRESHOLDS OF SIGNIFICANCE

Paraphrasing from Appendix G of the CEQA Guidelines, a project would normally result in significant noise impacts if noise levels generated by the project conflict with adopted environmental standards or plans, if the project would generate excessive ground-borne vibration, or if ambient noise levels at sensitive receivers would be substantially increased over a permanent, temporary, or periodic basis. The Project is not located within the environs of an airport, so there is no further discussion of aircraft noise. The following criteria were used to evaluate the significance of environmental noise resulting from the Project:

- A significant noise impact would be identified if the project would expose persons to or generate noise levels that would exceed applicable noise standards presented in the General Plan or Municipal Code. For single family residences the noise exposure is considered "normally acceptable" up to 60 dBA CNEL.
- A significant impact would be identified if the project would expose persons to excessive vibration levels. Ground-borne vibration levels from construction activities exceeding 0.30 in/sec PPV (peak particle velocity) would result in a significant impact as such levels would have the potential to result in damage to older residential buildings (Caltrans Guidance Manual).
- A significant impact would be identified if traffic generated by the project would substantially increase noise levels at sensitive receivers in the vicinity. Following standard practice, a substantial increase would occur if existing plus project noise levels would be 3 dBA CNEL or greater above existing conditions.
- A significant noise impact would be identified if construction related noise would temporarily increase ambient noise levels at sensitive receivers. Daily average construction noise levels exceeding 60 dBA L_{50} and 75 dBA Lmax for construction that would involve substantial noise generating activities (such as grading, excavation, use of impact equipment or building framing) continuing for more than 12 months (General Plan *Objective N-1.5*).

NOISE STANDARDS

Impact Noise-1: **Noise and Land Use Compatibility.** Residential uses that would be developed would be exposed to exterior noise levels considered "normally acceptable" by the Livermore General Plan. This is a ***less-than-significant*** impact.

The noise environment at the Project site could be characterized as affected by distant freeway traffic on I-580. Intermittent general aviation aircraft are regularly heard at the Project site, with maximum intermittent noise levels typically ranging from 50 to 60 dBA. The CNEL at the Project site is 59 dBA CNEL. Noise levels of less than 60 dBA CNEL are considered normally acceptable for residential development. The noise environment at the Project site is compatible with the proposed residential subdivision. Therefore the impact related to compatibility with noise standards is less than significant.

GROUNDBORNE NOISE AND VIBRATION

Impact Noise-2: **Ground-borne Noise and Vibration.** There are no sources of ground-borne noise or vibration that affect the Project area or would result from development of the Project area. This is a ***less-than-significant*** impact.

Ground-borne noise and vibration can result from railroad trains, railed transit systems, and heavy construction practices utilizing pile drivers or hoe-rams. The operation of the Project would not include any significant sources of ground vibration. No such activities or systems are planned within or near the Project area. Construction truck traffic traveling at low speed (25 mph or less) would access the site along Bear Creek Drive and/or Hawk Street. Residential structures are within about 25 feet of the roadways. Ground-borne vibration from a loaded truck at low speed would be less than 0.08 in./sec. PPV at a distance of 25 feet (Transit Noise and Vibration Impact Assessment, United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration, May 2006). Vibration levels may be intermittently perceptible, but would be well below a level of 0.30 inch/sec PPV that could cause damage to normal structures. This is a less-than-significant impact.

PERMANENT AMBIENT NOISE INCREASES

Impact Noise-3: **Permanent Noise Level Increases.** Project-generated traffic would cause noise levels to increase by less than 3 dBA CNEL along roadways adjoining existing residences in the area. This is a ***less-than-significant*** impact.

The development of the Project will cause an increase in vehicular traffic on the street network. Increased vehicular traffic on the streets is the only source of operational noise that would affect the noise environment in the vicinity of the Project. An increase is considered to be substantial if the noise exposure level increases by 3 dBA CNEL at a sensitive receiver. The noise exposure levels along Vasco Road, Garaventa Ranch Road, Bear Creek Road, Hawk Street, Altamont Creek Drive, Northfront Drive, and Herman Avenue were evaluated to determine whether or not the increased vehicular traffic would cause a substantial increase in the noise environment. Six intersections were analyzed in the vicinity of the Project. Traffic noise along a street is logarithmically proportional to the volume of traffic. Using traffic data developed for this study, noise levels along the roads in and around the Project area were calculated to increase above existing levels by 0-2 dBA CNEL as a result of Project generated traffic. Increases in vehicular traffic would not cause a significant noise impact to existing residents in the area.

TEMPORARY NOISE INCREASES

Impact Noise-4: **Construction Period Noise Impact.** The construction activities necessary to develop the Project would elevate noise levels in the areas near active construction sites but would comply with applicable Livermore regulations and would not cause a substantial temporary or periodic increase in ambient noise levels. This is a ***less-than-significant*** impact.

Construction activities generate noise. Typical construction noise levels resulting from the various construction phases are shown in Table 14.5. Noise levels associated with individual pieces of equipment are shown in Table 14.6. Site development including grading, construction of the Hawk Street bridge, and the loop road is scheduled to begin in April 2013 and last for about 8 months. Construction of the first model homes is scheduled for completion in February/March 2013. Home construction is scheduled to continue until February/March 2016.

Typical construction noise levels range from about 80-90 dBA at a distance of 50 feet from the center of busy construction activities. Ambient noise levels range from about 50-55 dBA in the vicinity of the Project and would experience construction activities in close proximity to the parcels. Daily average construction noise levels are calculated to exceed 60 dBA L_{50} within about 500 feet of the construction activity. Maximum intermittent noise levels are calculated to exceed 75 dBA within about 300 feet of construction equipment. Noise levels would increase throughout the period when the Project builds out, but noise levels are not projected to exceed the significance thresholds for a period of greater than 12 months at any individual sensitive receptor location.

Additionally, pursuant to General Plan Objectives N-1.2 and N-1.5 the Project is required to implement the following measures to control noise during construction:

(a) Limit construction to the hours of 7:00 AM to 7:00 PM on weekdays, and 9:00 AM to 5:00 PM on Saturdays, with no noise-generating construction on Sundays or holidays.

(b) Equip all internal combustion engine-driven equipment with mufflers which are in good condition and appropriate for the equipment.

(c) Utilize "quiet" models of air compressors and other stationary noise sources where technology exists.

(d) Locate stationary noise-generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction project area.

(e) Prohibit unnecessary idling of internal combustion engine.

(f) Prohibit construction worker's radios from being audible beyond the boundary of the project site.

(g) Designate a "noise disturbance coordinator" who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaints (e.g., starting too early, bad muffler, etc.) and institute reasonable measures warranted to correct the problem. Conspicuously post a telephone number for the disturbance coordinator at the construction site.

TABLE 14.5 TYPICAL RANGES OF ENERGY EQUIVALENT NOISE LEVELS AT 50 FEET, L_{EQ} IN DBA, AT CONSTRUCTION SITES

	Domestic Housing		Office Building, Hotel, Hospital, School, Public Works		Industrial Parking Garage, Religious Amusement & Recreations, Store, Service Station		Public Works Roads & Highways, Sewers, and Trenches	
	I	**II**	**I**	**II**	**I**	**II**	**I**	**II**
Ground Clearing	83	83	84	84	84	83	84	84
Excavation	88	75	89	79	89	71	88	78
Foundations	81	81	78	78	77	77	88	88
Erection	81	65	87	75	84	72	79	78
Finishing	88	72	89	75	89	74	84	84

I - All pertinent equipment present at site.
II - Minimum required equipment present at site.

Source: U.S.E.P.A., Legal Compilation on Noise, Vol. 1, p. 2-104, 1973.

TABLE 14.6 CONSTRUCTION EQUIPMENT 50-FOOT NOISE EMISSION LIMITS

Equipment Category	L_{max} Level (dBA)[1,2]	Impact/Continuous
Arc Welder	**73**	**Continuous**
Auger Drill Rig	**85**	**Continuous**
Backhoe	**80**	**Continuous**
Bar Bender	**80**	**Continuous**
Boring Jack Power Unit	**80**	**Continuous**
Chain Saw	**85**	**Continuous**
Compressor[3]	**70**	**Continuous**
Compressor (other)	**80**	**Continuous**
Concrete Mixer	**85**	**Continuous**
Concrete Pump	**82**	**Continuous**
Concrete Saw	**90**	**Continuous**
Concrete Vibrator	**80**	**Continuous**
Crane	**85**	**Continuous**
Dozer	**85**	**Continuous**
Excavator	**85**	**Continuous**
Front End Loader	**80**	**Continuous**
Generator	**82**	**Continuous**
Generator (25 KVA or less)	**70**	**Continuous**
Gradall	**85**	**Continuous**
Grader	**85**	**Continuous**
Grinder Saw	**85**	**Continuous**
Horizontal Boring Hydro Jack	**80**	**Continuous**
Hydra Break Ram	**90**	**Impact**
Impact Pile Driver	**105**	**Impact**
Insitu Soil Sampling Rig	**84**	**Continuous**
Jackhammer	**85**	**Impact**
Mounted Impact Hammer (hoe ram)	**90**	**Impact**
Paver	**85**	**Continuous**
Pneumatic Tools	**85**	**Continuous**
Pmps	**77**	**Continuous**
Rock Drill	**85**	**Continuous**
Scraper	**85**	**Continuous**
Slurry Trenching Machine	**82**	**Continuous**
Soil Mix Drill Rig	**80**	**Continuous**
Street Sweeper	**80**	**Continuous**
Tractor	**84**	**Continuous**
Truck (dump, delivery)	**84**	**Continuous**
Vacuum Excavator Truck (vac-truck)	**85**	**Continuous**
Vibratory Compactor	**80**	**Continuous**
Vibratory Pile Driver	**95**	**Continuous**
All other equipment with engines larger than 5 HP	**85**	**Continuous**

1 Measured at 50 feet from the construction equipment, with a "slow" (1 sec.) time constant.

2 Noise limits apply to total noise emitted from equipment and associated components operating at full power while engaged in its intended operation.

3 Portable Air Compressor rated at 75 cfm or greater and that operates at greater than 50 psi.

AIRCRAFT NOISE

Impact Noise-5: **Aircraft Noise Impact**. The Project site is located more than two miles from Livermore Municipal Airport. Noise exposure contours for the airport show that the noise exposure is less than 60 dBA CNEL. The site is located outside of the airport protection area and the airport influence area. This is a ***less-than-significant*** impact.

Aircraft noise at the Project site is below the noise exposure thresholds established by the City of Livermore and Alameda County. The site is located outside the two-mile limit established in the CEQA Guidelines and is located outside of the designated airport study areas. Impacts related to aircraft noise are ***less than significant***.

CUMULATIVE NOISE IMPACT

Impact Noise-6: **Cumulative Noise Level Increases.** The Project would not make a cumulatively considerable contribution to increased traffic noise in the area. This is a ***less-than-significant*** impact.

The development of the Project will contribute vehicular traffic to the cumulative increase in traffic projected on the street network. An increase in noise is considered to be cumulatively considerable if the cumulative noise exposure level increases by 3 dBA CNEL at a sensitive receiver and the Project is responsible for at least 1 dBA CNEL of the increase. The noise exposure levels along Vasco Road, Garaventa Ranch Road, Bear Creek Road, Hawk Street, Altamont Creek Drive, Northfront Drive, and Herman Avenue were evaluated to determine whether or not the increased vehicular traffic would cause a substantial cumulative increase in the noise environment. Six intersections were analyzed in the vicinity of the Project. Noise levels along segments of Garaventa Ranch Road, Laughlin Road, and Alameda Creek Drive will increase by 3-9 dBA CNEL as a result of cumulative traffic increases with or without the Project. The Project's contribution would be less than ½ dBA CNEL, not a cumulatively considerable contribution. Increases in vehicular traffic attributable to the Project would not cause a significant cumulative noise impact upon existing residents in the area.

15

POPULATION, PUBLIC SERVICES AND RECREATION

INTRODUCTION

This chapter of the Draft EIR contains discussion regarding three CEQA topic areas related to the increase in residents at the site: Population/Housing, Public Services, and Recreation. It describes the change in residents at the Project site and analyzes the potential for impacts on population and housing, public services, and recreation resulting from implementation of the proposed Project.

KNOWN CONCERNS

In the scoping meeting, neighbors expressed concern regarding impacts to enrollment at existing schools. These concerns have been addressed in this analysis.

POPULATION/HOUSING

SETTING

The State of California, Department of Finance (DOF), has estimated the population of Alameda County at 1,521,157 on January 1, 2011 and the City of Livermore population at 81,687 in 30,469 housing units.[1] The number of persons per household was last estimated at 2.87.[2] Note that this rate is higher than that projected in the City's General Plan Housing element (2.83 for 2010 and 2.82 for 2020)[3], so is considered a conservative number for analysis.

At the point the Livermore General Plan was written, the Association of Bay Area Governments (ABAG) projected that between 2000 and 2020, the San Francisco Bay Area population will increase by 18 percent, Alameda County by 16 percent and Livermore by 28 percent. The City and the Livermore Valley have historically grown at higher percentages than other Bay Area locations. [4]

The Livermore General Plan includes the residential growth policy to plan for an average residential population growth fixed range between 140 and 700 dwelling units annually (based on 0.5 to 2.5

[1] State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State, 2010-2011, with 2010 Benchmark. Sacramento, California, May 2011.

[2] State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State, 2001-2010, with 2000 Benchmark. Sacramento, California, May 2010.

[3] City of Livermore, prepared by EDAW/AECOM, 2009 Housing Element, Adopted March 2010, Table 2-2.

[4] City of Livermore, prepared by DC&E, City of Livermore General Plan 2003-2025, Adopted February 2004, as amended through June 2009, p. 3-40.

percent of 2002 housing units).[5] This growth policy takes into account the need for the City to accommodate a reasonable share of regional population growth with regards to Association of Bay Area Governments (ABAG) population projections. [6]

The availability of housing and jobs in a community affects the likelihood of people working and living in the same place. If there is sufficient housing and jobs supply, there is a higher chance that people could choose to live and work in the same city. A job-to-housing balance is important because it could potentially improve regional traffic and reduce pollution. At the time of preparation of the General Plan, the City had a relatively close balance between the number of local jobs and employed residents at one job per one and one-half (1:1.59) employed residents. It was projected that the jobs/employed residents balance could be maintained with the residential growth range between 140 and 700 residential units. [7]

PROPOSED PROJECT

The proposed Project would result in construction of 76 new residential units that will be sold over an approximately 2 year period. At an estimated 2.87 persons per unit[8], this would result in 218 new residents.

POPULATION/HOUSING IMPACT ANALYSIS

Standards of Significance

Under the CEQA Guidelines, Appendix G – Environmental Checklist Form, development of the Project site as proposed would have a significant environmental impact if it were to result in:

1. The inducement of substantial population growth in an area either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure); or
2. The displacement of substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere; or
3. The displacement of substantial numbers of people, necessitating the construction of replacement housing elsewhere.

Substantial Population Growth

Impact Pop-1: **Population Growth.** The Project would result in an increase of 218 residents at the Project site. However, this increase is consistent with local and regional projections and contributes to a jobs-housing balance in the area. The impact related to population growth would be considered a ***less than significant*** impact.

Development of the Project as proposed would result in construction on 76 single-family residential units, equating to an increase of approximately 218 residents at the Project site. The Project would

[5] City of Livermore, prepared by DC&E, City of Livermore General Plan 2003-2025, Adopted February 2004, as amended through June 2009, excerpt from Policy P6, p. 3-36.

[6] Ibid., excerpt from Policy P5, p. 3-36.

[7] Ibid., p. 3-40.

[8] State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State, 2001-2010, with 2000 Benchmark. Sacramento, California, May 2010.

increase the number of housing units in the City of Livermore by less than one quarter of one percent (0.249%) over that existing. This represents 5.43 percent of the targeted maximum annual growth policy of the General Plan for each of the approximately two years units will be sold.

With a community jobs-to-housing ratio of 1:1.59 jobs per home, the addition of more housing units would help contribute to a jobs-housing balance.

The Project is consistent with the growth projected in the General Plan and by ABAG. Therefore, the Project would be considered to have a ***less than significant*** impact on population growth from both a project-specific and cumulative perspective.

Displacement of Existing Housing Units and/or People

The Project would not displace any housing units or people. There would be ***no impact*** related to displacement of existing housing units or people.

PUBLIC SERVICES AND RECREATION

SETTING

The proposed Project is within the jurisdiction of the City of Livermore and would be served by City of Livermore public services, including the following.

Fire Protection and Emergency Medical Services

The Livermore-Pleasanton Fire Department (LPFD) provides fire prevention and emergency services for the City. LPFD responds to all fire, medical, rescue, and hazardous materials incidents in these two cities.

LPFD includes ten stations plus a separate headquarters and training center. The closest station to the Project site is Fire Station 8, located at 5750 Scenic Avenue. Station 8 is between 0.9 and 1.6 miles from the proposed Project access points at Hawk Street and Bear Creek Drive with no need to travel on or across Interstate 580.

LPFD responded to 10,782 calls in 2009 (the last year for which data is available), the majority of which, approximately 68%, were emergency medical service calls. The City's policy for fire services is to respond to medical emergencies and structure fire incidents within 7 minutes, 90% of the time. The City is currently meeting this policy with the first LPFD unit arriving on site within 7 minutes for 91.1% of the emergency calls. Extended response times are often the result of congested traffic particularly on freeway incidents.[9]

Police Protection Services

The Livermore Police Department provided crime prevention and law enforcement throughout the city. In 2010, the Livermore Police Department responded to 66,259 calls for service plus 39,839 officer-initiated calls and 3,954 alarm responses.[10]

[9] Livermore-Pleasanton Fire Department, 2009 Annual Report, available at http://www.cityoflivermore.net/citygov/fire/about/reports.asp

[10] Livermore Police Department, 2010 Annual Report, August 2011, available at http://www.cityoflivermore.net/citygov/police/default.asp

As of the 2010 Annual Report, the department employed 92 full-time equivalent (FTE) sworn officers and over 53 FTE professional staff. [11] While the ratio of sworn officers per 1,000 residents is not reported, using the January 1, 2011 population from Department of Finance presented in the Population section above, this can be calculated at a ratio of about 1.13 officers per 1,000 residents. The City of Livermore does not have a target ratio, but this ratio is consistent with the ratio for other cities in the Bay Area which largely range from 1.0 to 1.5 officers per 1,000 residents.

School Services

Senate Bill 50 (SB 50), which is funded by Proposition 1A, limits the power of Cities and Counties to require fiscal mitigation on home developers as a condition of approving new development and provides for a standardized developer fee. The State Allocation Board (SAB) approves increases in developer fee rates per Government Code Section 65995 (b) in response to inflation.

The Livermore Valley Joint Unified School District (LVJUSD) serves about 13,225 students in kindergarten through the 12th grade in 9 elementary schools, 2 K-8 schools, 3 middle schools, 2 comprehensive high schools, and 3 alternative schools. [12]

Students in the surrounding neighborhoods are assigned to Livermore High School (approximately 5 miles from Project site), Christensen Middle School (approximately 1 mile away) and Altamont Creek (within one quarter mile) or Croce Elementary (approximately 1 mile away) schools.[13] Table 15.1 shows the enrollment and capacity information for these schools.

Table 15.1: Capacity of Selected LVJUSD Schools

School	Capacity By Program 2009/10 [1]	Enrollment 2010/11 [2]	Available Space (+/-)
Altamont Creek Elementary	622	610	12
Croce Elementary	664	611	53
Christensen Middle	597	604	-7
Livermore High	2,043	2,000	43

[1] From information provided through correspondence with Jan Shipley, Construction Supervisor, Livermore Valley Joint Unified School District.
[2] 2010/2011 School Accountability Report Cards available at http://www.livermoreschools.com/cms/page_view?d=x&piid=&vpid=1229222749521

Based on 2010/2011 enrollment and 2009/2010 capacity information (the most recent available), there is available capacity for students from new developments within the current elementary schools and high school that would be anticipated to serve this development though the middle school anticipated to serve this development is marginally over capacity. It is projected that on a cumulative level, new

[11] Livermore Police Department, 2010 Annual Report, August 2011, available at http://www.cityoflivermore.net/citygov/police/default.asp

[12] Livermore Valley Joint Unified School District webpage: http://www.livermoreschools.com/cms/page_view?d=x&piid=&vpid=1228578813027.

[13] Livermore Valley Joint Unified School District, Street Guide School Assignments, available at: http://www.livermoreschools.com/Location.

schools would need to be developed to accommodate all students through build-out of the General Plan.[14]

Parks and Recreation

Since the passage of the 1975 Quimby Act (California Government Code §66477), Cities and Counties have been authorized to pass ordinances requiring that developers set aside land, donate conservation easements or pay fees for park improvements.

The Livermore Area Recreation and Park District (LARPD) was created in 1947 as an Independent Special District to provide recreation and park opportunities and services within the borders of the Murray Township including the City of Livermore separate from other local government in the Livermore Valley area. LARPD operates 27 neighborhood parks, three community parks, 11 special use parks and facilities, and five open space parks and preserves within the Livermore Area. Total parkland acreage provided in LARPD-operated parks is 1,778 acres, with over 75% of the acreage provided through open space parks and preserves (a total of 1,360 acres). [15]

LARPD's established level of service guidelines (acres/1000) for neighborhood parks (for relaxation or informal active recreation such as picnic areas and playgrounds), community parks (larger parks that include formal active recreation including playfields and/or courts) and special use parks (single-use areas such as a skate park, BMX course or cultural site) is 2 acres per 1,000 population for each of these three park types, which equates to an overall service goal of 6 acres per 1,000 population. Existing parkland provided by LARPD provides approximately 4.5 acres per 1,000 population, which is slightly less than the 6 acres per 1,000 goal. LARPD also has walkability targets of having a neighborhood park located within ¾ to 1 mile from every resident and a community park within 2 miles. The primary goal for Open Space is conservation and protection of natural resources, so a population level of service guideline is not applied. Similarly, LARPD does not establish a level of service guideline for the amount of trails because the recommended trail system for the Livermore Area is based upon optimal locations for trails to provide scenic recreation opportunities and local and regional connectivity rather than a specified amount of linear trail miles. Existing multi-use trails within LARPD's jurisdiction provide 0.31 miles of trail per 1000 people.[16]

LARPD also manages the 24-acre Garaventa Wetlands Preserve, located to the west of the Project site, as discussed in more detail in Chapter 7: Biological Resources.

PUBLIC SERVICES AND RECREATION IMPACT ANALYSIS

Standards of Significance

Under the CEQA Guidelines, Appendix G – Environmental Checklist Form, development of the Project site as proposed would have a significant environmental impact if it were to result in:

1. Substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction

[14] Livermore Valley Joint Unified School District, prepared by Government Financial Strategies Inc, Developer Fee Justification Study, March 2010.

[15] City of Livermore Community Development Department, Livermore Area Recreation and Park District 2008 Parks, Recreation and Trails Master Plan, Adopted October 29, 2008.

[16] City of Livermore Community Development Department, Livermore Area Recreation and Park District 2008 Parks, Recreation and Trails Master Plan, Adopted October 29, 2008.

of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

- fire services
- police services
- schools
- parks
- other public facilities

2. Increased use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated

All Public Services and Recreation

Impact Services-1: Increased Public Service Demand. The Project would increase the number of residents at the site. However, the Project could be adequately served with existing facilities and the impact related to public services would be considered ***less than significant***.

Additional discussion is provided below.

Fire and Police Protection

The Project would result in new residential development and population, which would increase demand for fire and emergency medical protection services and police services. The police and fire departments are funded through the City's General Fund. The Project is near an existing fire station (Station 8) and with an increase of only 218 residents, the Project is not anticipated to substantially change services ratios or the ability to provide adequate services with existing facilities.

Project-specific and cumulative contributions to increased demand for fire and police services are addressed through annual taxes. The Project would have a ***less than significant*** impact on the City's police and fire protection services.

Schools

The proposed Project would generate approximately 21 elementary, 14 middle and 17 high school students from the Project site (using LVJUSD student yield rates of 0.27 elementary students, 0.18 middle and 0.23 high school students for each single-family home[17]), thereby increasing demand for school facilities in the school districts. From the current enrollment status, it can be assumed that these new students would attend schools at or near capacity levels (marginally above or below).

The student generation from this particular Project is relatively small and would not in itself require dedicated new school facilities. Funds would be needed for equipment and staffing, and ultimately construction of expansions to existing school facilities and/or new schools to meet cumulative demands. School funding typically has a number of sources, such as property tax, State General Funds, special taxes and developer fees. As discussed in the setting above, the assessment of developer fees is regulated through the State Government Code. The School District would be responsible for environmental assessment of any new schools proposed to meet future cumulative needs. Because the

[17] Livermore Valley Joint Unified School District, prepared by Government Financial Strategies Inc, Developer Fee Justification Study, February 2012.

proposed Project would pay school mitigation fees consistent with State law, and the school district would be required to perform environmental review of any additional facilities prior to construction, potential impacts due to increased school enrollment would be ***less than significant***.

Parks and Recreation

There are a number of existing neighborhood parks within ¾ of a mile of the Project site, including the 6 acre Altamont Creek Park south across Altamont Creek from the Project, the 4.2 acre Summit Park to the south, and the 8.24 acre Christensen Park to the west. The community parks in Livermore are all located to the south of Interstate 580, the closest of which is the 29.86 acre Robert Livermore Community Center and Community Park approximately 4.5 miles away and May Nissen Community Park and Swim Center approximately 5.5 miles away. The northeast area of Livermore, where the Project is located, is noted to be underserved by community parks. To meet this need, LARPD has identified opportunities to add additional amenities to existing smaller parks to accommodate more intense use and the possibility for locating a sports park or community park outside the Urban Growth Boundary northeast of I-580. Both Christensen and Altamont Creek Parks currently provide sports fields. [18]

Utilizing the LARPD's target ratio of 6 acres per 1,000 residents and residents per unit from the Department of Finance as discussed under Population, above, the proposed Project would generate the need for an additional 1.3 acres of park area. The Project does not include any parkland, though it does include approximately 12 acres of open space, making up 38% of the Project site with approximately 0.3 miles of trails around the knoll areas.

The City allows land dedication and improvement and/or park in-lieu fees per chapter 12.60 of the Livermore Municipal Code to satisfy park requirements of a project. The Project will pay appropriate in-lieu park fees according to the City's adopted Park Facilities Fee Schedule in place at the time of development, discounting for any credit given for the proposed open space and trails through consultation with LARPD. This fee is used toward expanded park facilities (acquisition and improvement) to serve the new development. With the open space and trail provisions as well as required payment of park facilities fees as discussed above, the impact of the Project related to physical deterioration of existing parks would be ***less than significant***.

Other Facilities

As with the public services listed above, while the Project could result in a marginal increase in use of other facilities in Livermore, such as libraries, due to increase of residents on the Project site. The Springtown branch of the Livermore Public Library system is located approximately 2.5 miles to the southwest of the Project and is currently open on Tuesdays only.[19] It can be assumed that increases in demand from this Project and cumulative increases would be dealt with through increased hours of operation and would not result in the construction of new facilities, the construction of which would cause environmental impacts. The net effect on other facilities would be considered ***less than significant***.

[18] City of Livermore Community Development Department, Livermore Area Recreation and Park District 2008 Parks, Recreation and Trails Master Plan, Adopted October 29, 2008.

[19] Ibid.

This page intentionally left blank

16

TRANSPORTATION AND CIRCULATION

INTRODUCTION

This chapter of the Draft EIR analyzes the potential impacts on transportation and circulation resulting from implementation of the Garaventa Hills Project. Transportation-related issues of concern that are addressed include traffic on roadways, transit riders, bicycles, pedestrians, and parking. Transportation impacts are assessed for the proposed Project during weekday AM peak-hour during the commute period and the PM peak-hour, derived from a four-hour count to incorporate school-related traffic.

The traffic analysis and this chapter were prepared by Kittelson and Associates (formerly Dowling Associates).

KNOWN CONCERNS

In the scoping meeting, neighbors expressed concern regarding the influence of circulation in and around Altamont Creek Elementary School and possibility of cut-through traffic along Bear Creek Drive.

Caltrans provided direction in a letter dated December 7, 2011 regarding analysis of transportation conditions. In particular, identification of traffic impact fees and how the Project will affect state-owned roadway facilities will be discussed. Additionally, I-580 operates at sub-standard levels of service in some segments. While the Project is expected to contribute a minor volume of vehicle traffic to I-580, the Project's traffic will need to be quantified and its impacts analyzed.

These concerns have been addressed in this analysis.

SETTING

The proposed Project is located in northeastern Livermore in close proximity to North Vasco Road and Garaventa Hills Road. Bear Creek Drive would be extended further west to provide access from Laughlin Road. Hawk Street would be extended to the north with a bridge over Altamont Creek to provide access from Garaventa Ranch Road. **Figure 16.1** presents the project site and study locations.

In the immediate vicinity of the Project is the planned unit development of Maralisa, a residential community with an elementary school and park. The closest commercial uses are found on North Vasco Road south of Crestmont Avenue, about 0.7 miles away from the Project site. These commercial uses are predominantly strip malls consisting of fueling stations, national chain stores and fast food restaurants.

Figure 16.1: Project Area and Study Locations

Roadway Network

The northeast section of Livermore in which the Project site is located consists of a curvilinear suburban roadway network that is hierarchically arranged as arterial, collector, and residential streets. Most residences are accessed from local and cul-de-sac streets while commercial uses are accessed from arterials and collectors.

- ***Interstate 580 (I-580)*** – I-580 is an east-west divided freeway with four westbound lanes and five eastbound lanes (including one carpool lane for 2 or more passengers in the AM and PM peak hours) in the project vicinity. It is part of the Interstate Highway System and provides regional access to San Joaquin and San Francisco Counties. The posted speed limit along I-580 is 65 miles per hour. A number of transit agencies operate Express bus service using I-580. Pedestrians and bicyclists are prohibited from using the freeway.

- ***Vasco Road*** – Vasco Road is a north-south roadway designated as part of Alameda County's Metropolitan Transportation System. I-580 serves as the delineator between North Vasco and South Vasco Roads. It serves as a commuter route between eastern Contra Costa County and Alameda County and provides access to I-580. Within the Project study area, Vasco Road has four travel lanes with a raised, landscaped median. Residential subdivisions are found north of Crestmont Avenue and a mix of commercial uses and residential subdivisions are found from Crestmont Avenue to the I-580 freeway. Access to commercial developments is found directly off of Vasco Road, but residential access is provided by local streets that intersect with Vasco Road. On-street parking is prohibited and there are no transit stops in the Project area on Vasco Road, although transit service operates on portions of it. Sidewalks are provided along both sides of the street, marked crosswalks are found at signalized intersections, and curb ramps are found at the intersections. Bike lanes are provided on both sides of the roadway. The posted speed limit along Vasco Road is 45 miles per hour.
- ***Northfront Road*** – Northfront Road is an east-west, two-lane roadway with sparse residential and commercial land uses. It parallels I-580, which is located on the south side. East of Laughlin Road, it becomes Altamont Pass Road and provides access to I-580 ramps near Greenville Road. Between North Vasco Road and Herman Avenue, Northfront Road has intermittent, partial sidewalks but no marked crosswalks. One bus route operates along Northfront Road in the eastbound direction with only one stop near Vasco Road. There are no bikeways on Northfront Road and on-street parking is prohibited. The posted speed limit along Northfront Road is 45 miles per hour.
- ***Laughlin Road*** – Laughlin Road is a north-south, two-lane roadway with residential subdivisions on the west side and sparse land uses on the east side, including a former elementary school. Access to the residential subdivisions is provided by local streets that intersect with Laughlin Road. Sidewalks are located on the western side of the roadway from Sunridge Drive to Meadow Glen Drive, but there are no marked crosswalks. There are no bikeways and on-street parking is prohibited. Transit service does not operate on Laughlin Road. The posted speed limit along Laughlin Road is 40 miles per hour.
- ***Garaventa Ranch Road*** – Garaventa Ranch Road is an east-west, two-lane collector street that curves to become north-south Herman Avenue at Altamont Creek Drive. From North Vasco Road to Altamar Way, it has a raised, landscaped median. Garaventa Ranch Road is lined with an apartment complex and residential subdivisions, which are accessed from local streets that intersect with it, and provides direct access to Altamont Creek Elementary School. Pedestrian and bicycle access to Garaventa Ranch Road is provided from most cul-de-sacs except those near Altamont Creek Elementary School. On-street parking is only allowed on the north side of the roadway in front of Altamont Creek School. Sidewalks are found along both sides of the street and curb ramps are installed at intersections. Marked crosswalks are installed intermittently at stop-controlled legs

of intersections and at uncontrolled crossings. Bike lanes are found along both sides of the street. Wheels transit service, Route 15, has bus stops at Perriwinkle Common, Hawk Road, and Altamont Creek Drive in the Project study area. The posted speed limit along Garaventa Ranch Road is 25 miles per hour.

- ***Altamont Creek Drive*** – Altamont Creek Drive is an east-west, two-lane, collector street that is lined with Altamont Creek Elementary School grounds, a local park, and residential subdivisions that are accessed from local streets that intersect with it. Sidewalks are located on both sides of the street, along with a multi-use trail on the north side of the street that follows Altamont Creek between Laughlin and North Vasco Roads. Marked crosswalks are installed intermittently at stop-controlled legs of intersections and at uncontrolled crossings. Curb ramps are found at all intersections and on-street parking is allowed on both sides of the street. There is no transit service on Altamont Creek Drive. The posted speed limit along Altamont Creek Drive is 25 miles per hour.
- ***Bear Creek Road*** – Bear Creek Road is an east-west, two-lane, local street that is lined with single-family residences. It currently dead-ends west of Blackoak Court. Sidewalks are provided on both sides of Bear Creek Road and on-street parking is allowed on both sides. Curb ramps are found at all intersections but there are no marked crosswalks. There are no bikeways or transit service along Bear Creek Road.
- ***Hawk Street*** – Hawk Street is a north-south, two-lane, local street that is lined with Altamont Creek Elementary School and a residential subdivision. It currently dead-ends at Altamont Creek just north of Magnolia Common. It provides direct access to Altamont Creek trail and Altamont Creek Elementary School's pick-up and drop-off area for handicapped students. Sidewalks are provided on both sides of Hawk Street and on-street parking is allowed on both sides. Curb ramps are found at all intersections but there is only one marked crosswalk located at Garaventa Ranch Road. There are no bikeways or transit service along Hawk Street.

INTERSECTION OPERATIONS

The existing condition at local intersections was analyzed for the weekday AM and PM peak hours. Counts were done during the typical AM commute hours (7:00 AM to 9:00 AM) and a four-hour period in the PM to capture peak departures from Altamont Creek Elementary School and the typical PM commute hours (2:00 PM to 6:00 PM). Manual intersection counts were conducted in December 2011 while Altamont Creek Elementary School was still in session.

Signalized Intersection Methodology

Intersections, rather than roadway segments between intersections, are the capacity controlling locations for a circulation system such as the Project study area. Signalized intersection operation is graded based upon two different scales. The first scale employs a grading system called Level of Service (LOS) which ranges from LOS A, indicating uncongested flow and minimum delay to drivers, down to LOS F, indicating significant congestion and delay on most or all intersection approaches. The LOS scale is also associated with a control-delay tabulation as defined by the Transportation Research Board (TRB) in the *Highway Capacity Manual* (*HCM2000*). The control delay designation allows for a more detailed examination of the impacts of a particular project. **Table 16.1** presents the correlation between LOS and average control delay for signalized intersections.

Each jurisdiction determines acceptable LOS for intersections under its jurisdiction. The City of Livermore considers mid-level LOS D (average vehicle delay greater than 45 seconds) or worse to be an unacceptable level for signalized intersections, except for those downtown or near freeway interchanges. These standards are discussed in more detail under the Significance Criteria subsection later in this chapter.

Table 16.1: Signalized Intersection LOS Criteria

Level of Service	Average Delay (seconds/vehicle)	Description
A	≤ 10	Very Low Delay: This level of service occurs when progression is extremely favorable and most vehicles arrive during a green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	> 10 and ≤ 20	Minimal Delays: This level of service generally occurs with good progression, short cycle lengths, or both. More vehicles stop than at LOS A, causing higher levels of average delay.
C	> 20 and ≤ 35	Acceptable Delay: Delay increases due to fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level of service. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.
D	> 35 and ≤ 55	Approaching Unstable Operation/Significant Delays: The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume / capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	> 55 and ≤ 80	Unstable Operation/Substantial Delays: These high delay values generally indicate poor progression, long cycle lengths, and high volume / capacity ratios. Individual cycle failures are frequent occurrences.
F	> 80	Excessive Delays: This level, considered unacceptable to most drivers, often occurs with oversaturation (that is, when arrival traffic volumes exceed the capacity of the intersection). It may also occur at high volume / capacity ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Source: *Highway Capacity Manual* (HCM), Transportation Research Board, Washington, DC, 2000, Chapter 16 (Signalized Intersections)

Unsignalized Intersection Methodology

Unsignalized intersection operations are also graded using the LOS A through F scale. LOS ratings for all-way stop-controlled intersections are determined using the HCM2000 methodology. Under this methodology, operations are based on average control delay for the entire intersection. Side-street stop-controlled intersections are also evaluated using average control delay scales and LOS; however, unlike all-way stop-controlled intersections, side-street stop-controlled intersection delay is determined based on the worst operating controlled turning or through movement. **Table 16.2** presents the correlation between LOS and average control delay for unsignalized intersections.

The City of Livermore has no set standard for LOS at unsignalized intersections. However, standards used for this analysis are discussed in more detail under the Significance Criteria subsection later in this chapter.

Table 16.2: Unsignalized Intersection LOS Criteria

Level of Service	Average Delay (seconds/vehicle)	Description
A	≤ 10	Very Low Delay
B	> 10 and ≤ 15	Minimal Delays
C	> 15 and ≤ 25	Acceptable Delay
D	> 25 and ≤ 35	Approaching Unstable Operation and/or Significant Delays
E	> 35 and ≤ 50	Unstable Operation and/or Substantial Delays
F	> 50	Excessive Delays
LOS for all-way stop-controlled intersections is based on the weighted average, while LOS at side-street stop-controlled intersections is based on the approach with the highest delay.		
Source: *Highway Capacity Manual* (HCM), Transportation Research Board, Washington, DC, 2000, Chapter 17 (Unsignalized Intersections)		

Analysis Software

The City maintains an intersection LOS analysis model using the TRAFFIX™ software that covers all General Plan study intersections in Livermore. The methodology used to calculate LOS is based on the *Highway Capacity Manual* (HCM) 2000 Operations Method (Transportation Research Board 2000) that calculates delay at all signalized and unsignalized intersections. For the purpose of this transportation analysis, the model was expanded to address additional intersections in the study area.

Analysis of Existing Conditions

Based on the current turning movement volume data and intersection lane configurations, the existing intersection LOS has been calculated for the following six intersections:

1. North Vasco Road & Garaventa Ranch Road
2. Laughlin Road & Bear Creek Drive
3. Hawk Street & Garaventa Ranch Road
4. Laughlin Road & Altamont Creek Drive
5. Laughlin Road & Northfront Road
6. Herman Avenue-Garaventa Ranch Road & Altamont Creek Drive

Figure 16.2 shows the study intersections, lane configurations, traffic control, and existing AM and PM peak hour turning movement volumes. Detailed counts are located in the Appendix H.

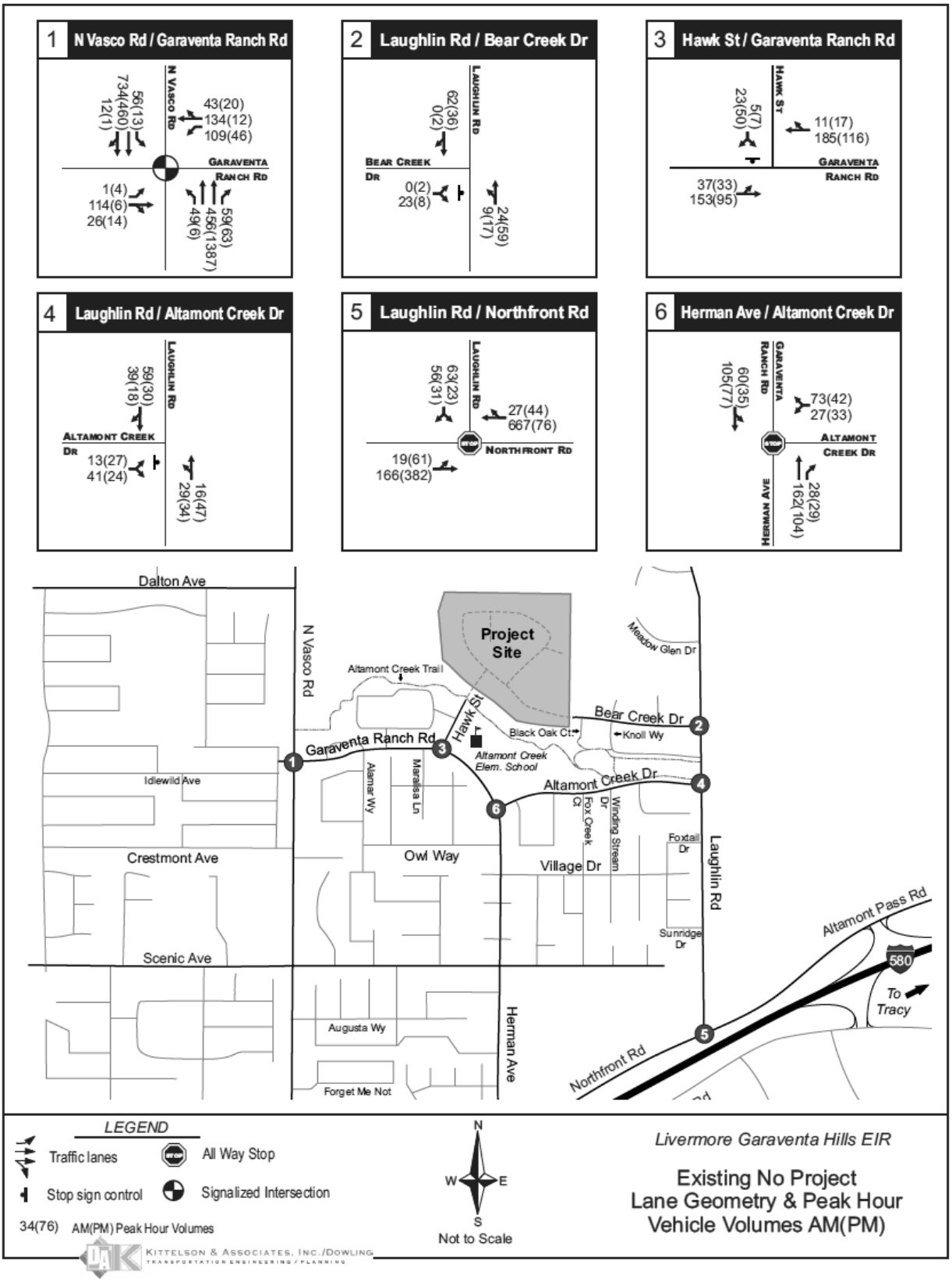


Figure 16.2: Existing Vehicle Turning Movement Volumes and Geometries

As presented in **Table 16.3**, all study intersections currently operate within acceptable levels.

Table 16.3: Existing Intersection Level of Service – Weekday Peak Hour

	Intersection	Traffic Control[1]	Peak Hour	LOS	Delay[2] (sec/veh)
1	North Vasco Road & Garaventa Ranch Road	Signal	AM	C	30.0
			PM	A	7.7
2	Laughlin Road & Bear Creek Drive	SSS	AM	A	8.8
			PM	A	8.7
3	Hawk Street & Garaventa Ranch Road	SSS	AM	B	11.2
			PM	B	10.5
4	Laughlin Road & Altamont Creek Drive	SSS	AM	A	9.2
			PM	A	9.2
5	Laughlin Road & Northfront Road	AWS	AM	D	26.2
			PM	B	11.0
6	Herman Avenue-Garaventa Ranch Road & Altamont Creek Drive	AWS	AM	A	9.9
			PM	A	8.3
1	**Signal** = Signalized intersection; **AWS** = All-Way Stop-Controlled intersection; **SSS** = Side-Street Stop-Controlled intersection.				
2	Delay shown is the weighted average delay in seconds per vehicle. For signal and AWS, LOS is based on delay for all intersection approaches. For SSS, LOS is based on the intersection approach with the highest delay.				
Counts conducted Thursday, December 1, 2011.					
Source: Kittelson and Associates, 2012					

24-HOUR VEHICLE COUNTS

In addition to the manual intersection counts, machine counts were conducted to collect vehicle volumes and speeds for a 24-hour period at three locations. Data was collected on a weekday in early December 2011 while Altamont Creek Elementary School was still in session. The counting tubes were placed in the roadway at the following locations:

A. Garaventa Ranch Road west of Maralisa Lane
B. Altamont Creek Drive west of Fox Creek Court
C. Laughlin Road south of Foxtail Drive

24-hour volumes on these roadways for both directions of travel ranged from 976 to 1,830 vehicles, as shown in **Figure 16.3** shows the 24-hour volumes, which are summarized in **Table 16.4**. Detailed counts are located in the Appendix H.

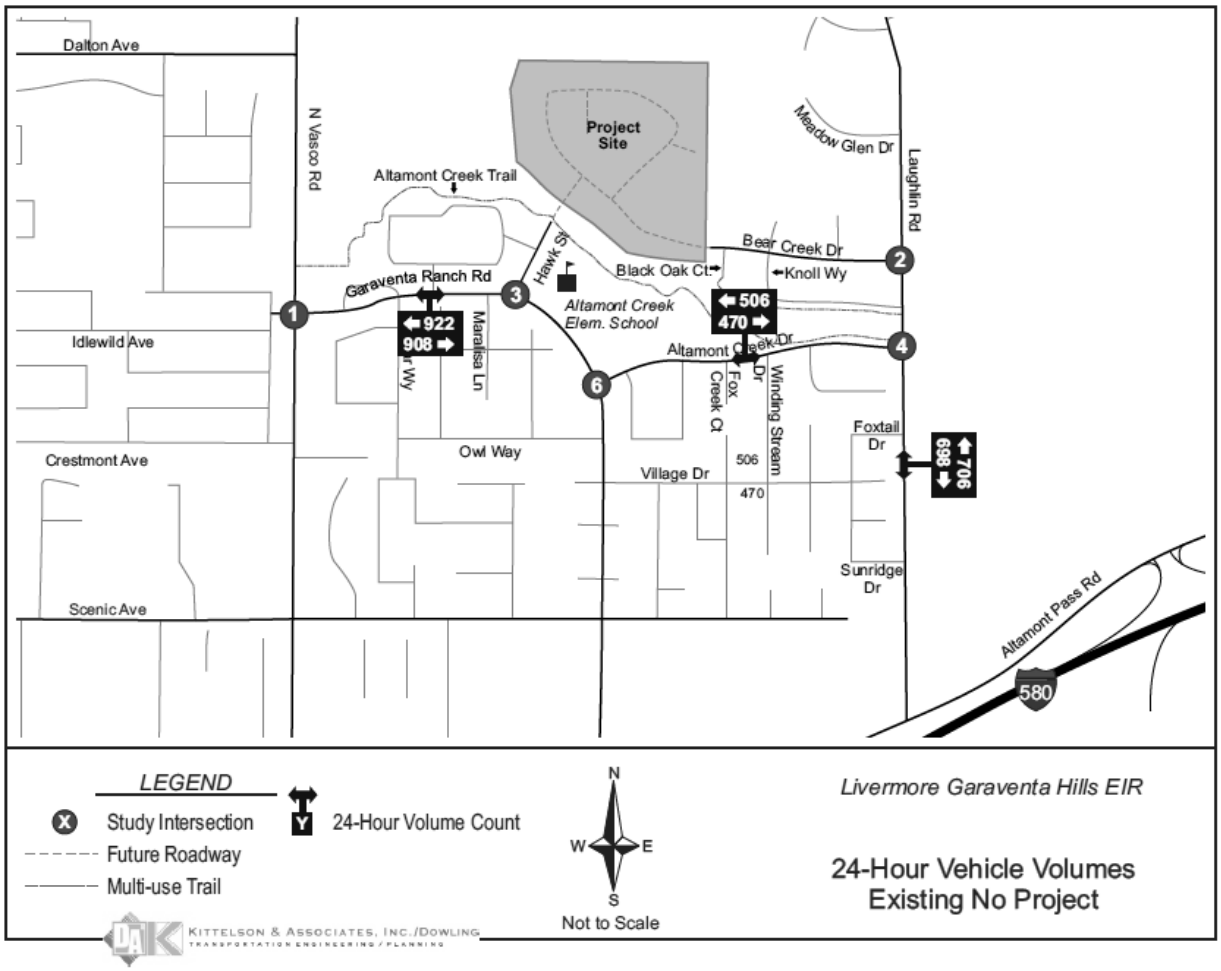


Figure 16.3: Existing 24-Hour Vehicle Volumes

Table 16.4: Existing 24-Hour Vehicle Volumes - Weekday

	Roadway	Vehicle Volume	Direction	Vehicle Volume	Direction	Total Vehicle Volume
A	Garaventa Ranch Road west of Maralisa Lane	908	Eastbound	922	Westbound	**1830**
B	Altamont Creek Drive west of Fox Creek Court	470	Eastbound	506	Westbound	**976**
C	Laughlin Road south of Foxtail Drive	700	Northbound	698	Southbound	**1398**
24-hour counts conducted on Thursday, December 1, 2011 for locations B and C and on Tuesday, December 6,2011 for location A.						
Source: Kittelson and Associates, 2012						

FREEWAY OPERATIONS

The I-580 freeway through the Livermore Valley under existing conditions experiences severe bottleneck conditions during commute times, and as such, traditional methods like the Highway Capacity Manual method for analysis of level of service which rely on traffic counts would not identify impacts as accurately as travel time runs. Therefore, the existing operations on the I-580 freeway were evaluated using information from the Alameda County CMP 2010 LOS Monitoring Study developed by the Alameda County Transportation Commission (ACTC)[1] and included here by reference. The ACTC report used travel time runs to identify existing segments operating at LOS F conditions. During the AM peak hour, four segments on westbound I-580 between Greenville Road to Portola Avenue were identified as deficient. During the PM peak hour, five eastbound segments between Foothill Road and El Charro Boulevard were identified as deficient. Other segments are likely operating at substandard conditions (LOS D or worse).

Freeway Methodology

Freeway operations were evaluated based on quantifying the addition of new traffic generated by the proposed Project on I-580 and evaluated against the information from ACTC's Alameda County CMP 2010 LOS Monitoring Study and the Caltrans significance criteria for identifying impacts. Cumulative impacts are evaluated using the cumulative volumes from the City of Livermore General Plan travel demand model and the Caltrans significance criteria that identify addition of project traffic added to already deficient segments.

PEDESTRIAN CONDITIONS

This section qualitatively describes facilities for pedestrians in the study area in terms of walkways, roadway crossings, and trails, as well as summarizes peak-hour pedestrian crossing counts.

Walkways

In general, sidewalks of 5-foot width or more and intersection curb ramps are found on both sides of the street in the more recently developed areas around the Project site. North Vasco Road, Bear Creek Drive, Garaventa Ranch Road, Altamont Creek Drive, and Hawk Street are study roadways with continuous pedestrian walkway facilities. However, Laughlin Road and Northfront Road do not have continuous walkway facilities.

Sidewalks and intersection curb ramps are found on the western side of Laughlin Road between Sunridge Drive Meadow Glen Drive, but there is no sidewalk from Sunridge Drive to Northfront Road on the western side. There is no sidewalk on the eastern side of Laughlin Road, as there is minimal development there.

Northfront Road has intermittent, partial sidewalks on the north side of the roadway between North Vasco Road and Herman Avenue and no sidewalk between Herman Avenue and Laughlin Road. A sidewalk segment on the south side of Northfront Road is found near the Vasco Road intersection but no sidewalk from there to Laughlin Road, as the south side is adjacent to the I-580 freeway and has minimal development.

[1] Formerly the Alameda County Congestion Management Agency (ACCMA)

Many of the existing cul-de-sac streets in the project vicinity have walkways that provide direct access to collector roadways of Garaventa Ranch Road and Laughlin Road, to Altamont Creek trail, and to other local streets. These connections aid pedestrian access by reducing walking times between residences, transit stops, and activity centers.

Roadway Crossings

Marked crosswalks in the study area are found on at least one leg of signalized intersections but are less frequently found at unsignalized intersections. Regardless of markings, pedestrians are permitted to cross at all intersection legs unless they are specifically prohibited from doing so.

At signalized intersections on North Vasco Road, marked crosswalks are accompanied by pedestrian signal heads, pedestrian actuation, and directional curb ramps. Pedestrians are prohibited from crossing the south leg of Scenic Avenue. High-contrast detectable warning pads are found on curb ramps at the Garaventa Ranch Road intersection. Pedestrians crossing North Vasco Road intersections encounter 88 to 108 foot curb-to-curb widths, equating to approximately 25 to 31 seconds of roadway exposure. Distances between signalized intersections range from roughly 550 feet to 1410 feet, about 3 to 7 minutes of walking time. There are no marked crosswalks or other crossing aids at unsignalized intersections across North Vasco Road in the study area.

On Garaventa Ranch Road, marked crosswalks are found at all legs of the Altamont Creek Drive intersection (all-way stop) and on the eastern and northern legs of Hawk Street (side-street stop-controlled on Hawk Street). Both intersections are in close proximity to Altamont Creek Elementary School and have standard school (yellow) crosswalks. The Hawk Street intersection is manned by a crossing guard during peak school arrivals and departures. Street widths across Garaventa Ranch Road are about 55 feet, resulting in 16 seconds of roadway exposure for crossing pedestrians.

On Altamont Creek Drive, marked crosswalks are found on the eastern leg of the Winding Stream Drive intersection (side-street stop-controlled on Winding Stream Drive) and on the western leg of Laughlin Road (side-street stop-controlled on Altamont Creek Drive). Both crosswalks provide direct access to Altamont Creek Trail. Street widths across Altamont Creek Drive are about 43 feet, resulting in 12 seconds of roadway exposure for crossing pedestrians.

Northfront Road has no marked crosswalks except at the signalized intersection with North Vasco Road. Laughlin Road has no marked crosswalks across the roadway, but local streets that intersect with Laughlin Road have marked crosswalks.

Curb extensions, pedestrian-actuated beacons or warning lights, pedestrian mid-block refuges, and other crossing devices are generally not found in the study area.

Trails

In addition to the roadways, there is Altamont Creek Trail, a paved multi-use path lining both sides of Altamont Creek for use by non-motorized modes, such as walking and biking. The southern trail extends from Laughlin to North Vasco Road. The northern trail goes from Laughlin Road to Hawk Street. A foot bridge over the creek is found between Knoll Way and Blackoak Court, which provides walking and biking access between the Bear Creek residences and Altamont Creek Elementary School and park.

Pedestrian Counts

Counts of pedestrian crossings at the study intersections were conducted at the same time as the intersection turning movement counts. Counts were conducted by intersection leg for the peak-hours (7:00 AM to 9:00 AM and 2:00 PM to 6:00 PM) to capture peak school and work commute times. Intersections with the highest pedestrian crossings were located near Altamont Creek Elementary School, particularly at the Garaventa Ranch Road-Hawk Street intersection. Afternoon peak-hour pedestrian crossings at intersections near the school corresponded to the school's dismissal times (2:40 and 2:50 PM) whereas other intersections had peak-hour pedestrian crossings during typical work commute hours. **Table 16.5** details the results and **Figure 16.4** displays a summary of the pedestrian crossing volumes by intersection leg. Detailed counts are located in the Appendix H.

Table 16.5: Existing Pedestrian Intersection Counts – Weekday Peak Hour

	Intersection	Peak-Hour Time Period	Total Peak Hour
1	North Vasco Road & Garaventa Ranch Road	7:45-8:45 AM	6
		2:15-3:15 PM	16
2	Laughlin Road & Bear Creek Drive	7:30-8:30 AM	1
		4:15-5:15 PM	5
3	Hawk Street & Garaventa Ranch Road	7:45-8:45 AM	123
		2:30-3:30 PM	110
4	Laughlin Road & Altamont Creek Drive	7:15-8:15 AM	3
		4:00-5:00 PM	13
5	Laughlin Road & Northfront Road	7:30-8:30 AM	1
		3:45-4:45 PM	1
6	Herman Avenue-Garaventa Ranch Road & Altamont Creek Drive	7:45-8:45 AM	45
		2:30-3:30 PM	28
Counts conducted Thursday, December 1, 2011.			
Source: Kittelson and Associates, 2012			

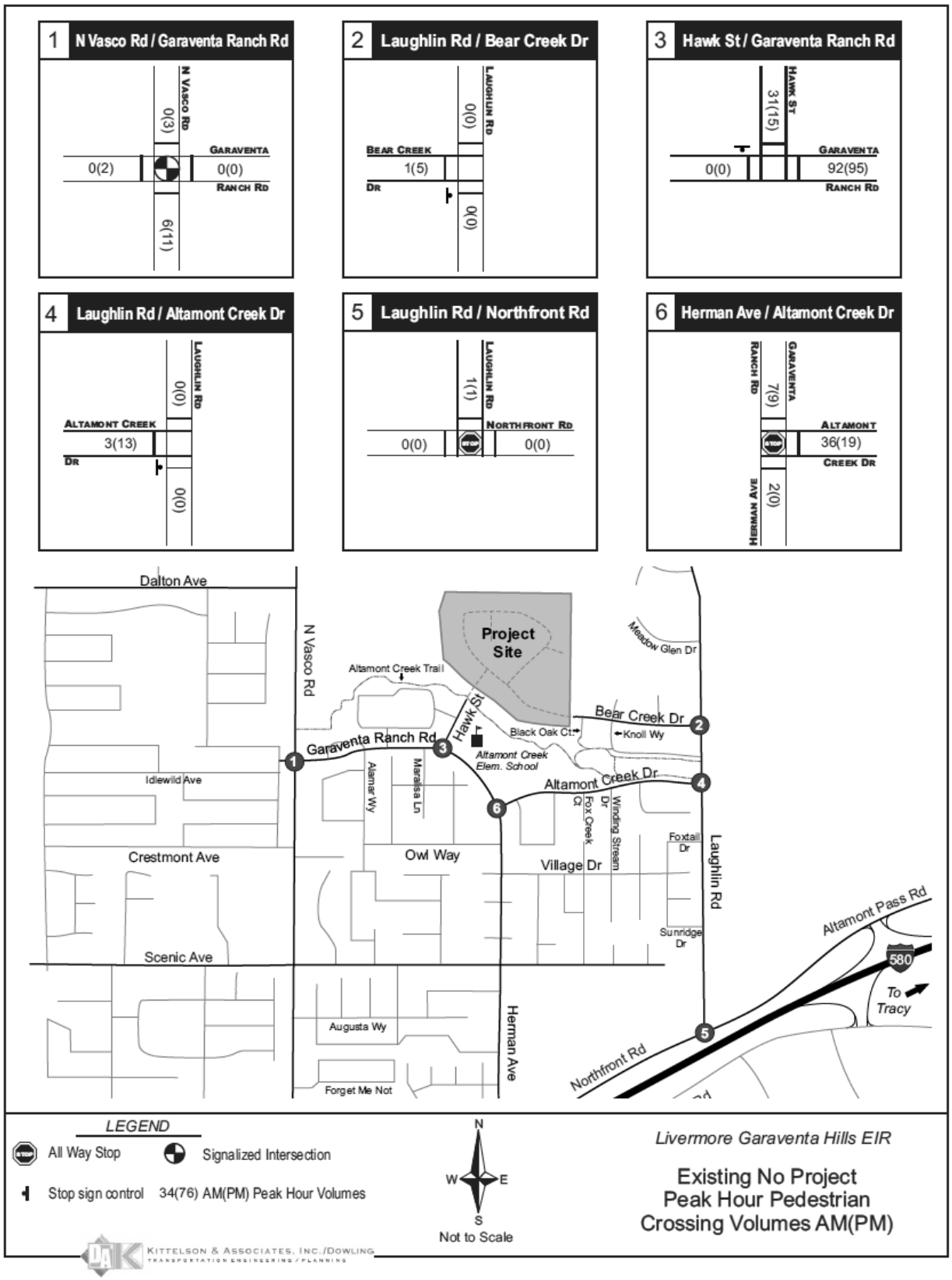


Figure 16.4: Peak-Hour Pedestrian Crossing Volumes

BICYCLE CONDITIONS

This section qualitatively describes facilities for bicyclists in the study area in terms of bikeways, parking, detection at signalized intersections, and transit, as well as summarizes peak-hour bicyclist turning movement counts.

There are three classes of bikeways that are commonly used in North America: Class I – Multi-Use Trails, Class II – Bike Lanes, and Class III – Bike Routes. In the project study area, Class I trails are found along Altamont Creek between Laughlin Road and North Vasco Road. 5-foot wide Class II bike lanes are found on North Vasco Road, Garaventa Ranch Road-Herman Avenue, and Scenic Avenue. According to the City of Livermore's *Bikeway Map* (2008), planned bikeway facilities in the study area include trails extensions east and west along Altamont Creek and Laughlin road north of Altamont Creek and bike lanes to connect North and South Vasco Road across the I-580 interchange. **Figure 16.5** displays a map of existing and planned bikeways in the project area.

Livermore's zoning code requires new developments to provide bike parking, but bike parking in the public right-of-way was not found in the study area. Altamont Creek Elementary School provides a bike cage that is located near the Garaventa Ranch Road-Hawk Street intersection.

The City of Livermore relies on video detection at its signalized intersections, which are calibrated to detect bicyclists waiting in the travel or bike lane.

Transit agencies operating in Livermore accommodate bicyclists in transit vehicles. Wheels' fixed-route bus service provides room for 2 bicycles on external, front-loading racks. The Altamont Commuter Express (ACE) train service includes a bike car that holds up to 16 bicycles plus coach cars that have 4 bike stalls each. Bicycles are allowed on Bay Area Rapid Transit (BART) trains during non-commute hours.

Counts of bicyclist turning movements at the study intersections were conducted at the same time as the vehicle counts. Counts were conducted for the peak-hours (7:00 AM to 9:00 AM and 2:00 PM to 6:00 PM) to capture peak school and work commute times. Garaventa Ranch Road-North Vasco Road intersection had the highest bicyclist volumes and peak-hour counts corresponded to Altamont Creek Elementary School's bell schedule. Additionally, the other two study intersections on Garaventa Ranch Road and the Laughlin Road-Northfront Road intersection afternoon peak hour counts corresponded to the school's dismissal times (2:40 and 2:50 PM). The remaining study intersections had peak-hour bicycle volumes during typical work commute hours. **Table 16.6** summarizes the total counts and **Figure 16.6** displays a summary of the bicyclist turning movement volumes. Detailed counts are located in the Appendix H.

Table 16.6: Existing Bicyclist Intersection Counts – Weekday Peak Hour

	Intersection	Peak-Hour Time Period	Total Peak Hour
1	North Vasco Road & Garaventa Ranch Road	7:45-8:45 AM	13
		2:15-3:15 PM	12
2	Laughlin Road & Bear Creek Drive	7:30-8:30 AM	2
		4:15-5:15 PM	4
3	Hawk Street & Garaventa Ranch Road	7:00-8:00 AM	1
		2:30-3:30 PM	6
4	Laughlin Road & Altamont Creek Drive	7:15-8:15 AM	0
		5:00-6:00 PM	4
5	Laughlin Road & Northfront Road	7:30-8:30 AM	0
		2:15-3:15 PM	6
6	Herman Avenue-Garaventa Ranch Road & Altamont Creek Drive	7:45-8:45 AM	5
		2:30-3:30 PM	4
Counts conducted Thursday, December 1, 2011.			
Source: Kittelson and Associates, 2012			

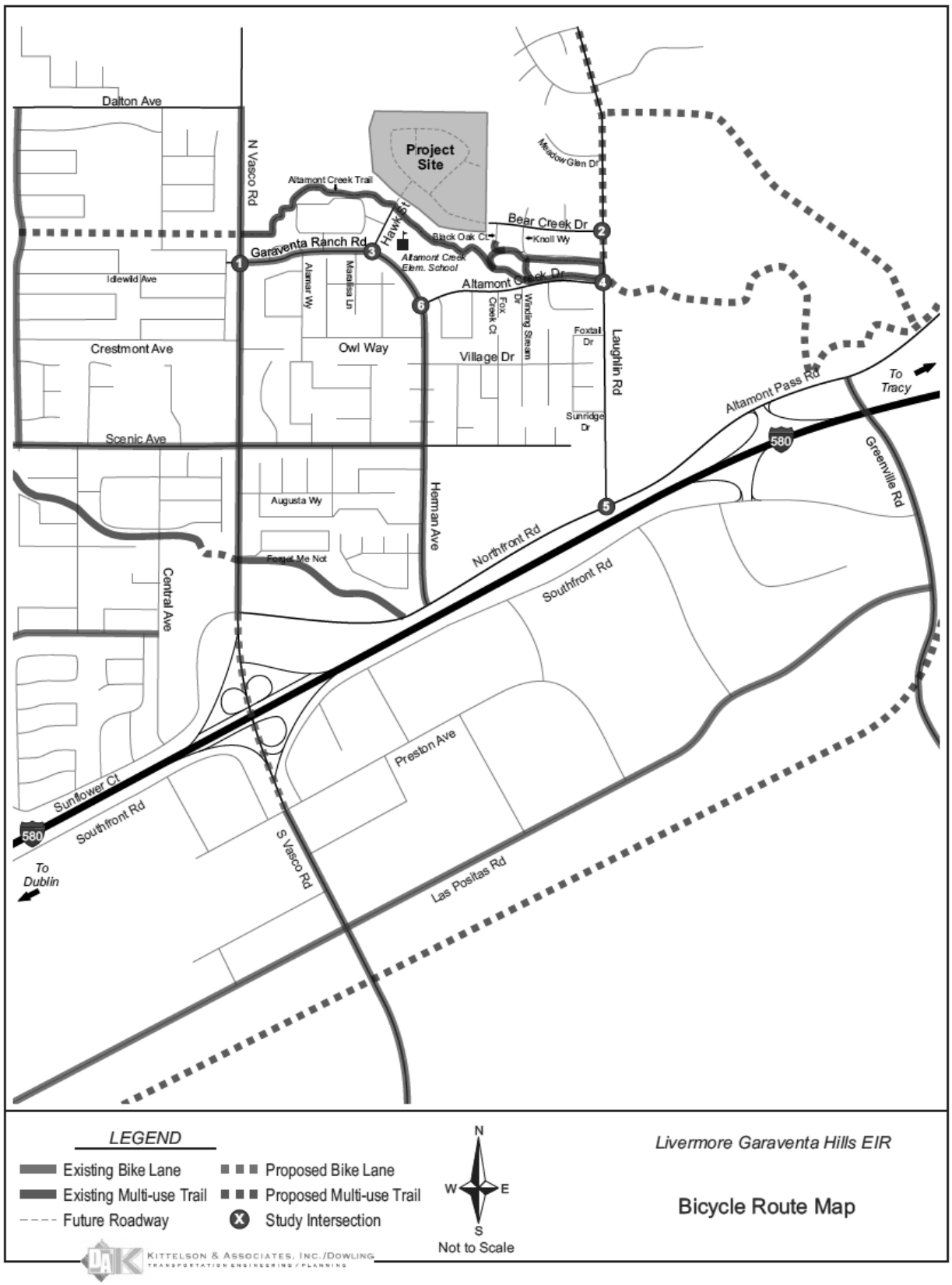


Figure 16.5: Existing and Planned Bikeways

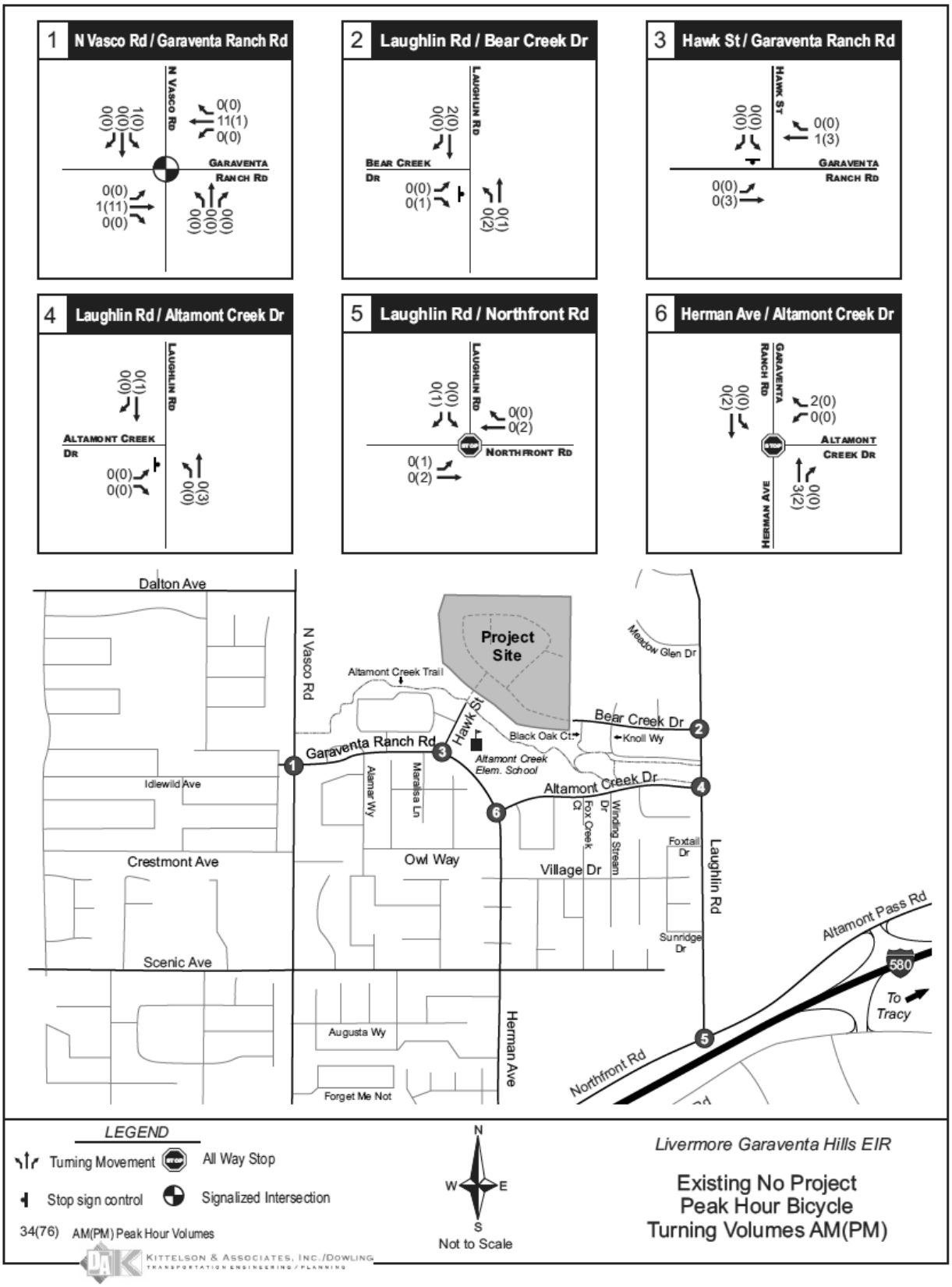


Figure 16.6: Peak-Hour Bicyclist Turning Movement Volumes

TRANSIT CONDITIONS

Transit options in the project site area are limited. This section details existing and planned transit service in close proximity to the study area.

The Livermore-Amador Valley Transit Authority (LAVTA) operates its Wheels fixed-route bus service throughout Livermore, Pleasanton, and Dublin. Wheels Route 15 operates in close proximity to the project site along Garaventa Ranch Road-Herman Avenue with the closest bus stop at its intersection with Hawk Street, about 0.2 miles away. Other Route 15 bus stops on Garaventa Ranch Road are found at Perriwinkle Common and Altamont Creek Drive. Route 15 operates weekdays, weekends, and holidays. Wheels Route 11 is a peak-hour only bus service that operates on Northfront Road in the project area. Its closest bus stop to the project site is located on Northfront Road east of North Vasco Road, about 1.2 miles away.[2]

The Altamont Commuter Express (ACE) operates a heavy-rail commuter train in the peak-hours only that connects San Joaquin, Alameda, and Santa Clara Counties. The closest station to the project site is located at South Vasco Road near Patterson Pass Road, about 2.25 miles away.[3]

The Bay Area Rapid Transit (BART) intends to extend it current terminus from the Dublin/Pleasanton station to Livermore. In 2010, the BART Board of Directors certified a program-level environmental impact report for the proposed extension of BART to Livermore. In July 2011, the City of Livermore adopted a locally preferred alignment for the extension along I-580 with a station stop at Isabel Avenue/I-580 and Greenville South. A Phase I extension to Isabel Avenue is planned to start project-level environmental review in 2012 and subsequent phases will need to be addressed in the future.[4]

Table 16.7 summarizes existing transit service and **Figure 16.7** shows existing and planned transit routes in close proximity to the project area.

[2] Livermore-Amador Valley Transit Authority website, accessed February 9, 2012 at www.lavta.org.
[3] Altamont Commuter Express website, accessed February 9, 2012 at www.acerail.com.
[4] San Francisco Bay Area Rapid Transit District, BART to Livermore Fact Sheet from April 20, 2011, accessed online on February 10, 2012 at http://www.bart.gov/docs/planning/Liv_Fact_Sheet_2011_04_20.pdf.

Table 16.7: Existing Transit Service

Agency/ Route	Stations and Timepoint Bus Stops	Peak-Hour Frequencies	Off-Peak Frequencies	Weekend Service
Altamont Commuter Express (ACE)[1]	Stockton, Lathrop/Manteca, Tracy, **Livermore-Vasco**, Livermore-Downtown, Pleasanton, Fremont, Santa Clara, San Jose	60-75 minutes	None	None
Wheels[2] Route 11	Livermore Transit Center, First St/Las Positas, **Northfront Rd/Vasco Rd**, Las Positas/Greenville Rd, Los Positas/Vasco Rd	60-125 minutes	None	None
Wheels[2] Route 15	Livermore Transit Center, First Street/Las Positas, Bluebell Dr/Springtown Blvd, Bluebell Dr/Galloway St, Scenic Ave/Heather Ln, **Dalton Ave/Vasco Rd**, **Garaventa Ranch Rd/Altamont Creek Dr**	30 minutes	30-60 minutes	60 minutes
Wheels[2] Route 20X	Dublin/Pleasanton BART, **Las Positas/ Mountain Vista Pkwy**, **Vasco Rd ACE Station**, Vasco Rd/ Lawrence Livermore National Laboratory, Mines Rd/ First St, Livermore Transit Center	45 minutes	None	None

Stops and stations in **bold** are those in closest proximity to the project site.

[1] Altamont Commuter Express (ACE) is a commuter rail service

[2] Wheels is the bus service operated by the Livermore-Amador Valley Transit Authority (LAVTA)

Source: Kittelson and Associates, 2012

Figure 16.7: Existing and Planned Transit Service

SCHOOL CIRCULATION

As is the case with most schools, circulation in and around Altamont Creek Elementary School has patterns that differ from the rest of the neighborhood. Morning peak arrivals and afternoon peak departures were observed. The bell schedule during observations was 8:30 AM for classes to begin, 2:40 PM for grades 1 through 3 dismissal, and 2:50 PM for grades 4 through 5 dismissal.

The official pick-up/drop-off area is located in the school parking lot off of Garaventa Ranch Road. There are two lanes to accommodate pick-up and drop-off operations, each about 480 feet in length to hold about 19 vehicles each. Vehicles enter at the southern driveway and exit at either the northern or southern driveway. Additionally, there is a crossing guard posted at the Hawk Street-Garaventa Ranch Road intersection during the peak arrivals and departures to assist students walking and biking to school. The bike parking cage is located near the Garaventa Ranch Road-Hawk Street intersection on school grounds.

During the morning arrivals, volunteers assist with drop-off operations near the school's main entrance by helping with off-loading of students out of the vehicles. Vehicle queues would sometimes near capacity at the drop-off zone, but did not spill out into the roadway. A number of school-associated motorists parked in the lot or at the curbside on Garaventa Ranch Road to escort students into the school grounds. About 21 vehicles between 8:20 AM and 8:30 AM were observed dropping off at the curbside on Garaventa Ranch Road in the school bus zone north of the northern school driveway. 7 of these vehicles did U-turn or 3-point turns on Garaventa Ranch Road between Hawk Street and Altamont Creek Drive to reverse their direction after dropping off students. The Hawk Street-Garaventa Ranch Road intersection had almost 125 pedestrian crossings during the school arrival period, as shown in Table 16.5. Pedestrian crossings at the eastern crosswalk were assisted by a crossing guard, and queuing of vehicles on Garaventa Ranch Road was observed throughout the morning arrival period. Bicyclists accessing the school from the eastbound direction of Garaventa Ranch Road would often dismount at the Hawk Street intersection to cross as a pedestrian and enter the bike parking cage.

During afternoon departure, school-associated vehicles were observed arriving in advance of the dismissal times and parking in the school's lot, on Garaventa Ranch Road, and on Hawk Street (a summary of on-street parking around the school follows). From 2:43 to 2:58 PM, the queue from the school's parking lot spilled out onto Garaventa Ranch Road. Near the school's southern driveway, there were blockages of vehicles in both directions on Garaventa Ranch Road due to vehicles waiting to enter the parking lot. Curbside pick-up at the school bus stop was common and 11 of these vehicles did U-turn or 3-point turns on Garaventa Ranch Road between Hawk Street and Altamont Creek Drive to reverse their direction after picking up students. The Hawk Street-Garaventa Ranch Road intersection had over 100 pedestrian crossings during the school departure period, as shown in Table 16.5.

PARKING CONDITIONS

The project area is characterized by ample off-street parking for residential and commercial uses. Concentrations of on-street parking were found close to Altamont Creek Elementary School.

Generally, on-street parking is prohibited on most of the arterial and collector roadways in the study area (Vasco Road, Northfront Road, Laughlin Road, and the majority of Garaventa Ranch Road). On-street parking is generally allowed on local roadways (Bear Creek, Altamont Creek Drive, and Hawk Street), but the number of cars parked on-street was low for observations during school hours.

On Garaventa Ranch Road, on-street parking is allowed on the north side of the roadway in front of Altamont Creek Elementary School and was fairly full for observations during school hours. On-street parking occupancies on Hawk Street and Garaventa Ranch Road around the school before and after dismissal times were counted. **Table 16.8** summarizes the parking occupancies at 2:30 (before dismissal time) and at 3:10 (after peak school departures).

Table 16.8: On-Street Parking Occupancies Before and After School Dismissal

				Number of Cars	
Street	**Limits**	**Side**	**Approx. Capacity**	**2:30 PM**	**3:10 PM**
Hawk St	Garaventa Ranch to north end	East	16	15	9
Hawk St	Garaventa Ranch to north end	West	10	6	3
Garaventa Ranch Rd	Hawk to Altamont Creek Rd	North	16	16	7
School dismissal times are 2:40 and 2:50 PM.					
Parking occupancy counts conducted Thursday, December 15, 2011.					
Source: Kittelson and Associates, 2012					

CUMULATIVE CONDITIONS

This section discusses the development of future year 2025 conditions with traffic from reasonably-foreseeable development projects.

Future Roadway Improvements

Lane configurations for study intersections under Cumulative Conditions were assumed to be the same as described under Existing and Project Conditions. The City of Livermore's General Plan model assumes the following roadway changes in the vicinity of the Project by 2025:

- Scenic Avenue, which currently ends east of Saddleview Court, will be extended to intersect with Laughlin Road.
- A 13-mile HOV/Express Lane (high-occupancy toll lane) will be added to I-580 in the eastbound and westbound direction from Greenville Road to Foothill Road with supporting auxiliary roads in some sections.
- The installation of an I-580 freeway interchange at North Greenville Road to replace existing ramps at Northfront and Southfront Roads.
- The I-580/Vasco Road interchange will be modified for increased capacity.
- Vasco Road will be widened to 6 lanes between Scenic Drive and Northfront Road, and 8 lanes between Northfront Road and Las Positas Road.

Cumulative No Project Traffic Forecasts

Cumulative (Year 2025) traffic volumes were developed using the City of Livermore's General Plan travel forecasting model and are based on reasonably foreseeable projects in the study area, buildout of the City's general plan and regional growth associated with Association of Bay Area Governments (ABAG) projections. The model was used to generate the growth between existing conditions and 2025 conditions at all study locations. The growth was added to the existing counts to develop turning movement forecasts at all study intersections. The model was previously validated to counts at selected screenline locations that included both freeway and arterial segments. Any differences between the counts and base year model volumes were removed using the industry standard incremental adjustment

methodology. Therefore only adjusted 2025 volumes were used in the cumulative analysis. The model was also used to identify project trip distribution for the with-project condition. Project volumes were added to the cumulative no project volumes on all study area roads and freeway segments. Cumulative impacts associated with the project were identified compared to the cumulative no project.

Based on the forecasting results from the travel demand model, traffic on the I-580 freeway is expected to increase over existing conditions. Therefore, existing deficient segments at LOS F are anticipated to remain deficient. These include all four segments on westbound I-580 from Greenville Road to west of First Street, and on eastbound I-580 from Foothill Boulevard to El Charro Road. Other segments are likely to continue to operate at LOS D or worse conditions. The addition of a new freeway interchange at Isabel Avenue and HOV/Express Lanes on I-580 may marginally improve service levels, but a review of the traffic reports from these studies does not indicate the conditions in the mixed-flow lanes will improve to less than LOS D conditions.

The resulting Cumulative No Project conditions traffic volumes are presented on **Figure 16.8**.

As presented in **Table 16.9**, the following study intersection would operate at sub-standard levels of service under the baseline cumulative condition:

- Intersection 5: Laughlin Road & Northfront Road is projected to operate at LOS F during the AM and PM peak

Table 16.9: Cumulative No Project Intersection Level of Service – Weekday Peak Hour

	Intersection	Traffic Control[1]	Peak Hour	LOS	Delay[2]
1	North Vasco Road & Garaventa Ranch Road	Signal	AM	C	30.2
			PM	C	25.3
2	Laughlin Road & Bear Creek Drive	SSS	AM	A	9.2
			PM	A	9.1
3	Hawk Street & Garaventa Ranch Road	SSS	AM	B	11.1
			PM	B	11.4
4	Laughlin Road & Altamont Creek Drive	SSS	AM	B	10.9
			PM	B	11.5
5	Laughlin Road & Northfront Road	AWS	AM	**F**	**339.6**
			PM	**F**	**305.5**
6	Herman Avenue-Garaventa Ranch Road & Altamont Creek Drive	AWS	AM	B	11.5
			PM	B	10.6
	Notes: **Bold** = Substandard operations				
1	**Signal** = Signalized intersection; **AWS** = All-Way Stop-Controlled intersection; **SSS** = Side-Street Stop-Controlled intersection.				
2	Delay shown is the weighted average delay in seconds per vehicle. For signal and AWS, LOS is based on delay for all intersection approaches. For SSS, LOS is based on the intersection approach with the highest delay.				
Source: Kittelson and Associates, 2012					

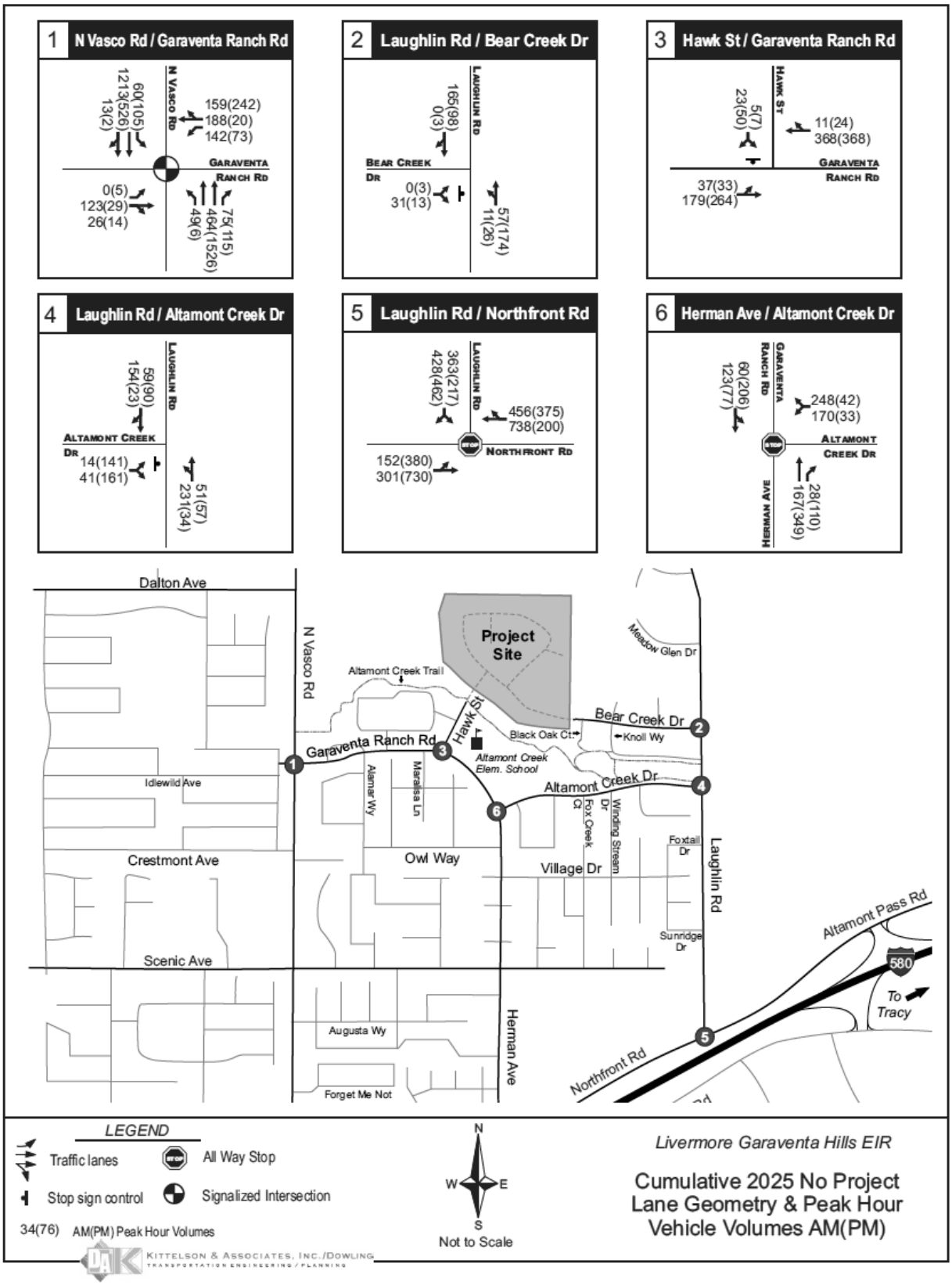


Figure 16.8: Cumulative No Project Turning Movement Volumes

PROJECT CONDITIONS

This section presents the analysis for the Project conditions, which includes vehicle trip generation, distribution, assignment, and analysis. Pedestrian, bicycle, transit, parking, and construction are also discussed.

PROJECT TRIPS

Trip Generation

Given the suburban location of the Project, it was appropriate to use the Institute of Transportation Engineers (ITE) *Trip Generation* manual to estimate project trips, as rates and equations in it are based predominantly on data collected at suburban locations. A summary of the results are shown in **Table 16.10**.

Table 16.10: Garaventa Hills Vehicle Trip Generation Estimates

Land Use	Dwelling Units	ITE[1] Land Use Code	Vehicle Trip Generation[2] AM Peak Hour Trips	AM Peak Hour In[3]	AM Peak Hour Out[3]	PM Peak Hour Trips	PM Peak Hour In[3]	PM Peak Hour Out[3]
Single Family Detached Residences	76	210	57	14	43	77	48	28

1 Institute of Transportation Engineers, *Trip Generation* , 8th Edition (2008)

2 Trip generation was based on average rates consistent with the ITE methodology. Rates for the AM and PM peak hour are based on "Peak hour of adjacent street traffic".

3 "In" refers to the number of trips entering the Project site and "Out" refers to the number of trips exiting the Project Site.

Source: Kittleson and Associates, February 2012

Trip Distribution

Project trips were distributed and assigned through the study intersections based on outputs from the City of Livermore's General Plan Travel Demand model. The resulting Project trip distribution percentages are presented in **Figure 16.9**. Based on the trip distribution, Project trips were then assigned to the roadway network through the study intersections and freeway segments. **Figure 16.10** presents the Project-only vehicle trips for the AM and PM peak-hours at the study intersections, indicating the relatively low volumes expected at each location.

Freeway Segments

Based on the trip generation and trip distribution described above, the Project is expected to assign the following amounts of traffic during each peak hour to the identified I-580 freeway segments:

AM Peak Hour

- I-580 westbound, west of Vasco Road, 6 vehicles per hour (vph)
- I-580 eastbound, west of Vasco Road, 2 vph
- I-580 westbound, west of First Street, 6 vph
- I-580 eastbound, east of First Street, 2 vph

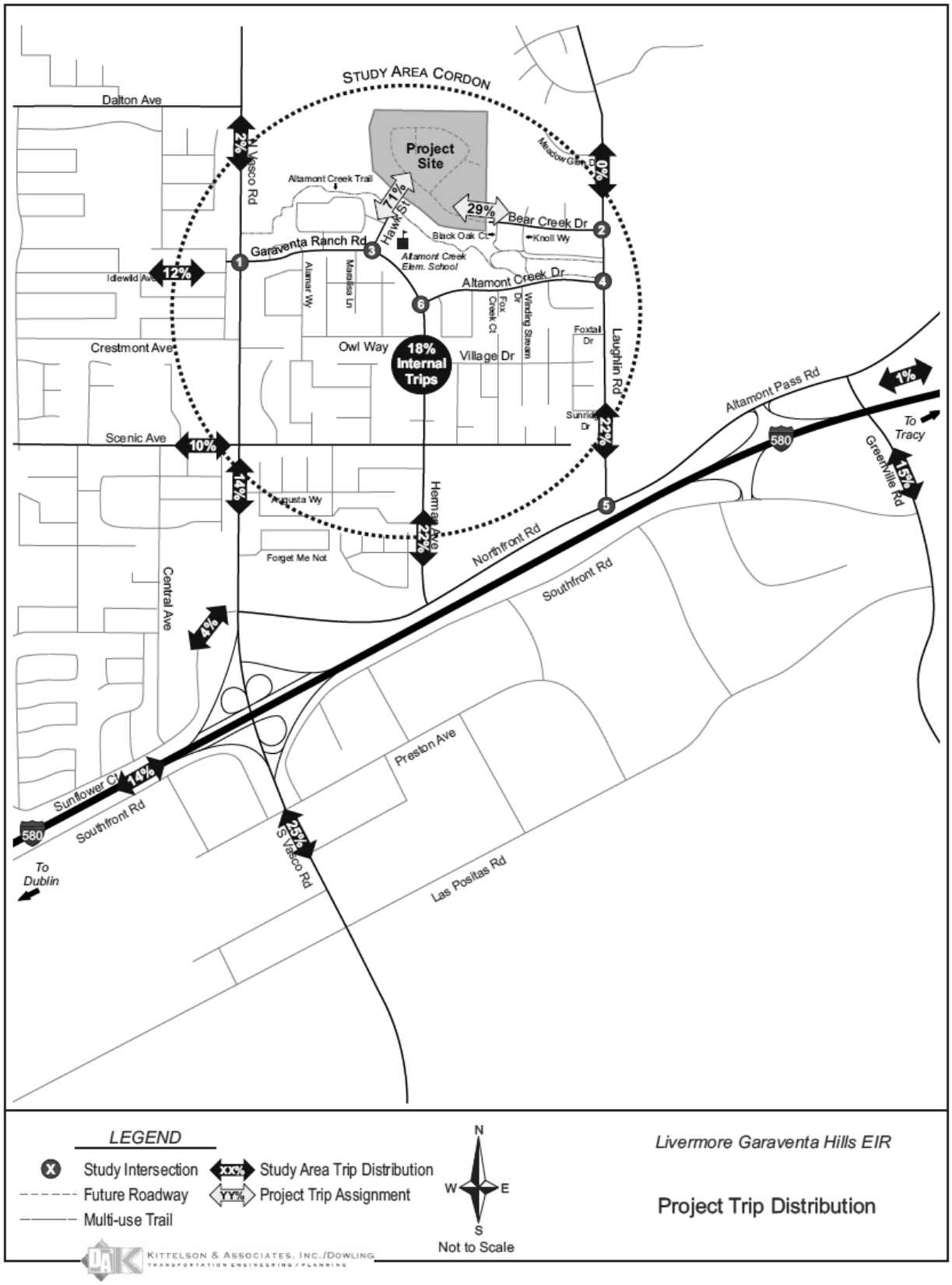


Figure 16.9: Trip Distribution

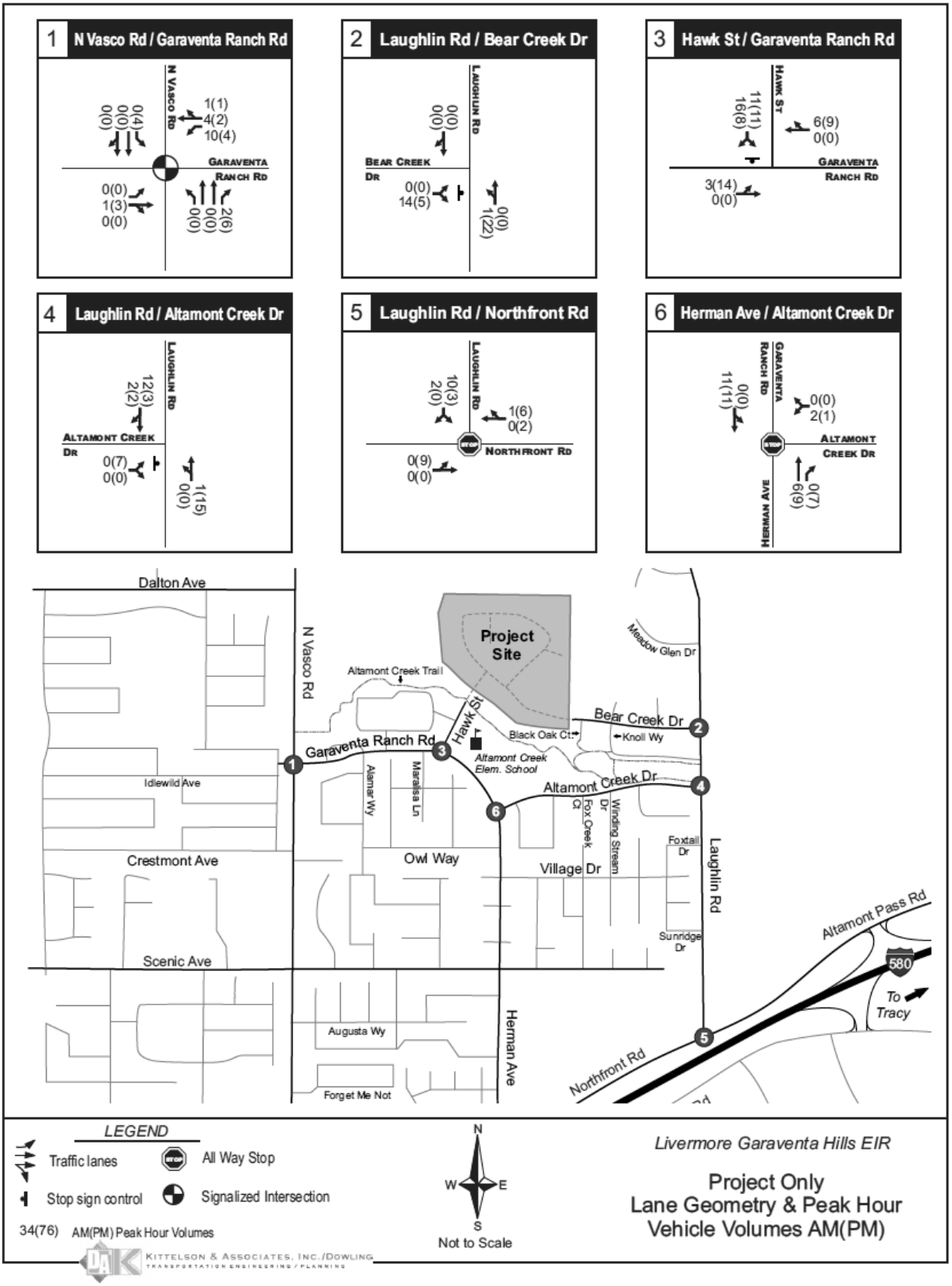


Figure 16.10: Project-Only Trips

PM Peak Hour

- I-580 westbound, east of Greenville Road, 1 vph
- I-580 westbound, west of Vasco Road, 5 vph
- I-580 eastbound, west of Vasco Road, 6 vph
- I-580 westbound, west of First Street, 4 vph
- I-580 eastbound, east of First Street, 6 vph

REGULATORY SETTING

This section provides a summary of the plans and policies of the City, and regional, state, and federal agencies that have policy and regulatory control over the Project study area. These plans and policies include the City of Livermore General Plan and Traffic Impact Fee program, Caltrans' *Guide for the Preparation of Traffic Impact Studies*, the California Manual on Uniform Traffic Control Devices (MUTCD), and the Tri-Valley Transportation Council's *Strategic Expenditure Plan Update*.

Federal Regulations

There are no federal transportation regulations applicable to the proposed Project.

State Regulations

Caltrans is responsible for planning, designing, constructing, and maintaining all interstate freeways and state routes. I-580 is a roadway in the study area that is under Caltrans' jurisdiction. Caltrans requirements are described in their 2002 *Guide for the Preparation of Traffic Impact Studies*, which covers the information needed for Caltrans to review the impacts on state highway facilities; including freeway segments, on- and off-ramps, and signalized intersections. Since I-580 operates at sub-standard levels of service, the Project must be analyzed for the number of trips it adds to the freeway and its impact on the freeway operations.

Regional Regulations

This project is expected to generate less than 100 PM peak hour trips, and is therefore not subject to analysis under Alameda County's Congestion Management Program.

The **Tri-Valley Transportation Council** was created upon the passage of the Measure C initiative to address area-wide transportation issues in locations straddling the two counties of Alameda and Contra Costa, which include the cities of Livermore, Dublin, Pleasanton, Danville, and San Ramon, as well as some unincorporated areas of each county. The 2011 *Strategic Expenditure Plan Update* identifies 11 legacy transportation projects and 11 new transportation projects that are of regional significance, including the Greenville Road/I-580 interchange modification, and updated its fee structure to address funding needs. This fee applies to all developments in the Tri-Valley. As of January 1, 2012, fee amounts were $3,053 per new single family dwelling unit and are expected to increase to $4,275 in January 2013. The fee is applied and collected by all of the TVTC jurisdictions, including the City of Livermore.

City of Livermore

The City's 2003–2025 General Plan was adopted in 2004. The Circulation Element provides the policy framework for the regulation and development of transportation systems, balancing demands for moving people and goods through the city while revitalizing the downtown and limiting nonlocal, cut-through traffic on the roadway network. The General Plan contains overall goals and specific

recommendations for facilitating traffic circulation, maintaining an acceptable level of service at signalized intersections, traffic demand management programs, parking management, and improving transit service and facilities for non-motorized transportation. Specific policies relevant to the proposed Project are discussed under "Significance Criteria" below.

The City adopted a Traffic Impact Fee (TIF) program in 1988 and updated it most recently in 2004 to charge new development the cost of transportation improvements identified in the 2003–2025 General Plan necessary to mitigate the impacts of new development. The TIF program contains a list of improvement projects in our study area, including improvements to the I-580/Vasco Road Interchange, improvements to the I-580/Greenville Road Interchange, widening of Vasco Road, and widening of Northfront Road. The Livermore TIF fee on new developments will partially fund the improvements identified, except for the I-580 Interchange improvements that include the contribution of identified other funding sources such as Measure B, STIP, Tri-Valley Transportation Development Fee, and/or federal earmarks. This fee applies to all developments in Livermore. As of January 2012, fee amounts were $6,773 per new single-family residential dwelling unit. This regional fee is estimated to generate approximately $220 million over the term of the program.

IMPACTS AND MITIGATION MEASURES

This section discusses existing conditions with the proposed Project, identifies Project-related impacts to the transportation network, and recommends mitigation measures to reduce significant impacts where possible.

STANDARDS OF SIGNIFICANCE

Significance criteria are identified to determine what constitutes a significant impact due to the Project. The standards used for this report are presented below:

Signalized Intersections

Impacts at signalized intersections would be significant if the Project is expected to:

- Degrade the AM or PM peak hour from an acceptable mid-level LOS D (50 seconds/vehicle) or better under No Project Conditions to an unacceptable high LOS D or worse under Project Conditions.
- Degrade the AM or PM peak hour at identified intersections near the freeway from an acceptable LOS E (80 seconds/vehicle) or better under No Project Conditions to an unacceptable LOS F under Project Conditions.
- Degrade the AM or PM peak hour operating at substandard LOS under No Project Conditions by increasing the average intersection delay by more than 5 seconds per vehicle.

An intersection can be mitigated to a *less-than-significant* level if an infrastructure improvement or traffic volume reduction results in the intersection operating at its minimum threshold or better. If an intersection is currently operating at substandard LOS, the improvement must, at a minimum, return the intersection to its No Project operating conditions to achieve a *less-than-significant* classification.

Unsignalized Intersections

The City of Livermore's General Plan does not have impact criteria for unsignalized intersections. For the purposes of this analysis, unsignalized intersection impact criteria were developed to be similar to those at signalized intersections.

Impacts at unsignalized intersections would be significant if the Project is expected to:

- Degrade the AM or PM peak hour at from an acceptable LOS E (50 seconds/vehicle) or better under No Project Conditions to an unacceptable LOS F (> 50 seconds/vehicle) under Project Conditions.
- Degrade the AM or PM peak hour operating at substandard LOS under No Project Conditions by increasing the average intersection delay by more than 5 seconds per vehicle at all-way stop-controlled intersections.
- Degrade the AM or PM peak hour operating at substandard LOS under No Project Conditions by increasing the vehicle delay of the leg with the worst LOS by more than 5 seconds per vehicle at side-street stop-controlled intersections.

The same mitigation criteria explained above for signalized intersections applies to unsignalized intersections.

Freeway and Ramp Operations

As stated in the Caltrans *Guide for the Preparation of Traffic Impact Studies* (Caltrans 2001), "Caltrans endeavors to maintain a target LOS at the transition between LOS 'C' and LOS 'D' on State highway facilities, however, Caltrans acknowledges that this may not always be feasible. If an existing State highway facility is operating at less than the appropriate target LOS, the existing [measure of effectiveness] should be maintained."

However, the Alameda County *Congestion Management Plan* and *Tri-Valley Transportation Plan/Action Plan for Routes of Regional Significance* identify LOS no worse than E (v/c < 1.00) on freeways and ramps during peak hours. For the purposes of this study, significant traffic impacts on I-580 in the study area are identified if the proposed Project causes:

- the operations of a freeway segment or ramp to deteriorate from LOS E or better to LOS F; or
- an increased v/c ratio on a freeway segment already operating at LOS F by more than 3%.

Transit, Pedestrian, and Bicycles

An impact to bicycle, pedestrian, and transit circulation would be significant if it conflicts with adopted policies, plans, or programs supporting these forms of transportation. The General Plan has a number of policies aimed at improving access for walking, biking, and transit. Impacts specific to bicycle, pedestrian, and transit circulation would be significant if the Project causes one or more of the following:

Bicycle

- Conflicts with existing or planned bikeways and trails.
- Creates a safety issue for bicyclists.
- Exacerbates a current substandard bicycle condition in the project area.

Pedestrian

- Results in substantial conflicts for pedestrians or would adversely affect nearby pedestrian facilities.
- Creates a safety issue for pedestrians.
- Exacerbates a current unsafe pedestrian condition in the project area.

Transit

- Conflicts with existing or future transit routes.
- Causes a transit demand above the levels able to be adequately provided by local transit operators or agencies, or has other adverse impacts on transit operations.

Mitigation measures identified in this analysis first attempt to achieve acceptable operating conditions. If this is unattainable through feasible mitigation measures, then measures to improve operating conditions to the same as or better than Existing Conditions were considered. This would still reduce the project impact to a *less-than-significant* level

Site Access and Circulation

Impacts to site access and on-site circulation would be significant if they satisfy the following criteria:

- The Project's on-site circulation system would be inadequate for the volumes and types of traffic expected.
- Vehicular access points would not be designed to appropriate design standards.

Additional Considerations

The Project would create a significant impact if it satisfied one or more of the following criteria:

- Resulted in a change to air traffic patterns.
- Substantially increased hazards due to design features.
- Resulted in inadequate emergency access.
- Resulted in construction-related impacts.
- Diverted traffic onto a local, residential street such that its total daily volumes resulted in more than 5,000 vehicles.

PROJECT-SPECIFIC INTERSECTION IMPACTS

Impact Traf-1: **Project-Generated Traffic.** Traffic generated by the proposed Project would increase traffic levels at vicinity intersections. However, these increases would either still be within acceptable service levels or not contribute to delays above threshold levels. This is a ***less than significant*** impact.

Project traffic was added to the existing traffic volumes at the six study intersections, as shown on **Figure 16.11**, to form the basis for the Project conditions analysis. The report evaluates the AM and PM peak hour operations at each study intersection listed in **Table 16.11**. The results shown in **Table 16.11** and discussed below consider that no roadway improvements would be included. Appendix H contains the detailed peak hour intersection LOS calculations.

Table 16.11: Existing Plus Project Conditions Intersection Level of Service

	Intersection	Traffic Control[1]	LOS Threshold	Peak Hour	Existing LOS	Existing Delay[2]	Existing + Project LOS	Existing + Project Delay[2]
1	North Vasco Road & Garaventa Ranch Road	Signal	Mid-Level D (45 seconds)	AM	C	30.0	C	30.5
				PM	A	7.5	A	8.3
2	Laughlin Road & Bear Creek Drive	SSS	E (50 seconds)	AM	A	8.8	A	8.9
				PM	A	8.7	A	8.7
3	Hawk Street & Garaventa Ranch Road	SSS	E (50 seconds)	AM	B	11.2	B	12.5
				PM	B	10.5	B	11.6
4	Laughlin Road & Altamont Creek Drive	SSS	E (50 seconds)	AM	A	9.2	A	9.3
				PM	A	9.2	A	9.4
5	Laughlin Road & Northfront Road	AWS	E (50 seconds)	AM	D	26.2	D	27.2
				PM	B	11.0	B	11.2
6	Herman Avenue-Garaventa Ranch Road & Altamont Creek Drive	AWS	E (50 seconds)	AM	A	9.9	B	10.1
				PM	A	8.3	A	8.4

Notes: **Bold** = Substandard operations; **Bold and Boxed** = Project impact

1 **Signal** = Signalized intersection; **AWS** = All-Way Stop-Controlled intersection; **SSS** = Side-Street Stop-Controlled intersection.

2 Delay shown is the weighted average delay in seconds per vehicle. For signal and AWS, LOS is based on delay for all intersection approaches. For SSS, LOS is based on the intersection approach with the highest delay.

Source: Kittelson and Associates, 2012

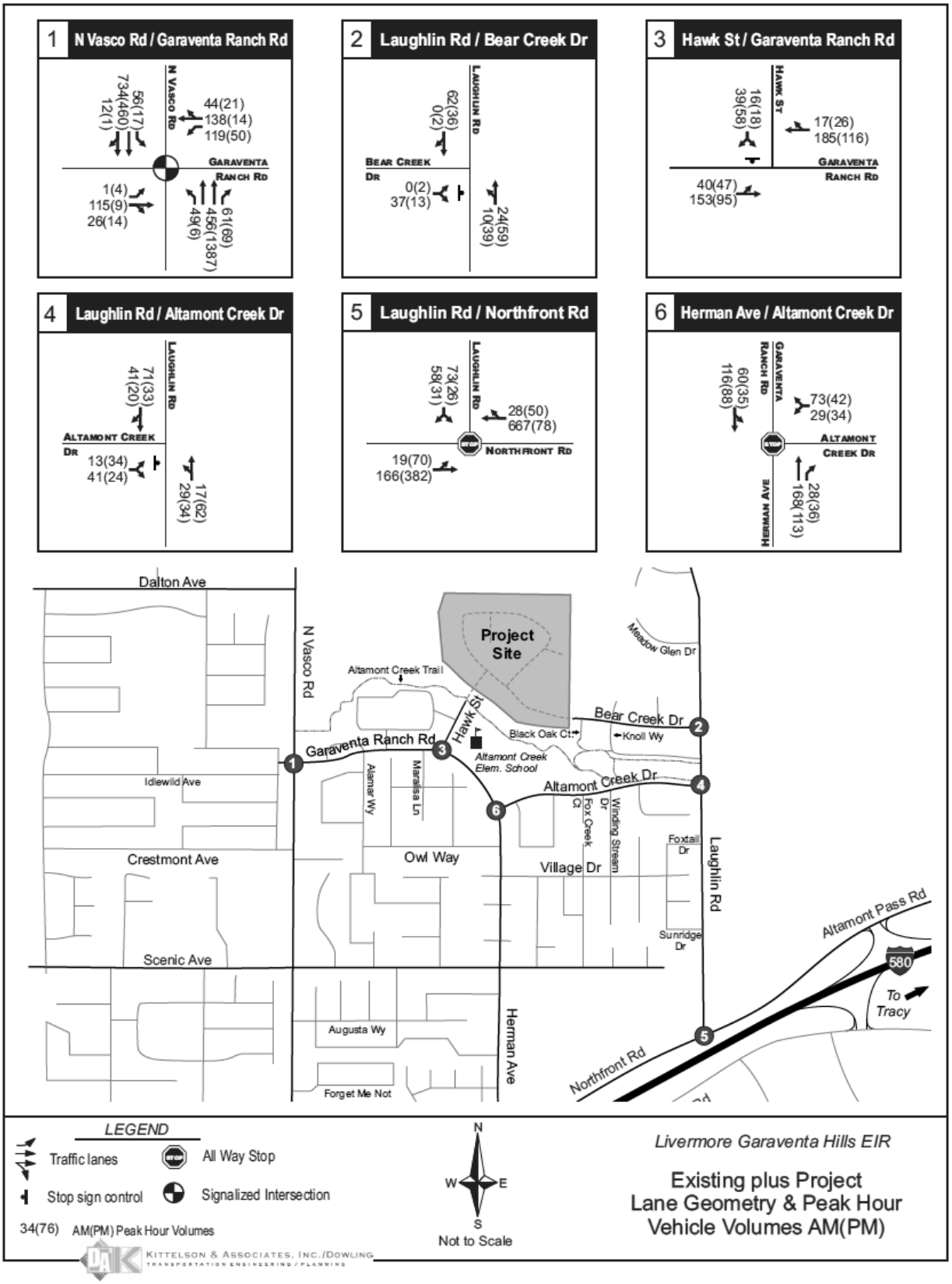


Figure 16.11: Existing Plus Project Turning Movements

Freeway Operation

Impact Traf-2: **Project-Generated Traffic contribution to Freeway.** Traffic generated by the proposed Project would increase the number of vehicles on I-580 during peak-hours. This is a ***less than significant*** impact.

While the Project would contribute vehicle volumes to the I-580 freeway, based on the trip generation and trip distribution identified above, the numbers are small. The results from the traffic model show Project traffic on I-580 freeway segments is expected to increase over existing conditions from between 1 to 7 vehicles per hour (vph) in some segments. These include all four deficient segments on westbound I-580 from Greenville Road to Portola/Isabel Avenue, and on eastbound I-580 from Foothill Boulevard to El Charro Road. Therefore existing deficient segments at LOS F are anticipated to remain deficient. Other segments are likely to continue to operate at LOS D conditions.

Based on the peak hour baseline no-project freeway volumes in deficient segments as identified in the traffic model, the project contribution increases traffic as follows:

- I-580 west of Vasco Road, westbound during the A.M peak hour is 7,974 vph. Project increase is 6 vph. Percent increase is less than 0.1%.
- I-580 west of Vasco Road, eastbound during the P.M peak hour is 7,117 vph. Project increase is 6 vph. Percent increase is less than 0.1%.

Other deficient segments indicate similar percent increases.

Therefore, based on the small amount of project traffic, this is not expected to increase the v/c ratio over the no project condition by more than 3% and therefore the freeway segments are not considered impacted.

The addition of future HOV or Express Lanes on I-580 may marginally improve service levels, but a review of the traffic reports from these studies does not indicate the conditions in the freeway sections with deficient mixed-flow lanes will improve to less than LOS D conditions.

BICYCLE AND PEDESTRIAN IMPACTS

Impact Traf-3: **Conflict with Pedestrian-Bicycle Trail.** The Project would install the Hawk Street bridge across the existing Altamont Creek Trail. This is a ***potentially significant*** impact.

The Hawk Street bridge would introduce vehicle traffic across the existing Altamont Creek Trail on both sides of the creek, creating potential conflicts for pedestrians and bicyclists with motor vehicles. Therefore, per the significance criteria previously identified, the Project's impact on pedestrian and bicycle facilities and safety is potentially significant.

Mitigation Measure

Traf-3: **Trail Crossing and Bridge Design.** The Project shall design the Hawk Street Bridge for pedestrian, bicycle, and equestrian access at the trail crossings and on the bridge itself.

In terms of the trails' intersection with Hawk Street (perpendicular to the bridge), the Federal Highway Administration recommends that the following elements are included:

- The trail should intersect the street at a 90-degree angle;
- Increase trail width at the intersection to reduce user conflicts;
- Provide good sight lines for both motorists and trail users;
- Provide signage to ensure that motorists are aware of the trail crossing;
- Provide a visible crosswalk across the intersection to increase trail user and motorist awareness;
- Signs, both on the road and the trail, should clearly indicate whether motorists or trail users have the right of way;
- Use curb ramps as required, including detectable warnings to ensure that trail users with vision impairments are aware of the street. Curb ramps should be designed and located in accordance with Section 16.3.1.d; and
- At a road and trail intersection, raising the level of the road up to the level of the trail can eliminate the need for curb ramps and contributes to traffic calming because of the raised crosswalk that is created (see Section 8.4). If this design is used, detectable warnings should be included between the edge of the trail and the roadway to ensure that users with vision impairments can identify the intersection.[5]

Instead of striping a standard crosswalk at roadway crossings, some trails use nonstandard crosswalk patterns in locations where cyclists are expected to ride across a roadway instead of dismounting and walking across. For example, crossings where cyclists are supposed to ride can be indicated with parallel dashed lines and bike symbols. Nonstandard striping indicates to drivers and trail users that the crossing is different than a standard crosswalk situation.

Pedestrian and bicycle access across the Hawk Street bridge should be provided on both sides and be designed for safe and convenient access, per the City of Livermore's design standards.

Implementation of mitigation measure Traf-3 would reduce the Project's impact on the Altamont Creek Trail to ***less than significant*** levels.

TRANSIT IMPACTS

Impact Traf-4: **Project-Generated Transit Demand.** The Project may increase levels of transit usage in the vicinity. However, the Project has adequate access to existing transit opportunities with available capacity and would not impede or interfere with existing services. This is a ***less than significant*** impact.

The proposed Project would include residential uses in close proximity to existing bus stops and a little over 2 miles to a train station. Assuming 10% of trips from the Project use transit, this would translate to roughly 6 trips in the morning peak hour and 8 trips in the evening peak hour. Considering these small numbers of potential transit riders, the net new transit trips could be accommodated by the existing transit service.

There is available existing capacity and because the proposed Project would not impede or interfere with existing transit services, its impact on alternative modes of travel would be less-than-significant.

[5] Federal Highways Administration, *Planning, Environment, and Realty*, Environment Chapter 16 Trail Crossings, accessed online on February 24, 2012 at http://www.fhwa.dot.gov/environment/sidewalk2/sidewalks216.htm

PARKING CONDITIONS

It is assumed that each single family residence in the Project will have at least two off-street parking spaces, as delineated by Section 4.04.020 of the Livermore Development Code that has been in effect since May 1, 2010.

It should be noted that parking deficits are considered to be social effects, rather than impacts on the physical environment as defined by CEQA. Under CEQA, a project's social impacts need not be treated as significant impacts on the environment. The social inconvenience of parking deficits, such as having to hunt for scarce parking spaces, is not an environmental impact. But there may be secondary physical environmental impacts, such as increased traffic congestion at intersections, air quality impacts, safety impacts, or noise impacts caused by congestion. However, as noted above, it is anticipated the Project will meet local parking requirements and provide adequate parking for the Project.

ADDITIONAL CONSIDERATIONS

Alter Air Traffic Patterns

The Project would not alter any air traffic patterns and therefore would have ***no impact*** on local air traffic patterns.

Hazards Due to Design Features or Incompatible Uses

Impact Traf-5: **Hazards Due to Design Features or Incompatible Uses.** The proposed Project includes installation of new internal roadways, trail access to open space areas, provision of a bridge and new access points from existing streets, and a roadway crossing of the Altamont Creek Trail that could result in hazards if the details are not properly designed. This is a ***potentially significant*** impact.

The new internal roadways include 40 feet curb-to-curb widths with 10 foot sidewalks on each side of the street for a total of 60 feet of public right-of-way. Distances between intersections in the subdivision generally exceed 400 feet. All new intersections in the subdivision are 3-legged (T-intersections) and corner radii are 30 feet. Intersection controls are not indicated. According to Livermore's Standard Detail ST-2A, design standards for new local streets should have a total right-of-way width of 60 feet, and a curb-to-curb width of 40 feet with 10 foot of sidewalk/planter strip area on each side. An informal trail system through the hilly open spaces (Lot A and Lot B) has access from Street A near Bear Creek Road and crosses Street B. The informal trail currently leads to the northwest end of Street A and to Lot C, but housing parcels are planned at this northwest end of the Project site. Once this Project is built, trail users may opt to access the trail on the northwest end to and from Street A between parcels 61 and 62. Pedestrian and bicyclist mid-block crossing features are not shown on the plan across Street B to connect the trail. There are no plans to improve or formalize the trail system through Lots A and B.

The Project's plan does not contain driveway locations or marked crosswalks. Therefore, there was not enough information to conduct a sight distance analysis at this time. Detailed plans are required by the City as part of Design Review and will be reviewed by City engineering staff prior to full Project approval and issuance of permits.

Mitigation Measure

Traf-5: **Design Review for Hazards Due to Design Features or Incompatible Uses.** The Project's on-site transportation elements, such as sight distances, driveway

locations, and marked crosswalk locations, shall be reviewed by the Livermore staff with design-level project approvals and shall be required to meet applicable local regulations. The following design details are recommended, though final details will be determined through consultation with Livermore staff, taking into consideration constraints of the site:

a) The stem of each intersection should be stop-controlled or contain other intersection controls.

b) Livermore thoroughfare standards should be followed, which could involve narrowed vehicle lanes, widened sidewalks, reduced corner radii, and installation of corner bulb-outs. Narrower vehicle travel lanes and tighter corner radii with bulb-outs are associated with lower vehicle travel speeds, increased visibility between pedestrians and motorists, and reduce pedestrian roadway exposure.

c) The mid-block trail crossing between Lot A and Lot B should be marked with a high-visibility crosswalk and include bulb-outs and lighting to enhance pedestrian visibility.

d) According to Livermore's Municipal Code 3-15-050, driveways should be located more than 20 feet from the corners, which should be confirmed during the design review.

Mitigation Measure Traf-3: Trail Crossing and Bridge Design, would also help to mitigate Impact Traf-5 by requiring appropriate design of the Hawk Street Bridge for pedestrian, bicycle, and equestrian access at the trail crossings and on the bridge itself.

Implementation of mitigation measures Traf-3 and Traf-5 would reduce the Project's hazards due to design features or incompatible uses to ***less-than-significant*** levels through application of appropriate detailed design features.

Emergency Access

Impact Traf-6: **Emergency Access.** The proposed Project includes a new internal roadway system that connects with existing roadways that could result in inadequate emergency access if the details are not properly designed. This is a ***potentially significant*** impact.

The proposed site plan appears to provide adequate access for emergency vehicles, including two points of ingress and egress to the existing roadways of Bear Creek Road and Hawk Street. The Project's plan includes a 40-foot roadway width with 30 foot corner radii, which meets the design standards.

Mitigation Measure Traf-6: **Design Review for Emergency Access.** It is expected that the Project's emergency access elements will be reviewed with design-level project approvals and would be required to meet applicable regulations.

Implementation of mitigation measure Traf-6 would reduce the Project's emergency access issues to ***less-than-significant*** levels.

Construction-Period Traffic Disruption

Impact Traf-7: **Construction.** Construction-related impacts generally would not be considered significant due to their temporary and limited duration. However, depending on the construction phasing and truck activity, this is a ***potentially significant*** impact.

Mitigation Measure
Traf-7: **City Review of Construction Plan.** It is expected that the construction plan will be reviewed by the City of Livermore and designed to meet applicable regulations.

Implementation of mitigation measure Traf-7 would reduce the Project's impacts due to construction to ***less-than-significant*** levels.

Vehicle Diversions

Impact Traf-8: **Vehicle Diversions.** It is expected that there will be some school-associated vehicles that will divert through the existing neighborhood. The resulting daily traffic will be within the design capacity for low-volume residential roadways. This is a ***less than significant*** impact.

There is known concern over the potential impact of traffic diverting onto local residential streets to cut-through existing neighborhoods from Altamont Creek Elementary School. Cut-through traffic, as opposed to local traffic, use neighborhood streets rather than arterial or collector streets to get to destinations outside of the neighborhood. The proposed site plan will extend Hawk Street to the north and provide a roadway connection to the existing residential neighborhood on Bear Creek Drive. This would enable vehicles to use Hawk Street-Bear Creek Road to return to Laughlin Road. As discussed under Impact Traf-1, affected streets (including nearby residential streets) will be well within design capacity with the addition of Project traffic and there would be no environmental impact to the functioning of these neighborhood roadways at the intersections.

Increases in traffic volumes are not considered environmental impacts when roadways and intersections continue to function within design capacity and level of service standards. This statement is intended to apply only to analysis of environmental impacts and not to validity of the statement from a quality of life perspective, which can be taken into consideration during Project approvals. With that in mind, additional quantification and discussion specifically relating to the potential for neighborhood cut-through traffic from school-associated traffic are included as an informational item, as detailed below.

School site observations were conducted of the AM and PM peak arrival and departure times, as detailed in the Setting section. Roadway congestion is found on Garaventa Ranch Road at the Hawk Street intersection on the eastern side of the roadway during the peak morning arrivals and afternoon departures. This is where the school crosswalk and crossing guard are located. Westbound vehicles would need to pass through this congestion to continue onto Garaventa Ranch Road or turn right onto Hawk Street. However, once passing through the Hawk Street intersection, congestion on Garaventa Ranch roadway and at the Vasco Road intersection is minimal, even under future conditions.

As indicated in the Setting section, 7 vehicles in the AM peak-hour and 11 vehicles in the PM peak-hour were observed doing U-turns or 3-point turns on Garaventa Ranch Road in front of the school after dropping off or picking up students. Most vehicles that did so arrived in the westbound direction and departed in the eastbound direction. In the afternoon peak departure times, some school-associated vehicles park on Hawk Street to pick up students. About 9 school-associated parked vehicles were counted on Hawk Street, 6 of which were parked in the northbound direction. As shown in **Table 16.8**, the capacity of on-street parking on Hawk Street is about 16 in the northbound direction and 10 in the

southbound direction. The school's back entrance off of Hawk Street is reserved for handicapped student pick-up and minimal vehicle activity was observed there.

Comparing the distances to Altamont Creek Drive-Laughlin Road intersection from Hawk Street-Garaventa Ranch Road, using Hawk Street-Bear Creek Drive-Laughlin Road would result in a journey of about 0.7 miles compared to about 0.5 miles using Garaventa Ranch Road-Altamont Creek Drive. The differences in distances, coupled with traffic congestion at the eastern leg of the Garaventa Ranch Road-Hawk Street intersection, would provide some disincentive to school-associated motorists to cut-through the residential neighborhoods located north of Altamont Creek Elementary School.

However, conservatively assuming that half of the observed U-turns and half the parking capacity on northbound Hawk Street would divert on neighborhood roadways to the north would result in 11 diverted vehicles in the AM peak-hour and 14 diverted vehicles in the PM peak-hour, a total of 25 additional vehicles added to the daily traffic. **Table 16.12** shows the estimated daily traffic volumes on Bear Creek Road and Hawk Street following Project construction with and without diversions from the Altamont Creek Elementary School. It's important to note that without the Project, the Hawk Street connection would not exist, and thus there would be no school-associated vehicle diversions to Laughlin Road.

Table 16.12: Daily Traffic and School Traffic Diversions on Local Streets

	Bear Creek Drive		Hawk Street	
Scenario	**No Diversion**	**With Diversion**	**No Diversion**	**With Diversion**
Existing + Project	515	540	1305	1330

Daily traffic estimated using peak-hour turning movement volumes at intersections.

Daily traffic estimates are two-way volumes

Diversion refers to school traffic using Hawk Street and Bear Creek Drive to avoid traffic on Garaventa Ranch Road and access Laughlin Road.

Source: Kittelson and Associates, 2012

The daily volume increases due to the Project and school traffic diversions would not result in more than 5,000 vehicles per day on Hawk Street or Bear Creek Drive, which is the capacity threshold for local streets in Livermore. This is true for all Project scenarios under existing and cumulative conditions. Increases in traffic along Bear Creek Drive are within design capacity and would not be considered a significant environmental impact.

CUMULATIVE IMPACTS

Impact Traf-9: **Project-Generated Traffic Contribution to Cumulative Levels.** Traffic generated by the proposed Project would contribute to cumulative increases in traffic levels at vicinity intersections and the I-580 freeway. However, other than those listed in separate impacts, these increases would either still be within acceptable service levels or the Project would not contribute a cumulatively considerable level to delays or speed reductions. This is a ***less than significant*** impact.

The Project is expected to be fully constructed and occupied for the cumulative analysis. Therefore, Project trips were added to the Cumulative No Project traffic forecast to yield the Cumulative Plus

Project traffic forecasts (see **Figure 16.12**). The assignment of Project traffic considers the improvements in Livermore, as described in the Setting section above.

Table 16.13 summarizes the delay and LOS forecasted for each study intersection under both Cumulative (Year 2025) No Project and Plus Project scenarios. Both Cumulative Conditions scenarios would result in one intersection operating unacceptably.

Table 16.13: Cumulative Conditions Intersection Level of Service

	Intersection	Traffic Control[1]	LOS Threshold	Peak Hour	Cumulative 2025 LOS	Cumulative 2025 Delay[2]	Cumulative + Project LOS	Cumulative + Project Delay[2]
1	North Vasco Road & Garaventa Ranch Road	Signal	Mid-Level D (45 seconds)	AM	C	30.2	C	30.5
				PM	C	25.3	C	26.8
2	Laughlin Road & Bear Creek Drive	SSS	E (50 seconds)	AM	A	9.2	A	9.3
				PM	A	9.1	A	9.1
3	Hawk Street & Garaventa Ranch Road	SSS	E (50 seconds)	AM	B	11.1	B	11.8
				PM	B	11.4	B	12.4
4	Laughlin Road & Altamont Creek Drive	SSS	E (50 seconds)	AM	B	10.9	B	11.0
				PM	B	11.5	B	11.8
5	Laughlin Road & Northfront Road	AWS	E (50 seconds)	AM	**F**	**339.6**	**F**	**342.5**
				PM	**F**	**305.5**	**F**	**310.7**
6	Herman Avenue-Garaventa Ranch Road & Altamont Creek Drive	AWS	E (50 seconds)	AM	B	11.5	B	11.7
				PM	B	10.6	B	10.8

Notes: **Bold** = Substandard operations; **Bold and Boxed** = Project impact

1 **Signal** = Signalized intersection; **AWS** = All-Way Stop-Controlled intersection; **SSS** = Side-Street Stop-Controlled intersection.

2 Delay shown is the weighted average delay in seconds per vehicle. For signal and AWS, LOS is based on delay for all intersection approaches. For SSS, LOS is based on the intersection approach with the highest delay.

Source: Kittelson and Associates, 2012

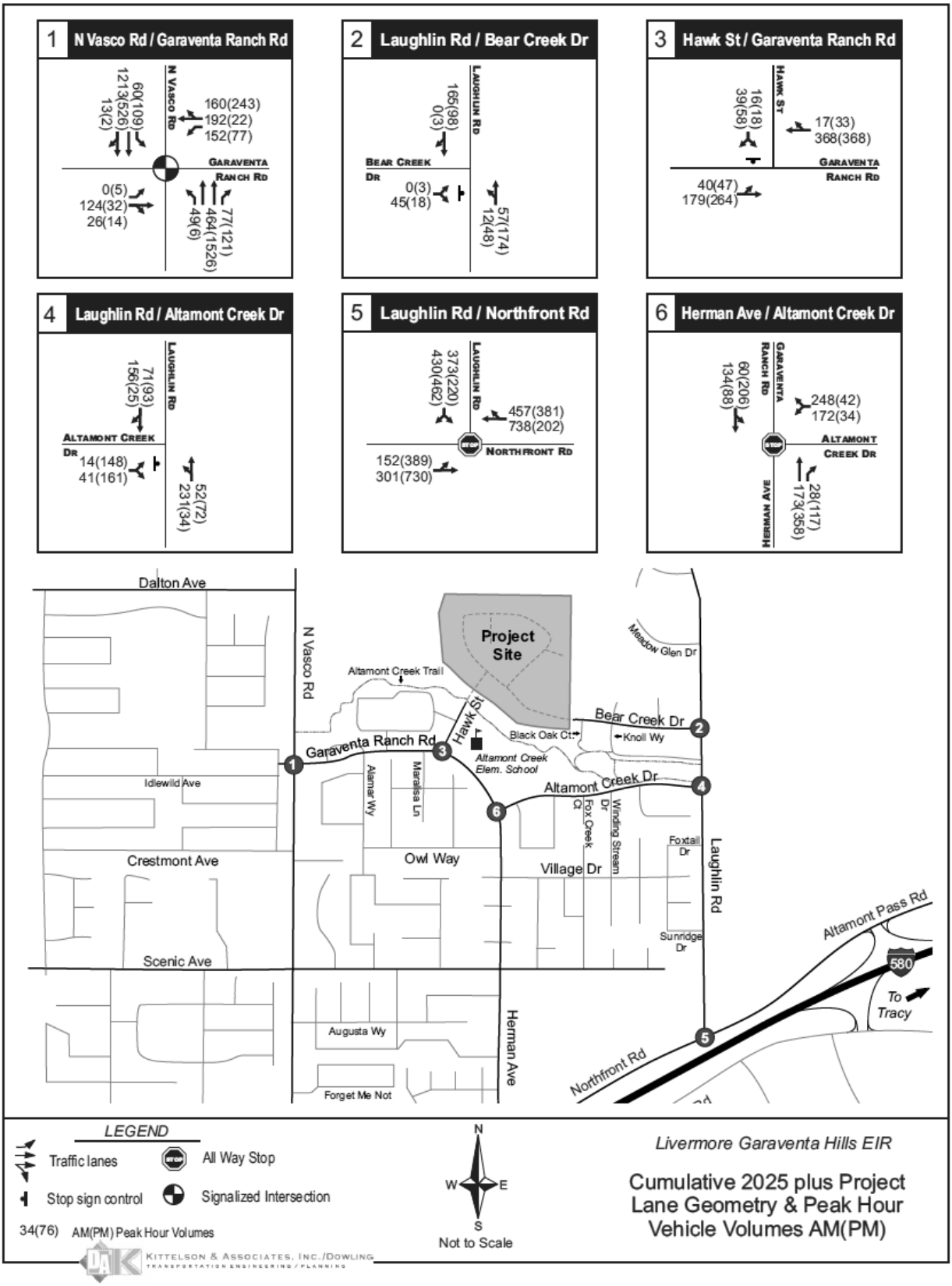


Figure 16.12: Cumulative Plus Project Turning Movement Volumes

As shown in **Table 16.13**, the addition of Project trips to the Cumulative No Project volumes would not cause any study intersections to go from acceptable operating conditions to unacceptable conditions. However, the following intersection would exceed the City of Livermore's standard:

Intersection 5: Laughlin Road & Northfront Road – Operates at an unacceptable LOS F during the AM and PM peak hours with or without the Project.

In the AM peak-hour at the Laughlin Road & Northfront Road intersection (#5), the proposed Project would not increase the seconds of delay by 5 seconds or more. Therefore, Project impacts would be less-than-significant for the AM peak-hour. The addition of Project trips would cause more than 5 seconds of delay in the PM peak-hour at this same intersection. This impact and associated mitigation measures are discussed below.

Intersection 5: Laughlin Road & Northfront Road

Impact Traf-10: **Laughlin Road & Northfront Road Intersection.** The addition of Project trips would have a cumulatively considerable impact on the delay at an intersection already projected to operate below acceptable levels (an increase of 5.2 seconds of average delay during the PM peak hour under Cumulative Plus Project conditions). This is a ***significant*** impact.

This intersection is currently all-way stop-controlled and there are no current plans for intersection improvements. The addition of Project traffic would worsen the overall delay at this intersection.

This impact could be mitigated in one of two ways, as described in the mitigation measure below. **Table 16.14** summarizes the LOS and delay results.

Mitigation Measure

Traf-10: **Laughlin Road & Northfront Road Intersection Improvements.** The Project shall contribute a fair share amount to improvements at this intersection, as determined by the City of Livermore Community Development Department. The improvements shall consist of either A) or B) below, again as determined in coordination with the City of Livermore Community Development Department:

A) Roundabout. Install a roundabout with yield-control at all three intersection legs. The current vehicle lane configuration would remain, but right-of-way may need to be expanded to accommodate traffic movements through the intersection.

OR

B) Signal Control. Signalize the intersection. The current vehicle lane configuration would need to be altered from the existing one lane in each direction to include a left-turn pocket in the eastbound direction and a right-turn pocket in the westbound direction. Right-of-way may need to be expanded to accommodate the turn-pocket lanes at the intersection.

Implementation of mitigation measure Traf-10 would reduce the Project's contribution to the cumulative impact at the Laughlin Road-Northfront Road intersection to ***less-than-significant*** levels. With implementation of either option A) or B), this intersection would operate at LOS E during the AM peak-hour and LOS D during the PM peak hour following mitigation. These are acceptable LOS conditions for an intersection near the freeway.

Table 16.14: Laughlin Road-Northfront Road Intersection Mitigations

Mitigation		Peak Hour	Cumulative 2025 LOS	Cumulative 2025 Delay[1]	Cumulative + Project LOS	Cumulative + Project Delay[1]
0	No Mitigation	AM	**F**	**339.6**	**F**	**342.5**
		PM	**F**	**305.5**	**F**	**310.7**
A	Roundabout with yield control at all legs	AM	E	46.0	E	47.3
		PM	D	27.3	D	28.7
B	Signal with eastbound left turn pocket and westbound right turn pocket	AM	E	58.9	E	60.5
		PM	D	44.4	D	45.7
	Notes: **Bold** = Substandard operations; **Bold and Boxed** = Project impact					
1	Delay shown is the weighted average delay in seconds per vehicle. For signal and AWS, LOS is based on delay for all intersection approaches. For SSS, LOS is based on the intersection approach with the					
Source: Kittelson and Associates, 2012						

Freeway Operation

Impact Traf-11: **Cumulative Project-Generated Traffic Contribution to Freeway.** Traffic generated by the proposed Project would increase the number of additional vehicles on I-580 during peak-hours. This is a ***less than significant*** impact.

While the Project would contribute vehicle volumes cumulatively to the I-580 freeway, based on the trip generation and trip distribution identified above, the numbers are relatively small. The results from the traffic model show Project traffic on I-580 freeway segments is expected to increase over cumulative conditions from between 1 to 7 vph in some segments. These segments include three existing deficient segments at LOS F on westbound I-580 from Vasco Road to Portola/Isabel Avenue, and on eastbound I-580 from Foothill Boulevard to El Charro Road. Therefore existing deficient segments at LOS F are anticipated to remain deficient under cumulative conditions. Other segments are likely to continue to operate at LOS D conditions. Based on the peak hour cumulative no-project freeway volumes in deficient segments as identified in the traffic model, the project contribution increases traffic as follows:

- I-580 west of Vasco Road, westbound during the A.M peak hour is 8,722 vph. Project increase is 6 vehicles per hour (vph). Percent increase is less than 0.1%.
- I-580 west of Vasco Road, eastbound during the P.M peak hour is 8,553 vph. Project increase is 6 vph. Percent increase is less than 0.1%.

Other deficient segments indicate similar percent increases.

Therefore, based on the small amount of project traffic, this is not expected to increase the v/c ratio over the no project condition by more than 3% and therefore the freeway segments are not considered impacted.

While the addition of future HOV or Express Lanes on I-580 marginally improves service levels under cumulative conditions, traffic volumes in the model do not indicate the conditions in the mixed-flow lanes of deficient segments will improve to less than LOS D conditions.

This page intentionally left blank

17

UTILITIES

INTRODUCTION

This chapter describes existing public utilities setting and evaluates the impact of the proposed Project on the provision of public utilities and possible adverse physical impacts to the environment.

SETTING

WASTEWATER

Within the City of Livermore, sewer service is provided by the City of Livermore's Public Services Department, Water Resources Division.

The Water Resources Division maintains approximately 267 miles of collection lines ranging in size from 6 inches to 48 inches in diameter. The sewage is conveyed by gravity to the Livermore Water Reclamation Plant.[1]

Livermore Water Reclamation Plant has a current design capacity of 8.5 MGD. The Livermore Water Reclamation Plant currently processes over 6 million gallons of wastewater each day from throughout the Livermore area. The plant includes primary, secondary and tertiary treatment processes, and UV disinfection. Treatment plant solids undergo thickening, stabilization, and dewatering prior to transport offsite for use as landfill cover. [2]

Approximately 4 to 7 million gallons per day (MGD) of treated wastewater is sent through the Livermore Amador Valley Water Management Agency (LAVWMA) pipeline for ultimate disposal by the East Bay Dischargers Authority (EBDA) in San Francisco Bay. Up to 6.0 MGD of recycled water can be produced for landscape irrigation and fire protection applications.[3]

The Livermore General Plan identified a shortfall of capacity in the Livermore Water Reclamation Plant that would be needed to handle projected ultimate flows under buildout of the General Plan. It is estimated that at build-out of the General Plan, sewage flows are estimated to reach 10.0 MGD of average dry weather flow and approximately 12.26 MGD of wet weather flow. The City has planned a Phase VI expansion project to address this need and has a sanitary sewer impact fee program in place to

[1] City of Livermore website, Water Resources Division Wastewater page: http://www.cityoflivermore.net/citygov/pw/wrd/wastewater/default.asp, accessed on January 18, 2012.

[2] Ibid

[3] Ibid

fund the required improvements. Completion of the Phase VI project would provide sufficient capacity for the plant to process the projected ultimate flows.[4]

WATER

The Livermore Municipal Water (LMW) service area comprises portions of the City of Livermore, including the Project site, with the remainder of the City being served by the California Water Service Company. The LMW service area comprises approximately 23 square miles and had a service population in 2010 of 31,994. The service population is expected to increase to 37,724 by 2020.[5]

LMW receives its water from Zone 7 Water Agency through turn-outs from the Cross Valley Pipeline. Zone 7 has confirmed their ability to meet projected demands through 2030, the farthest modeled date.[6] Because of current uncertainty revolving around legal and environmental constraints in the Delta region where the majority of Zone 7's water supply is sourced, Zone 7 has developed a set of potential backup supply sources to adequately accommodate demand if the supply from the Delta changes dramatically in the near or far term.[7]

The City of Livermore does not pump groundwater to meet any water demands of the LMW service area and has no plan to do so in the 20-year planning horizon. The Zone 7 Water Agency is the groundwater manager for the Livermore-Amador Valley Groundwater Basin and prepares the Groundwater Management Plan.

LMW operates a recycled water system for over 10% of the total water usage in the service area. However, the Project is not located in the recycled water use area (LMW Zone 1, in the northwestern portion of the city). Additionally, conservation efforts in compliance with the 2009 Water Conservation Bill are anticipated to decrease water usage by approximately 20% over the 20-year planning horizon.

STORMWATER

The City of Livermore protects the surface water from pollution by ensuring that storm water discharges comply with San Francisco Bay Regional Water Quality Control Board (RWQCB) permit requirements, establishing non-point source pollution control measures as required by federal and State law. Storm water pollution prevention measures for new development projects, such as swales, retention ponds, erosion, and sedimentation control, are incorporated in the planning, design, construction, and operation of projects with the potential to create pollutants in storm water runoff.

SOLID WASTE

Since July 1, 2010, Livermore Sanitation provides garbage, recycling, and curb-side compostable services in the City of Livermore. [8] This service provider was chosen in part to meet county-wide and

---

[4] City of Livermore, prepared by DC&E, City of Livermore General Plan 2003-2025, Adopted February 2004, as amended through June 2009, Infrastructure and Public Services Element, p. 7-12.

[5] Livermore Municipal Water, prepared by City of Livermore Water Resource Division, 2010 Urban Water Management Plan, June 2011.

[6] Livermore Municipal Water, prepared by City of Livermore Water Resource Division, 2010 Urban Water Management Plan, June 2011, Table 3-13.

[7] Zone 7 Water Agency, 2011 Water Supply Evaluation, July 2011.

[8] City of Livermore website, Environmental Services page: http://www.cityoflivermore.net/citygov/pw/swr/default.asp, accessed January 2012.

City diversion goals of 75%.[9] Garbage service rates for single-family homes includes recycling and compostable (organics) pick-up.[10]

The Livermore Diversion rate for 2011 was 74%.[11]

Vasco Road Sanitary Landfill, located at 4001 Vasco Road in Livermore, began operations in 1962 and is the principal disposal site for solid waste generated in the city of Livermore. The landfill has a total permitted capacity of 32,970 cubic yards with an estimated 29.9% capacity remaining and permitted maximum disposal rate of 2,250 tons per day. A total of 69,364 tons of solid waste from the City of Livermore was disposed at this landfill in 2009 (the latest year reported), which averages to approximately 277 tons per day (assuming garbage is hauled 250 days per year), or 12.3% of the permitted daily capacity. [12] The City's contract with the landfill anticipates availability capacity through the contract effective date of 2023 with agreements for reserving disposal capacity at this facility or arranging for alternative disposal.[13]

REGULATORY SETTING

FEDERAL LAWS AND REGULATIONS

Clean Water Act (CWA)

The Clean Water Act (CWA) was enacted by Congress in 1972 and amended several times since its inception. It is the primary federal law regulating water quality in the United States, and forms the basis for several state and local laws throughout the country. Its objective is to reduce or eliminate water pollution in the nation's rivers, streams, lakes, and coastal waters. The CWA prescribed the basic federal laws for regulating discharges of pollutants as well as set minimum water quality standards for all waters of the United States. At the Federal level, the CWA is administered by the U.S. Environmental Protection Agency (EPA). At the state and regional level, the CWA is administered and enforced by the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCBs). The State of California has developed a number of water quality laws, rules, and regulations to assist in the implementation of the CWA and related federally mandated water quality requirements. In many cases, the Federal requirements set minimum standards, and the laws, rules, and regulations adopted by the State and Regional Boards are more restrictive, i.e. more protective of the environment.

[9] City of Livermore, Amended and Restated Agreement between the City of Livermore and Livermore Sanitation, Inc., May 9, 2011, available at: http://www.cityoflivermore.net/civica/filebank/blobdload.asp?BlobID=6478.

[10] Livermore Sanitation website: http://www.livermoresanitation.com/residential-services.html , accessed January 2012.

[11] Stopwaste.org, calculated based on data submitted to CalRecycle, 1995 to 2011 Diversion Rates by Jurisdiction, Available at: http://www.stopwaste.org/docs/diversion-rates-by-jurisdiction.pdf.

[12] California Department of Resources Recycling and Recovery webpage, Active Landfills Profile for Vasco Road Sanitary Landfill, Available at: http://www.calrecycle.ca.gov/Profiles/Facility/Landfill/LFProfile1.asp?COID=1&FACID=01-AA-0010.

[13] City of Livermore, Amended and Restated Agreement between the City of Livermore and Republic Services Vasco Road, LLC for Disposal of Solid Waste, May 2012, Available at: http://www.cityoflivermore.net/civica/filebank/blobdload.asp?BlobID=5259.

STATE LAWS AND REGULATIONS

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act establishes the SWRCB and the RWQCB as the principal state agencies having primary responsibility for coordinating and controlling water quality in California. The Porter-Cologne Act establishes the responsibility of the RWQCBs for adopting, implementing, and enforcing water quality control plans (Basin Plans), which set forth the state's water quality standards (i.e. beneficial uses of surface waters and groundwater) and the objectives or criteria necessary to protect those beneficial uses.

San Francisco Bay Water Quality Control Plan (Basin Plan)

The City of Livermore is located within the San Francisco Bay RWQCB, which is responsible for the development, adoption, and implementation of the Water Quality Control Plan (Basin Plan) for the San Francisco Bay region. The Basin Plan is the master policy document that contains descriptions of the legal, technical, and programmatic bases of water quality regulation in the San Francisco Bay Region. The Basin Plan identifies beneficial uses of surface waters and groundwater within its region and specifies effluent limitations, discharge prohibitions, and water quality objectives to maintain the existing potential beneficial uses of the waters. The proposed Project is required to adhere to all applicable requirements of the Basin Plan.

California Integrated Waste Management Act

California's Integrated Waste Management Act (IWMA) of 1989 (AB 939) set a requirement for Cities and Counties throughout the State to divert 50 percent of all solid waste from landfills by January 1, 2000, through source reduction, recycling and composting. AB 939 also established the goal for all California counties to provide at least 15 years of on-going landfill capacity. Recently, Assembly Bill 341 (AB 341) has updated the waste diversion requirement to 75% by 2020.

IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

The following thresholds for measuring a Project's environmental impacts are based upon CEQA Guidelines:

1. Would the project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?
2. Would the project require substantial expansion or alteration of the City's water or wastewater treatment and collection facilities?
3. Would the project require or result in the construction of new storm water drainage facilities or expansion of existing facilities?
4. Would the project have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?
5. Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

6. Would the project be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?
7. Would the project comply with federal, state, and local statutes and regulations related to solid waste?

WATER SUPPLY AND FACILITIES / WASTEWATER TREATMENT, FACILITIES AND CAPACITY

Impact Util-1: **Increased Water Demand and Wastewater Generation.** The proposed Project represents new development and related increases in water demand and wastewater generation within the existing service area for Livermore Municipal Water. As a standard condition of any project, the proposed Project will pay appropriate development impact and utility connection fees toward ongoing improvement and maintenance of the water and wastewater systems and comply with all applicable regulations. While the proposed Project would lead to an increase in demand for water and generation of wastewater, it would utilize existing water facilities and resources and would not cause an exceedance of wastewater treatment requirements or result in the need for new off-site facilities. Therefore, the impacts related to water and wastewater are ***less than significant***.

The Project is estimated to require approximately 5.34 million gallons per year, which, if divided evenly over the year would equate to approximately 0.015 MGD.[14] Wastewater is assumed to be 90% of the water demand, 0.013 MGD.

As stated above, LMW would have sufficient water supply through 2030 to accommodate the future demand under buildout of the City's General Plan. While the LMW growth projections may not include demand projections for the specific Project site, there would be negligible change from the proposed housing units relative to city-wide projections. Additionally, conservation efforts in compliance with the 2009 Water Conservation Bill are anticipated to decrease water usage by approximately 20% over the 20-year planning horizon, freeing up capacity for new development.

The projected increase in wastewater is a very small portion of existing demand and would be well within current capacity. As stated above, cumulative increases in demand under the General Plan are anticipated to result in the need for expanded facilities at the Livermore Water Reclamation Plant. The Project's contribution to the ultimate need for new facilities is mitigated though payment of required sanitary sewer impact fees. Additionally, increasing water conservation efforts, as discussed above, would also translate to reductions in wastewater generation.

The impact related to increases in water demand and wastewater generation would be ***less than significant***.

STORMWATER DRAINAGE FACILITIES

The Project site is currently undeveloped, with 31.7 acres of pervious area. Under the proposed development, 20.58 acres will remain pervious while 11.12 acres will become impervious, including buildings and paved areas. Stormwater from undeveloped buffer areas to the north, east and south will continue to sheet flow into the adjacent creek and wetland areas. Stormwater from the developed portion of the site and knoll areas will be captured on site, slowed and treated using bioretention

[14] Bay Area Air Quality Management District, Calculations for Greenhouse Gas Model (BGM)Version: 1.1.9 based upon Project data.

treatments in the front yards and along sidewalks and a detention pond at the southeast corner of the site from which treated water will be released into the creek similar to historic flows from the site. Preliminary calculations must be approved through permitting under C.3 provisions. (See the Hydrology chapter for additional details). Therefore the proposed Project would have ***no impact*** related to Project-specific or cumulative storm water drainage facilities.

SOLID WASTE

Impact Util-2: **Increased Solid Waste Generation.** The Project would increase solid waste generation at the site but would be served by a landfill with sufficient permitted capacity to accommodate the Project's solid waste disposal needs, and would not impede the ability of the City to meet the applicable federal, state and local statutes and regulations related to solid waste. The Project would have a ***less-than-significant*** impact with no mitigation warranted.

The proposed Project would increase the amount of development at the site, resulting in an increase of solid waste to the Vasco Road Sanitary Landfill. With no assumed diversion, the Project is estimated to generate approximately 170 tons of solid waste per year.[15] This amount represents less than 0.1 percent of the permitted maximum amount accepted daily at this landfill (approximately 0.02 percent). Additionally, the City has a reported solid waste diversion rate of 74% through recycling and composting programs. At the current diversion rate, the solid waste generation would be 44.2 tons per year.

As described in the setting, the Vasco Road Sanitary Landfill currently has existing capacity anticipated to accommodate City of Livermore waste disposal through the planning horizon of 2035. The City of Livermore is anticipated to meet AB 939/341, SB 1016 waste reduction requirements. The proposed Project would not impede the City's compliance with waste reduction requirements or contribute to a facility with insufficient capacity, and therefore, the impact related to solid waste generation and compliance with solid waste regulations would be ***less than significant*** and no mitigation measures are required.

ENERGY

While not a specific threshold of significance, the CEQA Guidelines recommend assessment of a Project's energy usage. The Project would be considered to have a significant impact related to energy use if it would violate applicable federal, state and local statutes and regulations relating to energy standards and/or if energy consumption increases resulting from the Project would trigger the need or expanded off-site energy facilities that would have a significant environmental impact.

Impact Util-3: **Increased Energy Consumption.** The Project would have an incremental increase in the demand for gas and electrical power. However, the Project is expected to be served with existing capacity and would not require or result in construction of new energy facilities or expansion of existing off-site facilities and would not violate applicable federal, state and local statutes and regulations relating to energy standards. The Project would have a ***less than significant*** impact relating to energy consumption with no mitigation warranted.

[15] Bay Area Air Quality Management District, Calculations for Greenhouse Gas Model (BGM)Version: 1.1.9 based upon Project data.

The Project is estimated to require approximately 564 megawatt hours/year of electricity and 3,770 million British Thermal Units (MMBTU) of natural gas.[16] The Project would be required by the City to comply with all standards of Title 24 of the California Code of Regulations and the new CALGreen standards, as applicable, aimed at the incorporation of energy-conserving design and construction.

PG&E infrastructure would be extended onto the Project site as a part of the Project, the specifics of which would be determined in consultation with PG&E prior to installation. As a result, although the Project would incrementally increase energy consumption, it would not result in a significant impact related to the provision of energy services.

Additionally, Mitigation Measure GHG-1 would require energy efficiency at least 16% greater than Title 24 requirements and further reduce energy usage at the site.

CUMULATIVE UTILITIES IMPACTS

The geographic context for a discussion of cumulative impacts to utilities is the service area of the utility in question. The cumulative impacts analysis for each utility includes all cumulative growth within its respective service area, as identified by the providers' demand projections. The cumulative context has been taken into account in the impact analysis above and there would be no additional cumulative impacts.

[16] Bay Area Air Quality Management District, Calculations for Greenhouse Gas Model (BGM)Version: 1.1.9 based upon Project data.

This page intentionally left blank

18

OTHER CEQA CONSIDERATIONS

INTRODUCTION

This chapter of the Draft EIR contains discussion of the following additional CEQA considerations:

- Mandatory Findings of Significance
- Significant Irreversible Modifications in the Environment
- Growth Inducing Impacts

MANDATORY FINDINGS OF SIGNIFICANCE

Appendix G of the CEQA Guidelines (Environmental Checklist) contains a list of mandatory findings of significance that may be considered significant impacts if any of the following occur:

- Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of California history or prehistory?
- Does the project have impacts that are individually limited, but cumulatively considerable?
- Does the project have environmental effects which will cause substantial adverse effects on human beings either directly or indirectly?

QUALITY OF THE ENVIRONMENT

Project implementation could lead to development that adversely affects the environment in terms of impacts to various CEQA issue topics, as discussed in this EIR. However, impacts of the Project are considered to be less than significant with mitigation. Implementation of the Project would not degrade the quality and extent of the environment provided all policies, rules, and regulations of all relevant governing bodies are adhered to, and the mitigation measures contained within this document are implemented.

CUMULATIVE IMPACTS

The Project is located at the edge of a developed urban environment and unincorporated area that is expected to remain undeveloped. The cumulative context for analysis in this EIR includes the existing development as well as the cumulative buildout under the City of Livermore General Plan (2025). As the last undeveloped area within the City limits in the vicinity, no additional development was assumed in the immediate vicinity of the Project. It is theoretically possible that additional residential units could be developed to the east, these are not currently planned and would be limited in number such that cumulative impacts would not be substantially changed.

Cumulative impacts of the Project are considered to be less than significant with mitigation. As discussed in the preceding sections of this checklist, implementation of the Project would not cumulatively impact the environment provided all policies, rules and regulations of all relevant governing bodies are adhered to, and the mitigation measures contained within this document are implemented.

ADVERSE EFFECTS ON HUMAN BEINGS

The Project would not have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly. Emissions, seismic activity and soil instability, and potential vehicle/pedestrian conflicts are ***less than significant with mitigation***. The Project would not expose people to significant new hazards. There would be no other adverse effects on human beings.

SIGNIFICANT IRREVERSIBLE MODIFICATIONS IN THE ENVIRONMENT

An EIR must identify any significant irreversible environmental changes that could be caused by a project. These may include current or future uses of non-renewable resources, and secondary or growth-inducing impacts that commit future generations to similar uses. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified. The *CEQA Guidelines* describe three distinct categories of significant irreversible changes: 1) changes in land use which would commit future generations to specific uses; 2) irreversible changes from environmental actions; and 3) consumption of non-renewable resources.

Changes in Land Use Which Would Commit Future Generations

The Project is generally consistent with plans and policies for development of the site and existing uses in the vicinity and would not constitute a change in land use which would commit future generations.

Irreversible Changes from Environmental Actions

This Project would contribute to regional emissions of air pollutants and greenhouse gasses, largely from vehicle emission of residents traveling to and from the site. However, the level of impact was determined to be less than significant and is expected to be further reduced over time as regulations and changes in travel habits lead to reduced vehicle emissions.

Consumption of Nonrenewable Resources

Consumption of nonrenewable resources can include increased energy consumption, conversion of agricultural or forested lands, and lost access to mining reserves. The Project would not result in the loss of agricultural or forested lands or mining reserves. Development of the Project area as proposed could result in the commitment of nonrenewable resources (e.g., gravel and petroleum products) and slowly renewable resources (e.g., wood products) used in construction. The operation of the proposed use would also require commitment of water and energy resources (e.g., petroleum products for vehicle operations, natural gas and electricity for lighting, heating, and cooling). However, the relative amount of resource use is low and would comply with applicable regulations. (See Chapter 17: Utilities for a more detailed discussion of energy usage.)

GROWTH INDUCING IMPACTS

The Project site is located at the edge of the City limits within the previous planned and developed Maralisa development. The Project site itself has been designated for development whereas the areas to

the north and west are projected to remain undeveloped as wetland or critical habitat area. Areas to the east and south are already developed. Development of the Project site would not have a growth-inducing effect.

This page intentionally left blank

19

ALTERNATIVES

INTRODUCTION

The California Environmental Quality Act Guidelines (CEQA Guidelines, 1970, as amended, Section 15126.6) require an EIR to include a discussion of a reasonable range of alternatives to the proposed project. The CEQA Guidelines also require that the EIR explain why specific project alternatives considered at one time were rejected in favor of the proposed project. The selection of alternatives is to be guided by the provision of reasonable choices and the promotion of informed decision making and informed public participation. An EIR need not evaluate alternatives that would have effects that cannot be determined, or for which implementation would be remote and speculative.

The Guidelines also require that the EIR specifically evaluate a "no project" alternative within this discussion and that an "environmentally superior" alternative be identified (Section 15126.6 [e]).

The alternatives addressed in this EIR were selected based on the following factors:

1. The extent to which the alternative would accomplish most of the basic project objectives.
2. The extent to which the alternative would avoid or lessen any of the identified significant environmental effects of the project (discussed in Chapters 4 through 18).
3. The potential feasibility of the alternative (as discussed in this Chapter).
4. The extent to which the alternative contributes to a "reasonable range" of alternatives necessary to permit a reasoned choice.

The proposed Project is fully described in Chapter 3 of this EIR (Project Description). The environmental consequences are addressed in Chapters 4 through 18 of this EIR.

PROJECT OBJECTIVES

CEQA requires the analysis of alternatives that would feasibly attain "most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project."[1] Therefore, the stated objectives can be used as a metric against which an alternative can be measured when determining overall feasibility.[2] Additionally, CEQA requires the evaluation of a proposed project to address only impacts to the physical environment; economic and social effects can be analyzed only as one link in a chain of cause and effect from a proposed decision (e.g., physical

[1] *CEQA Guidelines*, Section 15126.6 (a)

[2] Ibid., Section 15126.6 (a)

changes caused, in turn, by economic and social changes).[3] However, economic viability can be considered when determining the feasibility of a project alternative.[4]

The following are the objectives that would be fulfilled by the proposed Project. Alternatives will be evaluated in part based on their ability to meet these objectives.

1. Complete implementation of the current Planned Development zoning designation that reflects the Project site's inclusion in the Planned Unit Development Permit (PUD 115-A) for the Maralisa development, which indicates development with 76 single-family homes.
2. Contribute to housing availability to accommodate Livermore's growing population and to help satisfy Livermore's share of regional housing needs.
3. Provide housing near Livermore and Tri-Valley employment centers within the existing City Boundary and North Livermore Urban Growth Boundary.
4. Provide a high-quality residential neighborhood that is compatible and integrated with existing nearby residential, park, school and open space uses.
5. Provide adequate access to the site for safety purposes while minimizing environmental impacts and satisfying natural resource and flood control regulatory agencies.
6. Provide buffers as a separation and natural transition from adjacent open space and habitat to urban development.
7. Conserve the two prominent knolls as visual resources for the community.
8. Retain public access to trails around the knolls as a public amenity for hiking and vista views.

PROJECT IMPACTS

The Project would result in potentially significant impacts associated with the following topics, which would be significant without the implementation of mitigation measures, but would be reduced to a less than significant level if the mitigation measures recommended in this document are implemented.

- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- Hazards and Hazardous Materials
- Hydrology
- Noise
- Transportation and Circulation

All other topic areas would have no impact or less than significant impacts only.

Based on the analysis contained in this Draft EIR, implementation of the Project would not result in any significant and unavoidable impacts.

[3] *CEQA Guidelines,* Section 15131.

[4] Ibid., Section 15126.6(f)(1).

A comparison of the alternatives with respect to all the topic areas listed above is included in Table 19.1 at the end of this chapter.

ALTERNATIVES ANALYSIS

The alternatives analysis is presented as a comparative analysis to the proposed Project. A project may have the potential to generate significant impacts, but changes to certain features may also afford the opportunity to avoid or reduce such impacts. The following alternatives analysis compares the potential significant environmental impacts of the alternatives with those of the proposed Project for each of the environmental topics analyzed in detail in Chapters 4 through 18 of the EIR and discusses feasibility of implementation, and ability to meet objectives.

SELECTION OF ALTERNATIVES

A. No Project, No Development Alternative

B. Reduced Density, Current General Plan Allowance Alternative

Two alternatives were evaluated. Both alternatives are located on the Project site. Differences between the alternatives focus on reducing the density of the Project, and therefore air quality emissions, construction-period noise impacts and operational traffic-related impacts. The two alternatives to be analyzed in comparison to the proposed Project are shown in **Table 19.1** and are as follows:

Alternative A: No Project, No Development Alternative. Alternative A is a "no project" alternative. It assumes the proposed Project is not approved and the site would remain in an undeveloped state, with no development of roadways or residences.

Alternative B: Reduced Density, Current General Plan Allowance Alternative. Alternative B assumes the Project site is developed consistent with the current "UL-1" (Urban Low Residential 1-1.5 dwelling units per acres) General Plan designation. Given this current General Plan designation, the Project site could be developed with another residential project. Specifically, this alternative assumes 47 residential units would be constructed on the 31.7-acre site (at approximately 1.5 units per acre). This is 62% of the units proposed under the Project. A residential development at these lower densities would likely be comprised of larger lots covering a similar area as under the Project.

Alternatives Rejected as Infeasible

As described above, Section 15126.6(c) of the CEQA Guidelines requires an EIR to identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination.

This site is unique in that it is the last parcel of the previously-developed Maralisa subdivision. It is adjacent to developed areas, already within Livermore's city boundary and North Livermore Urban Growth Boundary, and identified in the General Plan as an area in which residential development is anticipated. The parcel is within the city and currently controlled by the applicant. Therefore, a similar project in a different location would be a different project with a different applicant and was not considered a reasonable alternative for purposes of this environmental review.

The Reduced Density, Current General Plan Density Alternative was chosen from possible development scenarios because it is within the density range allowed under the current General Plan designation.

Additionally, alternative roadway configurations were considered that would have avoided the necessity for a bridge over Altamont Creek. However, in early consultation with California Department of Fish & Game and US Fish & Wildlife Service, it was determined that because of adjacent sensitive habitat, a roadway to the west or a second connect to the east (farther north than the proposed connection) would not be desirable from a biological standpoint.

Every possible alternative to the Project cannot be fully evaluated. Alternatives A and B satisfy the requirement to consider and discuss "a range of reasonable alternatives to the project" pursuant to CEQA Guidelines section 15126.6. As discussed in the descriptions above, these alternatives were chosen as reasonable alternatives at this site and no additional alternatives were identified that would substantially contribute to a meaningful evaluation, analysis, and comparison of the project to possible alternatives.

ALTERNATIVE A: NO PROJECT, NO DEVELOPMENT ALTERNATIVE

Impact Analysis

Impact Summary

Under a "no development" alternative, the Project site would remain in an undeveloped state. There would be no impacts on the environment, because no new development would occur.

Ability to Accomplish Project Objectives and Feasibility

A No Project/No Development alternative would not meet any of the project objectives, except for separating adjacent habitats from development activity (objective 6) and preserving the knolls (objective 7). With no development, this alternative would not complete implementation of the Maralisa development, would not contribute to housing availability, and would not provide housing near employment centers. It is assumed the existing informal trails would remain on site.

This alternative represents the possibility that no project is approved on this site. However, there is no current proposal for the City or other agency to purchase this site or otherwise preserve it in an undeveloped state. This site is zoned for and previously indicated under the Maralisa plan for residential development. Therefore, while this alternative analyzes a no development scenario, it is not necessarily feasible to assume the site would remain undeveloped in the long term.

ALTERNATIVE B: REDUCED DENSITY, CURRENT GENERAL PLAN DENSITY ALTERNATIVE

Impact Analysis

Impact Summary

Alternative B would involve a similar amount of site preparation as proposed under the Project, with a reduced amount of construction, resulting in a construction timeframe approximately 9 months shorter, for a total of 2.25 years. Because it is assumed that grading at the site would remain necessary as would having connecting roadways including a new bridge, the bulk of the construction timeline and activities would remain. Therefore, construction-period impacts related to noise and emissions as well as biological impact related to development of habitat would be marginally reduced from already less than significant levels. With a reduction in traffic generation, Alternative B would also reduce operational

impacts related to traffic and emissions, avoiding significant contribution to one cumulative impact but otherwise requiring the same mitigation as under the Project to reduce impacts to less than significant.

Air Quality and Greenhouse Gas Emissions

This Alternative would result in approximately 62% of the daily vehicle trips assumed under the proposed Project, as well as less building space that would require water and use energy. Operational air quality impacts and greenhouse gas emissions would be expected to be approximately 38% less than those identified under the proposed Project. However, air quality and GHG emissions would be anticipated to be below the threshold of significance for both the Project and Alternative B. Thus, Alternative B would lessen already less than significant impacts related to emissions under the Project.

While Alternative B would reduce construction activities and therefore emissions, mitigation for construction-period emissions would be anticipated to still be required to reduce emissions levels to less than significant levels, as required under the proposed Project.

Biological Resources

Because it can be assumed the site would still require grading and connecting roadways, including a bridge, impacts related to biological resources would be similar under this alternative as under the Project. As under the Project, this alternative would result in removal of non-native annual grassland that could serve as habitat for a number of special-status species that would be mitigated through construction-period measures to protect offsite wetlands and vernal pools, pre-construction surveys, and provision of compensatory habitat approved through the appropriate regulatory agencies to reduce the impacts to less than significant levels.

Noise

While Alternative A would reduce construction activities, they would still be expected to span over a year and would be mitigated to a less then significant level under the Project or Alternative B.

Transportation and Circulation

The reduced development proposed under Alternative B would result in new vehicle trips in the vicinity, but these would equate to approximately 62% of the PM peak hour trips assumed under the proposed Project.

This would likely reduce the Project's contribution to a cumulative impact at Laughlin Road & Northfront Road Intersection below significance levels. Other impacts related to the extension of Hawk Street across Altamont Creek and the pedestrian-bicycle trail, and the requirement for design review for hazards, emergency access and review of the construction-period traffic plan would remain necessary to ensure these items are less than significant under Alternative B.

Other Environmental Topic Areas

Other than those discussed above, all impacts under Alternative B would be similar to those under the Project. Because Alternative B does not reduce the size of the Project site, but only the intensity of development on it, impacts related to site disturbance would be generally the same as under the Project, such as potential disturbance of undiscovered cultural resources, the potential for construction period runoff and erosion, construction of structures in a seismically active region, and routine use and therefore potential upset of hazardous materials during construction. All these impacts were less than

significant or reduced to that level through mitigation that would be anticipated to be required under the Project or Alternative B.

Ability to Accomplish Project Objectives and Feasibility

Alternative B would have the following ability to meet project objectives:

1. Alternative B would meet to a lesser degree the objective to complete implementation of the current Planned Development zoning designation that reflects the Project site's inclusion in the Planned Unit Development Permit (PUD 115-A) for the Maralisa development, but with fewer units than planned.

2. Alternative B would meet to a lesser degree the objective to contribute to housing availability.

3. Alternative B would meet to a lesser degree the objective to provide housing near Livermore and Tri-Valley employment centers.

4. Alternative B would meet the objective to provide a high-quality residential neighborhood that is compatible and integrated with existing nearby uses though Alternative B would result lower density development than that in the surrounding residential developments.

5. Alternative B would meet the objective to provide adequate access to the site if bridge construction remains financially feasible with a reduced unit count.

6. Alternative B would meet the objective to provide buffers as a separation and natural transition from adjacent open space and habitat to urban development.

7. It can be assumed that Alternative B would meet the objective to conserve the two prominent knolls.

8. It can be assumed that Alternative B would meet the objective to retain trails around the knolls as a public amenity for hiking and vista views.

The reduced intensity of development under Alternative B would meet all of the Project Objectives, though some would be to a lesser degree than would the proposed Project. It should also be noted that the financial feasibility of this Alternative is questionable, as the private residential development would fund construction of the Altamont Bridge connection. The inclusion of less residential development may make the development financially infeasible.

ENVIRONMENTALLY SUPERIOR ALTERNATIVE

In addition to the discussion and comparison of impacts of the proposed Project and the alternatives, Section 15126.6 of the CEQA Guidelines requires that an "environmentally superior" alternative be selected and the reasons for such a selection disclosed. In general, the environmentally superior alternative is the alternative that would be expected to generate the least amount of significant impacts. Identification of the environmentally superior alternative is an informational procedure and the alternative selected may not be the alternative that best meets the goals or needs of the City.

Table 19.1, on the following pages, provides a summary comparison of the environmental impacts of the alternatives compared to the proposed Project for each of the topic areas in which a potentially significant impact was identified under the Project. The table lists the level of significance of the impacts of the proposed Project to each of the environmental topics areas analyzed in the EIR and

shows whether the impacts anticipated under each proposed alternative would be similar to ("s"), greater ("+") or lesser ("-") than the proposed Project or whether the impact would be avoided ("-a").

No significant and unavoidable impacts were identified under the proposed Project. All Project impacts are either less than significant or can be reduced to those levels through implementation of the mitigation contained in this Draft EIR. Because of the low impact of the proposed Project, differences between it and the Alternatives are marginal and confined to reductions in already less than significant impacts. Alternative A, the No Project, No Development Alternative, has no impacts as it does not propose any change to the site. Alternative A would be the environmentally superior alternative.

The CEQA Guidelines also require that "if the environmentally superior alternative is the 'no project' alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives" (CEQA Guidelines Section 15126.6(e)(2)). In general, the environmentally superior alternative minimizes adverse impacts to the environment, while still achieving the basic project objectives.

Alternative B, the Reduced Density, Current General Plan Density Alternative would be the next most environmentally superior alternative with the lower density contributing to reduced impacts related to both the construction period and operational period. Alternative B would result in marginal reductions in already less than significant impacts, requiring mostly the same mitigation. However, the financial feasibility of this alternative is not known, as the reduction in units could undermine the financial feasibility of bridge construction.

TABLE 19.1: SUMMARY COMPARISON OF IMPACTS, PROPOSED PROJECT AND ALTERNATIVES

ENVIRONMENTAL ISSUE AREA	Project	ALTERNATIVE A	ALTERNATIVE B
		No Project	**Reduced Density (General Plan)**
AESTHETICS			
Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway or a scenic vista?	**LTS**	-a	s
Would the project substantially degrade the existing visual character or quality of the site and its surroundings?	**LTS**	-a	s
Would the project create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?	**LTS**	-a	s
AIR QUALITY			
Would the project conflict with or obstruct implementation of the applicable air quality plan?	**No Impact**	s	s
Would the project violate any air quality standard, contribute substantially to an existing or projected air quality violation or result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	**LTS (w/MM)**	-	-
Would the project expose sensitive receptors to substantial pollutants?	**LTS**	-	-
Would the project create objectionable odors affecting a substantial number of people?	**No Impact**	s	s
BIOLOGICAL RESOURCES			
Would the project have a substantial adverse effect, either directly or through habitat modifications, on species identified as candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or US Fish and Wildlife Services?	**LTS (w/MM)**	-a	s
Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game, or the US Fish and Wildlife Service?	**LTS (w/MM)**	-a	s

LTS = less than significant impact
LTS (w/MM) = an impact reduced to less than significant through incorporation of mitigation measures
SU = significant and unavoidable impact (not used)

s = same or similar impacts
+ = increased impacts
- = reduced impacts
-a = avoided impacts

ENVIRONMENTAL ISSUE AREA	Project	ALTERNATIVE A	ALTERNATIVE B
Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including but not limited to, marsh, vernal pool, coastal etc.), through direct removal, filling, hydrological interruption, or other means?	**LTS (w/MM)**	-a	s
Would the project interfere substantially with the movement of any native resident of migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites?	**LTS**	-a	s
Would the project conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	**No Impact**	s	s
CULTURAL RESOURCES			
Would the project cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5?	**No Impact**	s	s
Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5, directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; or disturb any human remains, including those interred outside of formal cemeteries.	**LTS (w/MM)**	-a	s
GEOLOGY AND SOILS			
Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Faulting Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	**LTS**	-a	s
Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving exposure to strong seismic ground shaking and/or seismic ground failure, including liquefaction, densification, and differential settlement or landslides?	**LTS (w/MM)**	-a	s
Would the project be located on a geologic unit or soil that is unstable (or that would become unstable as a result of the project) and which could potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	**LTS (w/MM)**	-a	s
Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving volcanic hazards;	**No Impact**	s	s
Development located on expansive soil, creating substantial risks to life and property	**LTS (w/MM)**	-a	s

LTS = less than significant impact
LTS (w/MM) = an impact reduced to less than significant through incorporation of mitigation measures
SU = significant and unavoidable impact (not used)

s = same or similar impacts
+ = increased impacts
- = reduced impacts
-a = avoided impacts

ENVIRONMENTAL ISSUE AREA	Project	ALTERNATIVE A	ALTERNATIVE B
Would the project result in soil erosion?	**LTS (w/MM)**	-a	s
Would the project be located in an area where soils are incapable of adequately supporting the use of septic tanks or alternate waste water disposal systems where sewers are not available for the disposal of waste water?	**No Impact**	s	s
GREENHOUSE GAS EMISSIONS			
Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	**LTS (w/MM)**	-a	-
Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?	**LTS (w/MM)**	-a	s
HAZARDS AND HAZARDOUS MATERIALS			
Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	**LTS**	-a	-
Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school?	**No Impact**	s	s
Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	**LTS (w/MM)**	-a	s
Is the project located within an airport land use plan area, would it result in a safety hazard for people residing or working in the project area?	**No Impact**	s	s
Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	**No Impact**	s	s
Would the project expose people or structures to a significant risk of loss, injury or death involving wild land fires, including where wild lands are adjacent to urbanized areas or where residences are intermixed with wild lands?	**LTS**	-a	s
HYDROLOGY AND WATER QUALITY			
Would the project violate water quality standards or waste discharge requirements?	**LTS (w/MM)**	-a	s

LTS = less than significant impact
LTS (w/MM) = an impact reduced to less than significant through incorporation of mitigation measures
SU = significant and unavoidable impact (not used)

s = same or similar impacts
+ = increased impacts
- = reduced impacts
-a = avoided impacts

ENVIRONMENTAL ISSUE AREA	Project	ALTERNATIVE A	ALTERNATIVE B
Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table?	**No Impact**	s	s
Would the project alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner, which would result in substantial erosion or siltation on- or off-site?	**LTS**	-a	s
Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner, which would result in flooding on- or off-site?	**No Impact**	s	s
Would the project place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	**No Impact**	s	s
Would the project place within a 100-year flood hazard area structures which would impede or redirect flood flows?	**No Impact**	s	s
Would the project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	**No Impact**	s	s
Would the project expose people or structures to inundation by seiche, tsunami, or mudflow?	**No Impact**	s	s
NOISE			
Would the project result in exposure of persons to or generation of noise in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies or cause a substantial increase in ambient noise levels in the project vicinity above levels existing without the project?	**LTS**	-a	s
Would the project result in substantial temporary or periodic increase in ambient noise levels in the project vicinity?	**LTS**	-a	-
Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	**LTS**	-a	-
Would the project result in exposure of people residing or working at the project site to excessive noise levels from a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public use airport or a private airport?	**LTS**	-a	s

LTS = less than significant impact
LTS (w/MM) = an impact reduced to less than significant through incorporation of mitigation measures
SU = significant and unavoidable impact (not used)

s = same or similar impacts
+ = increased impacts
- = reduced impacts
-a = avoided impacts

ENVIRONMENTAL ISSUE AREA	Project	ALTERNATIVE A	ALTERNATIVE B
TRANSPORTATION AND CIRCULATION			
Would the project conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	**LTS (w/MM)**	-a	-
Would the project conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	**LTS**	-a	-
Would the project substantially increase hazards due to a design feature or incompatible uses?	**LTS (w/MM)**	-a	s
Result in inadequate emergency access?	**LTS (w/MM)**	-a	s
Would the project conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	**LTS**	-a	s

LTS = less than significant impact
LTS (w/MM) = an impact reduced to less than significant through incorporation of mitigation measures
SU = significant and unavoidable impact (not used)

s = same or similar impacts
+ = increased impacts
- = reduced impacts
-a = avoided impacts

20

REPORT PREPARERS

REPORT PREPARERS

Lamphier – Gregory
1944 Embarcadero
Oakland, Ca. 94606
510-535-6690

Lamphier-Gregory
(Primary Report Preparers and all analyses not detailed below)
Scott Gregory, President
Rebecca Gorton, Senior Planner

Zander Associates
(Biological Resources)
Leslie Zander, Principal Biologist

William Self Associates
(Cultural Resources)
Matthew A. Russell, Ph.D., RPA
Aimee L. Arrigoni, M.A., Historian

Illingworth & Rodkin
(Noise and Vibration)
Richard Rodkin, Principal
Michael Thill, Staff Scientist

Kittelson and Associates (formerly Dowling Associates)
(Traffic and Circulation)
Damian Stefanakis, Senior Transportation Engineer
Kamala Parks, Senior Planner

CITY CONTACT

This document was prepared under the direction of City of Livermore staff and in particular, Steve Stewart, Senior Planner.

This page intentionally left blank

Appendix A:

Notice of Preparation (NOP) and Comments

Notice of Preparation

To: State Clearinghouse
1400 Tenth Street
Sacramento, CA 95814
(Address)

From: City of Livermore
1052 South Livermore Avenue
Livermore, CA 94550
(Address)

Subject: Notice of Preparation of a Draft Environmental Impact Report

City of Livermore will be the Lead Agency and will prepare an environmental impact report for the project identified below. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached materials. A copy of the Initial Study (☐ is ☒ is not) attached.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice.

Please send your response to Steve Stewart, Senior Planner at the address shown above. We will need the name for a contact person in your agency.

Project Title: Garaventa Hills Project

Project Applicant, if any: Livermore LT Ventures I Group, LLC

Date November 16, 2011

Signature

Title Senior Planner

Telephone (925)960-4450

Reference: California Code of Regulations, Title 14, (CEQA Guidelines) Sections 15082(a), 15103, 15375.

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #

Project Title: Garaventa Hills Project

Lead Agency: City of Livermore — Contact Person: Steve Stewart
Mailing Address: City Administration Building, 1052 South Livermore Ave. — Phone: (925) 960-4468
City: Livermore — Zip: 94551 — County: Alameda

Project Location: County: _____ City/Nearest Community: Livermore
Cross Streets: north of Garaventa Ranch Rd. and Hawk St., west of Bear Creek Dr. and Laughlin Rd. — Zip Code: 94551
Longitude/Latitude (degrees, minutes and seconds): 37 ° 43 ′ 30 ″ N / 121 ° 43 ′ 00 ″ W — Total Acres: 31.7
Assessor's Parcel No.: 99B-5300-10 — Section: _____ Twp.: _____ Range: _____ Base: _____
Within 2 Miles: State Hwy #: I-580 — Waterways: Altamont Creek
Airports: none — Railways: ACE — Schools: various

Document Type:

CEQA: ☑ NOP ☐ Draft EIR — NEPA: ☐ NOI — Other: ☐ Joint Document
☐ Early Cons ☐ Supplement/Subsequent EIR ☐ EA ☐ Final Document
☐ Neg Dec (Prior SCH No.) _____ ☐ Draft EIS ☐ Other: _____
☐ Mit Neg Dec Other: _____ ☐ FONSI

Local Action Type:

☐ General Plan Update ☐ Specific Plan ☑ Rezone ☐ Annexation
☑ General Plan Amendment ☐ Master Plan ☐ Prezone ☐ Redevelopment
☐ General Plan Element ☑ Planned Unit Development ☐ Use Permit ☐ Coastal Permit
☐ Community Plan ☑ Site Plan ☑ Land Division (Subdivision, etc.) ☐ Other: _____

Development Type:

☑ Residential: Units 76 Acres _____
☐ Office: Sq.ft. _____ Acres _____ Employees _____ ☐ Transportation: Type _____
☐ Commercial: Sq.ft. _____ Acres _____ Employees _____ ☐ Mining: Mineral _____
☐ Industrial: Sq.ft. _____ Acres _____ Employees _____ ☐ Power: Type _____ MW _____
☐ Educational: _____ ☐ Waste Treatment: Type _____ MGD _____
☐ Recreational: _____ ☐ Hazardous Waste: Type _____
☐ Water Facilities: Type _____ MGD _____ ☐ Other: _____

Project Issues Discussed in Document:

☐ Aesthetic/Visual ☐ Fiscal ☐ Recreation/Parks ☐ Vegetation
☐ Agricultural Land ☐ Flood Plain/Flooding ☐ Schools/Universities ☐ Water Quality
☐ Air Quality ☐ Forest Land/Fire Hazard ☐ Septic Systems ☐ Water Supply/Groundwater
☐ Archeological/Historical ☐ Geologic/Seismic ☐ Sewer Capacity ☐ Wetland/Riparian
☐ Biological Resources ☐ Minerals ☐ Soil Erosion/Compaction/Grading ☐ Growth Inducement
☐ Coastal Zone ☐ Noise ☐ Solid Waste ☐ Land Use
☐ Drainage/Absorption ☐ Population/Housing Balance ☐ Toxic/Hazardous ☐ Cumulative Effects
☐ Economic/Jobs ☐ Public Services/Facilities ☐ Traffic/Circulation ☑ Other: see Attachment A

Present Land Use/Zoning/General Plan Designation:

currently undeveloped. UL-1: Urban Low Density Residential

Project Description: *(please use a separate page if necessary)*
76-unit single-family residential subdivision including bridge construction over Altamont Creek. See Attachment A for more details.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "X".
If you have already sent your document to the agency please denote that with an "S".

_____ Air Resources Board
_____ Boating & Waterways, Department of
_____ California Highway Patrol
_____ Caltrans District # 4
_____ Caltrans Division of Aeronautics
_____ Caltrans Planning
_____ Central Valley Flood Protection Board
_____ Coachella Valley Mtns. Conservancy
_____ Coastal Commission
_____ Colorado River Board
_____ Conservation, Department of
_____ Corrections, Department of
_____ Delta Protection Commission
_____ Education, Department of
_____ Energy Commission
_____ Fish & Game Region # 3
_____ Food & Agriculture, Department of
_____ Forestry and Fire Protection, Department of
_____ General Services, Department of
_____ Health Services, Department of
_____ Housing & Community Development
_____ Integrated Waste Management Board
_____ Native American Heritage Commission

_____ Office of Emergency Services
_____ Office of Historic Preservation
_____ Office of Public School Construction
_____ Parks & Recreation, Department of
_____ Pesticide Regulation, Department of
_____ Public Utilities Commission
_____ Regional WQCB # 2
_____ Resources Agency
_____ S.F. Bay Conservation & Development Comm.
_____ San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
_____ San Joaquin River Conservancy
_____ Santa Monica Mtns. Conservancy
_____ State Lands Commission
_____ SWRCB: Clean Water Grants
_____ SWRCB: Water Quality
_____ SWRCB: Water Rights
_____ Tahoe Regional Planning Agency
_____ Toxic Substances Control, Department of
_____ Water Resources, Department of

_____ Other: _____
_____ Other: _____

Local Public Review Period (to be filled in by lead agency)

Starting Date _____ Ending Date _____

Lead Agency (Complete if applicable):

Consulting Firm: Lamphier-Gregory, Inc.
Address: 1944 Embarcadero
City/State/Zip: Oakland, CA 94110
Contact: Rebecca Gorton
Phone: 510-535-6690

Applicant: Livermore LT Ventures I Group, LLC
Address: 5000 Executive Parkway, No. 530
City/State/Zip: San Ramon, California 94583
Phone: 925-830-2603

Signature of Lead Agency Representative: _____ **Date:** 11/16/11

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

SITE LOCATION AND CONDITIONS

LOCATION AND EXISTING CONDITIONS

The 31.7-acre project site is located north of Interstate-580 and east of Vasco Road and west of Laughlin Road in the City of Livermore, and is an undeveloped parcel consisting predominantly of non-native grassland habitat, as shown on Figure 1.

The site is bordered by open space along the northern, western and immediate eastern boundaries, and is adjacent to other existing residential developments to the south and east.

The topography of the site is moderately steeply sloping. Altamont Creek, an intermittent stream channel, forms the southern boundary of the site. A ridgeline in the center of the site forms a natural watershed divide, with runoff draining either towards the north or south. The ridgeline forms a connection between the two prominent knolls in roughly the center of the site.

PROJECT DESCRIPTION

The project applicant is seeking land use entitlements and environmental clearance for a proposed 76-unit residential subdivision that would be known as Garaventa Hills. The proposed site plan is shown included as Figure 2.

The proposed subdivision would consist of an internal looped circulation plan circumscribing the prominent knolls, with a number of smaller cul-de-sacs accessing the corners of the property. The looped roadway system would be connected to the south across Altamont Creek by a new bridge crossing at Hawk Street that would connect to the developed properties to the south, and by the planned extension of Bear Creek Drive, which ultimately connects to Laughlin Road to the east. Construction of this bridge would require modification of the streambed, as shown in Figure 3.

A detailed slope analysis of the property has been prepared, indicating the relative gradient of the site as having a predominantly 15% to 20% slope. The site development plan seeks to work with these existing contours by aligning the primary internal road system parallel to the slope contours and using natural grade to find adequate access to the more gently sloping portions of the site. Excavations into the side slopes of the existing two hills would result in new slopes at approximately 3:1 (horizontal to vertical) ratios, placement of fill across the majority of the site, and construction of up to 30-foot-high slopes along the property boundaries, with total gross grading of approximately 200,000 cubic yards.

Ultimate development will include 76 residential lots of approximately 6,500 square feet in size each, and construction of associated roadways and utilities. Each lot will contain one single-family home supported by a shallow foundation system. Lots and roadways will comprise approximately 62% of the site only, with the remaining land reserved for open space slopes at the edges (Lot C on Figure 2), undeveloped knolls with trails (Lots B and C), and a detention basin (Lot D).

PROPOSED ANALYSIS

An Initial Study Checklist has not been prepared for this Notice of Preparation since the Lead Agency has determined that the proposed project has the potential to significantly affect the environment. A comprehensive EIR will be prepared for the project, which will address all environmental issues related to the project. Because biology and hydrology are anticipated to be important issues with a creek running along the site, a discussion of the issues and intended analysis is included below. As traffic is always a concern, even with this relatively low-traffic generating project, the scope of the traffic study is also excerpted below to facilitate early comments:

Biological Resources/Hydrology

With Altamont Creek at the southern border, the project site contains both wetland and waters of the U.S. (under Army Corps of Engineers jurisdiction). Alteration of the streambed will be necessary to build the proposed bridge and the Project will formalize one discharge point from the site.

Wetland and grassland habitats on or surrounding the project site have been determined through studies for the applicant to support several special-status species including California red-legged frog, California tiger salamander, burrowing owl and Congdon's tarplant. It is possible the US Fish and Wildlife Service will also request assumed presence of San Joaquin kit fox.

The applicant has begun coordinating appropriate permits and clearances through the Corps, the Regional Water Quality Control Board (RWQCB), California Department of Fish and Game (CDFG) and the US Fish and Wildlife Service (USFWS).

The CEQA analysis related to these topics will include peer review of hydrology issues by the City's engineering department and Lamphier-Gregory and peer review of applicant biological studies by Zander & Associates, as well as coordination with the permitting process to ensure mitigation is both appropriate and consistent with agency requirements.

TRANSPORTATION AND CIRCULATION

Dowling Associates, Inc (DA) will complete the traffic analysis for the project. DA will use published trip generation rates from Institute of Transportation Engineers (ITE) Trip Generation, Version 8 to calculate the trips for the project and determine any potential impacts to nearby City intersections. Potential impacts will be assessed based on City Standards of Significance, and any impacts will be mitigated to reduce them to less than significant levels. DA will use the Citywide General Plan Traffic Model to determine trip distribution percentages (select zone) to manually perform trip assignment. DA will apply industry standard incremental adjustment methods to minimize any model errors based on differences between counts and base model turning volumes. DA will use the volume growth at the study intersections and segments between the 2005 and 2025 model as the growth basis for cumulative analysis. These will be added to the existing condition counts and function as the cumulative no build conditions. The following scenarios will be analyzed for a.m. and p.m. peak hour conditions:

1. Existing (2011)
2. Existing (2011) plus Project
3. Cumulative (2025) without Project
4. Cumulative (2025) with Project

The impacts of the proposed project on traffic operations (both existing and cumulative conditions) will be analyzed at the study locations using the 2000 HCM methods for the weekday a.m. and p.m. peak hour conditions. DA will use TRAFFIX software to develop the level of service (LOS) using the 2000 Highway Capacity Manual Operations Analysis Method at all study intersections. Potential traffic impacts will be identified according to the City standards of significance, and mitigated to less than significant levels. Alameda CTC CMP Compliance analysis is *not* proposed, as the Project is expected to generate less than 100 p.m. peak hour trips.

The following six intersections and three roadway segments were chosen for analysis based on existing vicinity conditions, anticipated trip distribution, and coordination with City staff.

Study Intersections

1. North Vasco Road / Garaventa Ranch Road
2. Laughlin Road / Bear Creek Drive (east project access)
3. Hawk Street / Garaventa Ranch Road (south project access)
4. Laughlin Road / Altamont Creek Drive
5. Laughlin Road / Northfront Road
6. Herman Avenue/Garaventa/ Altamont Creek Drive

Road Segments

1. Laughlin Road
2. Garaventa Ranch Road
3. Altamont Creek Road

Figure 1: Site Location and Vicinity

Figure 2: Site Plan

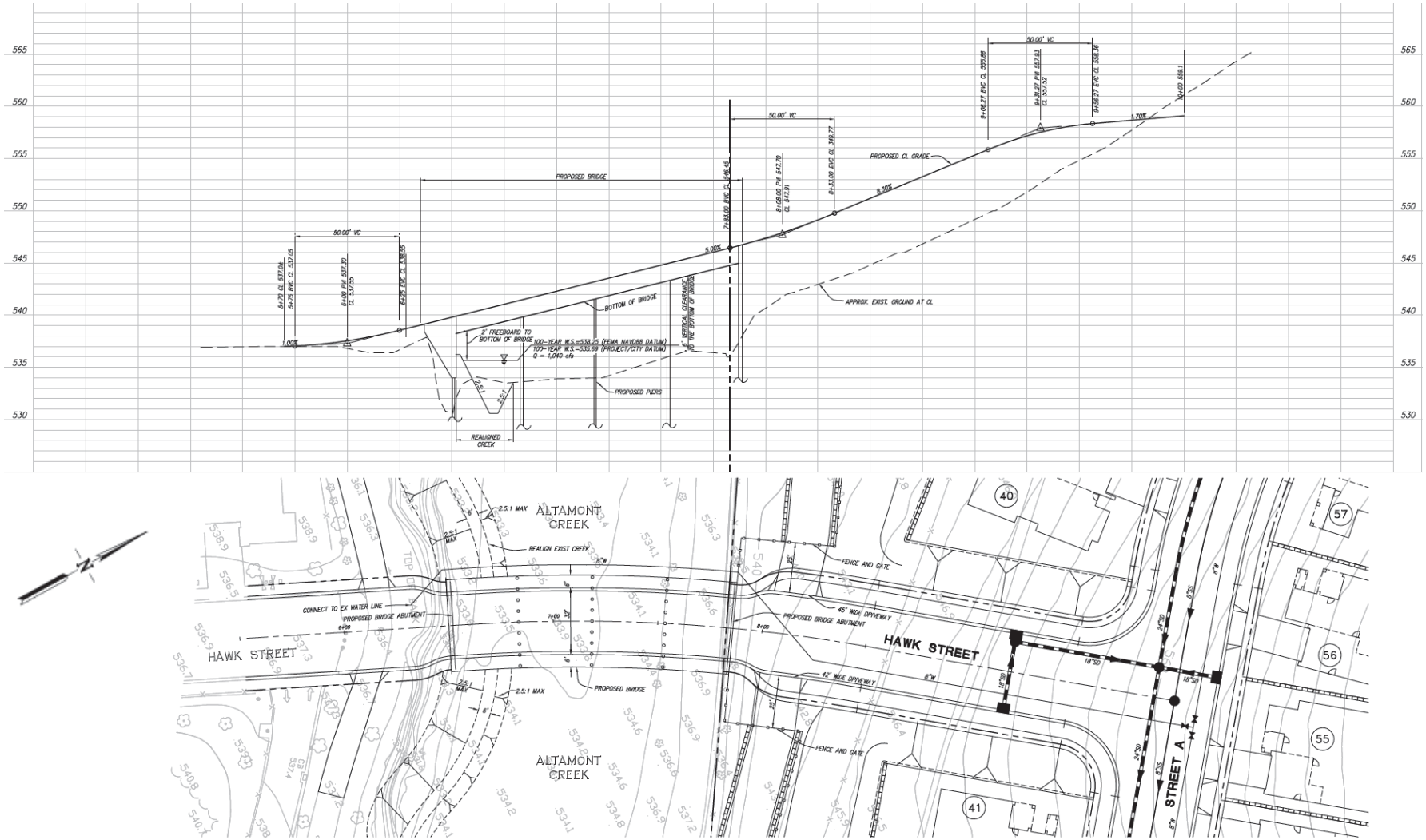


Figure 3: Preliminary Hawk Street Bridge Plan

STATE OF CALIFORNIA

Governor's Office of Planning and Research

State Clearinghouse and Planning Unit

Edmund G. Brown Jr.
Governor

Ken Alex
Director

Notice of Preparation

November 18, 2011

RECEIVED
NOV 22 2011
PLANNING DIVISION

To: Reviewing Agencies

Re: Garaventa Hills Project
SCH# 2011112045

Attached for your review and comment is the Notice of Preparation (NOP) for the Garaventa Hills Project draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Steve Stewart
City of Livermore City Administration Building
1052 S. Livermore Avenue
Livermore, CA 94551

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Attachments
cc: Lead Agency

Document Details Report
State Clearinghouse Data Base

SCH#	2011112045
Project Title	Garaventa Hills Project
Lead Agency	Livermore, City of

Type	NOP Notice of Preparation
Description	76-unit single-family residential subdivision including bridge construction over Altamont Creek.

Lead Agency Contact

Name	Steve Stewart		
Agency	City of Livermore City Administration Building		
Phone	925 960 4468	*Fax*	
email			
Address	1052 S. Livermore Avenue		
City	Livermore	*State* CA	*Zip* 94551

Project Location

County	Alameda
City	Livermore
Region	
Cross Streets	north of Garaventa Ranch Rd. and Hawk St., west of Bear Creek Dr. and Laughlin Rd.
Lat / Long	37° 43' 30" N / 121° 43' 0" W
Parcel No.	99B-5300-10

Township	*Range*	*Section*	*Base*

Proximity to:

Highways	I-580
Airports	No
Railways	ACE
Waterways	Altamont Creek
Schools	various
Land Use	currently undeveloped. UL-1: Urban Low Density Residential

Project Issues	Other Issues

Reviewing Agencies	Resources Agency; Department of Boating and Waterways; Department of Parks and Recreation; Department of Water Resources; Department of Fish and Game, Region 3; Native American Heritage Commission; Public Utilities Commission; State Lands Commission; California Highway Patrol; Caltrans, District 4; Regional Water Quality Control Board, Region 2

Date Received	11/18/2011	*Start of Review*	11/18/2011	*End of Review*	12/19/2011

Note: Blanks in data fields result from insufficient information provided by lead agency.

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH # 2011112045

Project Title: Garaventa Hills Project

Lead Agency: City of Livermore — Contact Person: Steve Stewart
Mailing Address: City Administration Building, 1052 South Livermore Ave. — Phone: (925) 960-4468
City: Livermore — Zip: 94551 — County: Alameda

Project Location: County: Alameda — City/Nearest Community: Livermore
Cross Streets: north of Garaventa Ranch Rd. and Hawk St., west of Bear Creek Dr. and Laughlin Rd. — Zip Code: 94551
Longitude/Latitude (degrees, minutes and seconds): 37 ° 43 ′ 30 ″ N / 121 ° 43 ′ 00 ″ W Total Acres: 31.7
Assessor's Parcel No.: 99B-5300-10 — Section: ____ Twp.: ____ Range: ____ Base: ____
Within 2 Miles: State Hwy #: I-580 — Waterways: Altamont Creek
Airports: none — Railways: ACE — Schools: various

RECEIVED
NOV 18 2011
STATE CLEARING HOUSE

Document Type:

CEQA: ☑ NOP ☐ Draft EIR ☐ Supplement/Subsequent EIR ☐ Early Cons ☐ Neg Dec ☐ Mit Neg Dec (Prior SCH No.) ____ Other: ____
NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI
Other: ☐ Joint Document ☐ Final Document ☐ Other: ____

Local Action Type:

☐ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan
☐ Specific Plan ☐ Master Plan ☑ Planned Unit Development ☑ Site Plan
☑ Rezone ☐ Prezone ☐ Use Permit ☑ Land Division (Subdivision, etc.)
☐ Annexation ☐ Redevelopment ☐ Coastal Permit ☐ Other: ____

Development Type:

☑ Residential: Units 76 Acres ____
☐ Office: Sq.ft. ____ Acres ____ Employees ____
☐ Commercial: Sq.ft. ____ Acres ____ Employees ____
☐ Industrial: Sq.ft. ____ Acres ____ Employees ____
☐ Educational: ____
☐ Recreational: ____
☐ Water Facilities: Type ____ MGD ____
☐ Transportation: Type ____
☐ Mining: Mineral ____
☐ Power: Type ____ MW ____
☐ Waste Treatment: Type ____ MGD ____
☐ Hazardous Waste: Type ____
☐ Other: ____

Project Issues Discussed in Document:

☐ Aesthetic/Visual ☐ Agricultural Land ☐ Air Quality ☐ Archeological/Historical ☐ Biological Resources ☐ Coastal Zone ☐ Drainage/Absorption ☐ Economic/Jobs
☐ Fiscal ☐ Flood Plain/Flooding ☐ Forest Land/Fire Hazard ☐ Geologic/Seismic ☐ Minerals ☐ Noise ☐ Population/Housing Balance ☐ Public Services/Facilities
☐ Recreation/Parks ☐ Schools/Universities ☐ Septic Systems ☐ Sewer Capacity ☐ Soil Erosion/Compaction/Grading ☐ Solid Waste ☐ Toxic/Hazardous ☐ Traffic/Circulation
☐ Vegetation ☐ Water Quality ☐ Water Supply/Groundwater ☐ Wetland/Riparian ☐ Growth Inducement ☐ Land Use ☐ Cumulative Effects ☑ Other: see Attachment A

Present Land Use/Zoning/General Plan Designation:

currently undeveloped. UL-1: Urban Low Density Residential

Project Description: *(please use a separate page if necessary)*

76-unit single-family residential subdivision including bridge construction over Altamont Creek. See Attachment A for more details.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "X".
If you have already sent your document to the agency please denote that with an "S".

_____ Air Resources Board	_____ Office of Emergency Services
_____ Boating & Waterways, Department of	_____ Office of Historic Preservation
_____ California Highway Patrol	_____ Office of Public School Construction
_____ Caltrans District # 4	_____ Parks & Recreation, Department of
_____ Caltrans Division of Aeronautics	_____ Pesticide Regulation, Department of
_____ Caltrans Planning	_____ Public Utilities Commission
_____ Central Valley Flood Protection Board	_____ Regional WQCB # 2
_____ Coachella Valley Mtns. Conservancy	_____ Resources Agency
_____ Coastal Commission	_____ S.F. Bay Conservation & Development Comm.
_____ Colorado River Board	_____ San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
_____ Conservation, Department of	_____ San Joaquin River Conservancy
_____ Corrections, Department of	_____ Santa Monica Mtns. Conservancy
_____ Delta Protection Commission	_____ State Lands Commission
_____ Education, Department of	_____ SWRCB: Clean Water Grants
_____ Energy Commission	_____ SWRCB: Water Quality
_____ Fish & Game Region # 3	_____ SWRCB: Water Rights
_____ Food & Agriculture, Department of	_____ Tahoe Regional Planning Agency
_____ Forestry and Fire Protection, Department of	_____ Toxic Substances Control, Department of
_____ General Services, Department of	_____ Water Resources, Department of
_____ Health Services, Department of	
_____ Housing & Community Development	_____ Other: _____
_____ Integrated Waste Management Board	_____ Other: _____
_____ Native American Heritage Commission	

Local Public Review Period (to be filled in by lead agency)

Starting Date _____ Ending Date _____

Lead Agency (Complete if applicable):

Consulting Firm: Lamphier-Gregory, Inc.
Address: 1944 Embarcadero
City/State/Zip: Oakland, CA 94110
Contact: Rebecca Gorton
Phone: 510-535-6690

Applicant: Livermore LT Ventures I Group, LLC
Address: 5000 Executive Parkway, No. 530
City/State/Zip: San Ramon, California 94583
Phone: 925-830-2603

Signature of Lead Agency Representative: _____ **Date:** 11/16/11

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

NOP Distribution List

County: Alameda SCH# 2011112045

Resources Agency

- [x] **Resources Agency**
  Nadell Gayou
- [x] **Dept. of Boating & Waterways**
  Nicole Wong
- [ ] **California Coastal Commission**
  Elizabeth A. Fuchs
- [ ] **Colorado River Board**
  Gerald R. Zimmerman
- [ ] **Dept. of Conservation**
  Elizabeth Carpenter
- [ ] **California Energy Commission**
  Eric Knight
- [ ] **Cal Fire**
  Allen Robertson
- [ ] **Central Valley Flood Protection Board**
  James Herota
- [ ] **Office of Historic Preservation**
  Ron Parsons
- [x] **Dept of Parks & Recreation**
  Environmental Stewardship Section
- [ ] **California Department of Resources, Recycling & Recovery**
  Sue O'Leary
- [ ] **S.F. Bay Conservation & Dev't. Comm.**
  Steve McAdam
- [x] **Dept. of Water Resources** Resources Agency
  Nadell Gayou

Fish and Game

- [ ] **Depart. of Fish & Game**
  Scott Flint
  Environmental Services Division
- [ ] **Fish & Game Region 1**
  Donald Koch
- [ ] **Fish & Game Region 1E**
  Laurie Harnsberger
- [ ] **Fish & Game Region 2**
  Jeff Drongesen
- [x] **Fish & Game Region 3**
  Charles Armor
- [ ] **Fish & Game Region 4**
  Julie Vance
- [ ] **Fish & Game Region 5**
  Leslie Newton-Reed
  Habitat Conservation Program
- [ ] **Fish & Game Region 6**
  Gabrina Gatchel
  Habitat Conservation Program
- [ ] **Fish & Game Region 6 I/M**
  Brad Henderson
  Inyo/Mono, Habitat Conservation Program
- [ ] **Dept. of Fish & Game M**
  George Isaac
  Marine Region

Other Departments

- [ ] **Food & Agriculture**
  Sandra Schubert
  Dept. of Food and Agriculture
- [ ] **Depart. of General Services**
  Public School Construction
- [ ] **Dept. of General Services**
  Anna Garbeff
  Environmental Services Section
- [ ] **Dept. of Public Health**
  Bridgette Binning
  Dept. of Health/Drinking Water
- [ ] **Delta Stewardship Council**
  Terry Macaulay

Independent Commissions,Boards

- [ ] **Delta Protection Commission**
  Linda Flack
- [ ] **Cal EMA (Emergency Management Agency)**
  Dennis Castrillo
- [x] **Native American Heritage Comm.**
  Debbie Treadway
- [x] **Public Utilities Commission**
  Leo Wong
- [ ] **Santa Monica Bay Restoration**
  Guangyu Wang
- [x] **State Lands Commission**
  Jennifer Deleong
- [ ] **Tahoe Regional Planning Agency (TRPA)**
  Cherry Jacques

Business, Trans & Housing

- [ ] **Caltrans - Division of Aeronautics**
  Philip Crimmins
- [ ] **Caltrans - Planning**
  Terri Pencovic
- [x] **California Highway Patrol**
  Suzann Ikeuchi
  Office of Special Projects
- [ ] **Housing & Community Development**
  CEQA Coordinator
  Housing Policy Division

Dept. of Transportation

- [ ] **Caltrans, District 1**
  Rex Jackman
- [ ] **Caltrans, District 2**
  Marcelino Gonzalez
- [ ] **Caltrans, District 3**
  Bruce de Terra
- [x] **Caltrans, District 4**
  Lisa Carboni
- [ ] **Caltrans, District 5**
  David Murray
- [ ] **Caltrans, District 6**
  Michael Navarro
- [ ] **Caltrans, District 7**
  Elmer Alvarez
- [ ] **Caltrans, District 8**
  Dan Kopulsky
- [ ] **Caltrans, District 9**
  Gayle Rosander
- [ ] **Caltrans, District 10**
  Tom Dumas
- [ ] **Caltrans, District 11**
  Jacob Armstrong
- [ ] **Caltrans, District 12**
  Marlon Regisford

Cal EPA

Air Resources Board

- [ ] Airport/Energy Projects
  Jim Lerner
- [ ] Transportation Projects
  Douglas Ito
- [ ] Industrial Projects
  Mike Tollstrup
- [ ] **State Water Resources Control Board**
  Regional Programs Unit
  Division of Financial Assistance
- [ ] **State Water Resources Control Board**
  Student Intern, 401 Water Quality Certification Unit
  Division of Water Quality
- [ ] **State Water Resouces Control Board**
  Phil Crader
  Division of Water Rights
- [ ] **Dept. of Toxic Substances Control**
  CEQA Tracking Center
- [ ] **Department of Pesticide Regulation**
  CEQA Coordinator

Regional Water Quality Control Board (RWQCB)

- [ ] **RWQCB 1**
  Cathleen Hudson
  North Coast Region (1)
- [x] **RWQCB 2**
  Environmental Document Coordinator
  San Francisco Bay Region (2)
- [ ] **RWQCB 3**
  Central Coast Region (3)
- [ ] **RWQCB 4**
  Teresa Rodgers
  Los Angeles Region (4)
- [ ] **RWQCB 5S**
  Central Valley Region (5)
- [ ] **RWQCB 5F**
  Central Valley Region (5)
  Fresno Branch Office
- [ ] **RWQCB 5R**
  Central Valley Region (5)
  Redding Branch Office
- [ ] **RWQCB 6**
  Lahontan Region (6)
- [ ] **RWQCB 6V**
  Lahontan Region (6)
  Victorville Branch Office
- [ ] **RWQCB 7**
  Colorado River Basin Region (7)
- [ ] **RWQCB 8**
  Santa Ana Region (8)
- [ ] **RWQCB 9**
  San Diego Region (9)

- [ ] **Other** _____

_____

_____

- [ ] _____
  Conservancy

Last Updated 9/29/11

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
(916) 657-5390 - Fax

RECEIVED
DEC -7 2011
COMMUNITY DEVELOPMENT DEPT.

December 5, 2011

Steve Stewart
City of Livermore City Administration Building
1052 S. Livermore Avenue
Livermore, CA 94551

RE: SCH# 2011112045 Garaventa Hiills Project; Alameda County.

Dear Mr. Stewart:

The Native American Heritage Commission (NAHC) has reviewed the Notice of Preparation (NOP) referenced above. The California Environmental Quality Act (CEQA) states that any project that causes a substantial adverse change in the significance of an historical resource, which includes archeological resources, is a significant effect requiring the preparation of an EIR (CEQA Guidelines 15064(b)). To comply with this provision the lead agency is required to assess whether the project will have an adverse impact on historical resources within the area of project effect (APE), and if so to mitigate that effect. To adequately assess and mitigate project-related impacts to archaeological resources, the NAHC recommends the following actions:

- ✓ Contact the appropriate regional archaeological Information Center for a record search. The record search will determine:
  - If a part or all of the area of project effect (APE) has been previously surveyed for cultural resources.
  - If any known cultural resources have already been recorded on or adjacent to the APE.
  - If the probability is low, moderate, or high that cultural resources are located in the APE.
  - If a survey is required to determine whether previously unrecorded cultural resources are present.
- ✓ If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
  - The final report containing site forms, site significance, and mitigation measurers should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for public disclosure.
  - The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.
- ✓ Contact the Native American Heritage Commission for:
  - A Sacred Lands File Check. **USGS 7.5 minute quadrangle name, township, range and section required.**
  - A list of appropriate Native American contacts for consultation concerning the project site and to assist in the mitigation measures. **Native American Contacts List attached.**
- ✓ Lack of surface evidence of archeological resources does not preclude their subsurface existence.
  - Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) §15064.5(f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.
  - Lead agencies should include in their mitigation plan provisions for the disposition of recovered artifacts, in consultation with culturally affiliated Native Americans.
  - Lead agencies should include provisions for discovery of Native American human remains in their mitigation plan. Health and Safety Code §7050.5, CEQA §15064.5(e), and Public Resources Code §5097.98 mandates the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery.

Sincerely,

Katy Sanchez

Katy Sanchez
Program Analyst
(916) 653-4040

cc: State Clearinghouse

Native American Contact List
Alameda County
December 5, 2011

Indian Canyon Mutsun Band of Costanoan
Ann Marie Sayers, Chairperson
P.O. Box 28
Hollister , CA 95024
ams@indiancanyon.org
831-637-4238
Ohlone/Costanoan

Amah/MutsunTribal Band
Irene Zwierlein, Chairperson
789 Canada Road
Woodside , CA 94062
amah_mutsun@yahoo.com
(650) 851-7747 - Home
(650) 851-7489 - Fax
Ohlone/Costanoan

Jakki Kehl
720 North 2nd Street
Patterson , CA 95363
jakki@bigvalley.net
(209) 892-1060
Ohlone/Costanoan

Don Hankins
P.O. Box 627
Forest Ranch, CA 959421
530-343-3489 - phone/fax
Miwok

Katherine Erolinda Perez
PO Box 717
Linden , CA 95236
canutes@verizon.net
(209) 887-3415
Ohlone/Costanoan
Northern Valley Yokuts
Bay Miwok

Amah/Mutsun Tribal Band
Joseph Mondragon, Tribal Administrator
882 Bay view Avenue
Pacific Grove, CA 94062
831-372-9015
831-372-7078 - fax
Ohlone/Costanoan

Trina Marine Ruano Family
Ramona Garibay, Representative
30940 Watkins Street
Union City , CA 94587
soaprootmo@msn.com
510-972-0645-home
209-688-4753-cell
Ohlone/Costanoan
Bay Miwok
Plains Miwok
Patwin

Amah/Mutsun Tribal Band
Melvin Ketchum III, Environmental Coordinator
7273 Rosanna Street
Gilroy , CA 95020
408-842-3220
Ohlone/Costanoan

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH# 2011112045 Garavent Hills Project; Alameda County.

Native American Contact List
Alameda County
December 5, 2011

Muwekma Ohlone Indian Tribe of the SF Bay Area
Rosemary Cambra, Chairperson
2574 Seaboard Avenue
San Jose , CA 95131
muwekma@muwekma.org
408-205-9714
510-581-5194

Ohlone / Costanoan

Amah/MutsunTribal Band
Jean-Marie Feyling
19350 Hunter Court
Redding , CA 96003
jmfgmc@sbcglobal.net
530-243-1633

Ohlone/Costanoan

The Ohlone Indian Tribe
Andrew Galvan
PO Box 3152
Fremont , CA 94539
chochenyo@AOL.com
(510) 882-0527 - Cell
(510) 687-9393 - Fax

Ohlone/Costanoan
Bay Miwok
Plains Miwok
Patwin

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH# 2011112045 Garavent Hills Project; Alameda County.

Notes from City of Livermore Project Introduction and
Draft Environmental Impact Report Scoping Meeting on December 7, 2011

Introductions: Steve Stewart, Senior Planner with the City of Livermore Community Development Department introduced; Scott Gregory, Lamphier-Gregory consulting firm that will be preparing the Environmental Impact Report for the project; and Scott Roylance and Pat Toohey from Livermore LT Ventures 1, homebuilder proposing the project.

Meeting Purpose and Environmental Impact Report Process: Steve Stewart explained the purpose of the meeting and the Environmental Impact Report process: The purpose of the meeting was to introduce a residential project concept and receive comments on anything about the project that would be important to include in an Environmental Impact Report for the project.

The project site is under the land use jurisdiction of the City of Livermore and Livermore LT Ventures I, is seeking City approval of land use entitlements to develop the property with single family homes. Land use entitlements are typically a subdivision to divide the property up into single family lots, and site plan design review that would have details on lot layout, street designs, architecture, and landscaping.

The California Environmental Quality Act (CEQA), requires an Environmental Impact Report (EIR) to be prepared in order to address impacts on the physical environment that may result from this project, ways to minimize such impacts, and alternatives to the project in light of the EIR's purpose to provide information about these impacts.

The homebuilder is funding the EIR. However, Lamphier-Gregory will be preparing the EIR under the direction of the City and under a City-administered contract. This arrangement ensures that the environmental impact report remains objective and does not advocate for or against a project.

Lamphier-Gregory will soon begin performing studies and analyzing environmental information for the site. Once they prepare a draft EIR, then that document will be available for public review and comments. A final EIR will then be prepared that will include responses to all of the comments.

Public meetings will also be held by the City's Planning Commission and City Council to consider the EIR. Other land use entitlements such as a subdivision to create the individual lots and site plan/design review for the architecture/landscaping/street designs, would likely be considered concurrently with the EIR. If the City Council determines that that the EIR adequately addresses environmental impacts, then they would certify the EIR, approve the land use entitlements, and the project could move forward to construction.

Scott Roylance, Livermore LT Ventures 1 introduced his firm and background.

Scott Gregory, Lamphier-Gregory introduced himself and provided some background on his firm. At this point, Lamphier-Gregory is preparing to conduct technical studies and research

to address some of the potential environmental issues including: aesthetics, air quality, geotechnical, biological, public services, traffic, utilities, and acoustics.

Comments: Below is a summary of the concerns/comments/suggestions from meeting attendees:

- Public Notice: Attendees questioned how notification of this meeting was handled. Steve Stewart responded that typically a 300 foot radius is utilized to identify properties to receive notice. Steve will send the notice list to attendees if interested. The City is also able to expand the notification for future meetings to include complete neighborhoods in the project vicinity.

- Greenbelt behind homes (along Bear Creek Dr. and other nearby homes): Residents asked if development is prohibited because of sensitive environmental conditions (rare grasses, earthquake faults, and natural springs).

- Traffic. Potential for traffic conflicts with Altamont Creek Elementary school traffic. Cut through traffic on Bear Creek Dr. is a concern.

- Schools. Impacts to enrollment at existing schools.

- Marketability and impact on property values: Is there a market for new homes and how will they impact surrounding property values. Does the City need this project now?

- Oil seeps/treatment: There is a history of oil seeps in the area and extensive clean ups have been necessary.

- Geology/soils: Some of the soils in the area seem unstable and there are nearby rock formations.

- Natural springs: There are natural springs in the project area that flow heavily at times.

- Project amenities: Does the project offer any amenities to the public and nearby neighborhoods.

- Failed Housing Implementation Project (HIP): Unsuccessful attempt in approximately 2000. Why come back with another one now?

- Access: Look at alternative access other than Bear Creek Drive.

- Slope: Slope stability is a concern.

Livermore Area
Recreation & Park District
An independent special district

4444 East Ave., Livermore, CA 94550-5053
(925) 373-5700 www.larpd.dst.ca.us

General Manager
Timothy J. Barry

December 6, 2011

RECEIVED
DEC -8 2011
COMMUNITY DEVELOPMENT DEPT.

Mr. Steve Stewart, Sr. Planner
City of Livermore
1052 So. Livermore Ave.
Livermore, CA 94550

Dear Mr. Stewart:

We received the Notice of Preparation of an Environmental Impact Report and Project Introduction and Scoping Meeting Notice for the Proposed Garaventa Hills Project and have some comments and concerns about this project. Chiye Azuma, Mike Nicholson and John Lawrence from our staff met with Scott Roylance of Lafferty Communities on Thursday April 14, 2011 to discuss the Garaventa housing project. We reviewed all of our concerns regarding the proposed project. Since 1996, LARPD has owned and managed the Garaventa Wetlands Preserve, a 24-acre wetland area at the northeast corner of North Vasco Road and Altamont Creek containing sensitive alkali wetlands and vernal pools supporting a wide range of special status species.

The Garaventa wetland property is mitigation for the development just to the south of the existing Preserve. The primary concern expressed at the April 14th meeting was the negative impact the development will have on the natural drainage patterns to the neighboring wetlands. The seasonal drainage (or lack thereof) will have a significant impact on the surrounding wetland environment. We were also concerned with potential pollutants such as fertilizers, oils from autos, pet feces, (etc.) that will be transported into the wetlands via water runoff.

The City's NOP doesn't clearly indicate the adjacent wetland area. The EIR should clearly indicate that mitigation area for discussion on how this development will negatively impact the environmentally sensitive wetlands. From what we can ascertain from the City's NOP: (1) the developer did not incorporate the LARPD trail comments from our meeting with him to maximize the buffer between the development and the wetland; (2) there are no ponds incorporated into the plan to filter runoff from the develop before it enters the wetland, as discussed with the developer; and, (3) the roadway adjacent to the creek should be a single loaded street to maximize the creek protection and public access (Lots 41-47).

The above mentioned items are design issues and not directly related to the NOP. However, given that the developer met with LARPD staff to discuss our needs/concerns, and our comments are apparently not incorporated in the plan, we request that the City

Board of Directors
Maryalice Faltings Steve Goodman David Hutchinson Beth Wilson

address the issue of protecting and enhancing the wetland area east of Vasco Road. Until there is an overall plan for the area (addressing hydrology and wetland integrity issues), LARPD is concerned with any housing developments in the area.

Sincerely,

Tim Barry
General Manager

TB/s

cc: John Lawrence, Asst. General Manager

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY EDMUND G. BROWN JR., Governor

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5541
FAX (510) 286-5559
TTY 711

Flex your power!
Be energy efficient!

December 7, 2011

ALA580859
ALA-580-R8.9
SCH #2011112045

Mr. Steve Stewart
City of Livermore
1052 S. Livermore Avenue
Livermore, CA 94551

Dear Mr. Steward:

Garaventa Hills Project – Notice of Preparation

Thank you for including the California Department of Transportation (Department) in the environmental review process for the above project. The following comments are based on the Notice of Preparation (NOP). As the lead agency, the City of Livermore (City) is responsible for all project mitigation, including any needed improvements to state highways. The project's fair share contribution, financing, scheduling, implementation responsibilities and lead agency monitoring should be fully discussed for all proposed mitigation measures. This information should also be presented in the Mitigation Monitoring and Reporting Plan of the environmental document. Required roadway improvements should be completed prior to issuance of the Certificate of Occupancy. Since an encroachment permit is required for work in the state right of way (ROW), and the Department will not issue a permit until our concerns are adequately addressed, we strongly recommend that the City work with both the applicant and the Department to ensure that our concerns are resolved during the environmental review process, and in any case prior to submittal of a permit application. Further comments will be provided during the encroachment permit process; see the end of this letter for more information regarding encroachment permits.

Traffic Impact Fees
Please identify traffic impact fees. Development plans should require traffic impact fees based on projected traffic and/or based on associated cost estimates for public transportation facilities necessitated by development. Please refer to the Department's *2003 General Plan Guidelines* page 163, which can be accessed on-line at the following website: http://www.opr.ca.gov/index.php?a=planning/gpg.html

Scheduling and costs associated with planned improvements on Departmental ROW should be listed, in addition to identifying viable funding sources correlated to the pace of improvements for roadway improvements, if any. Please refer to the Department's *2003 General Plan Guidelines* page 106.

Traffic Impact Study

We encourage the City to coordinate preparation of the Traffic Impact Study (TIS) with our office, and we would appreciate the opportunity to review the scope of work. Please include the information detailed below in the TIS to ensure that project-related impacts to state roadway facilities are thoroughly assessed. The Department's *"Guide for the Preparation of Traffic Impact Studies"* should be reviewed prior to initiating any traffic analysis for the project; it is available at the following website:
http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf

The TIS should include:

1. Vicinity map, regional location map, and a site plan clearly showing project access in relation to nearby state roadways. Ingress and egress for all project components should be clearly identified. The state right of way (ROW) should be clearly identified.

2. The maps should also include project driveways, local roads and intersections, parking, and transit facilities.

3. Project-related trip generation, distribution, and assignment. The assumptions and methodologies used to develop this information should be detailed in the study, and should be supported with appropriate documentation.

4. Average Daily Traffic, AM and PM peak hour volumes and levels of service (LOS) on all significantly affected roadways, including crossroads and controlled intersections for existing, existing plus project, cumulative and cumulative plus project scenarios. Calculation of cumulative traffic volumes should consider all traffic-generating developments, both existing and future, that would affect study area roadways and intersections. The analysis should clearly identify the project's contribution to area traffic and degradation to existing and cumulative levels of service. Lastly, the Department's LOS threshold, which is the transition between LOS C and D, and is explained in detail in the Guide for Traffic Studies, should be applied to all state facilities. Please note, the Department considers LOS by itself as an inadequate measure of effectiveness (MOE) for describing traffic operational conditions since it may actually mask a deficient condition on one or more approaches. As for intersection analysis the accepted MOEs used by the Department include flow (output), average control delay, queue (length or number of vehicles), and Volume/Capacity (V/C) ratio. For freeway and ramp operations, flow (output), speed, and travel time/delay are the accepted MOEs in addition to LOS.

5. Schematic illustration of traffic conditions including the project site and study area roadways, trip distribution percentages and volumes as well as intersection geometrics, i.e., lane configurations, for the scenarios described above.

If the proposed project will not generate the amount of trips needed to meet the Department's trip generation thresholds, an explanation of how this conclusion was reached must be provided.

Cumulative Impact
Cumulative impacts should also be considered where alternatives contemplate work that would affect Departmental ROW, such as any transportation of hazardous material on state ROW, greenhouse emissions, community impacts, traffic impacts, tree removal, section 4(f), endangered species, seasonal wetlands, and water quality impacts (e.g. drainages, culverts etc.).

Please forward one hard copy and one CD of the environmental document, along with the TIS, including Technical Appendices, one full size and one 11" X 17" complete plan set, and the City's Conditions of Approval as soon as they are available.

Sincerely,

GARY ARNOLD
District Branch Chief
Local Development – Intergovernmental Review

c: State Clearinghouse

Appendix B:

Air Quality and Greenhouse Gas Emissions Model and Construction Health Risk Assessment Results

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name:

Project Name: Garaventa

Project Location: Alameda County

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

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2013 TOTALS (tons/year unmitigated)	0.53	3.47	2.72	0.00	11.88	0.20	12.08	2.48	0.18	2.66	476.73
2014 TOTALS (tons/year unmitigated)	1.27	1.88	2.60	0.00	0.01	0.12	0.12	0.00	0.11	0.11	395.30
2015 TOTALS (tons/year unmitigated)	1.27	1.74	2.47	0.00	0.01	0.11	0.12	0.00	0.10	0.10	395.40
2016 TOTALS (tons/year unmitigated)	0.23	0.25	0.37	0.00	0.00	0.02	0.02	0.00	0.01	0.01	62.16

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.95	0.17	0.38	0.00	0.00	0.00	222.75

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.87	1.22	10.43	0.01	1.95	0.37	1,070.85

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	1.82	1.39	10.81	0.01	1.95	0.37	1,293.60

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2013	0.53	3.47	2.72	0.00	11.88	0.20	12.08	2.48	0.18	2.66	476.73

Mass Grading 04/01/2013-09/27/2013	0.23	1.84	1.10	0.00	10.30	0.09	10.39	2.15	0.09	2.24	209.77
Mass Grading Dust	0.00	0.00	0.00	0.00	10.30	0.00	10.30	2.15	0.00	2.15	0.00
Mass Grading Off Road Diesel	0.23	1.80	1.02	0.00	0.00	0.09	0.09	0.00	0.08	0.08	195.49
Mass Grading On Road Diesel	0.00	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.99
Mass Grading Worker Trips	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.30
Building 07/01/2013-10/25/2013	0.19	1.00	1.09	0.00	0.00	0.06	0.07	0.00	0.06	0.06	180.95
Building Off Road Diesel	0.17	0.93	0.62	0.00	0.00	0.06	0.06	0.00	0.06	0.06	121.48
Building Vendor Trips	0.00	0.05	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.96
Building Worker Trips	0.01	0.02	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47.51
Fine Grading 09/30/2013-10/25/2013	0.04	0.28	0.17	0.00	1.58	0.01	1.60	0.33	0.01	0.34	31.35
Fine Grading Dust	0.00	0.00	0.00	0.00	1.58	0.00	1.58	0.33	0.00	0.33	0.00
Fine Grading Off Road Diesel	0.04	0.28	0.16	0.00	0.00	0.01	0.01	0.00	0.01	0.01	30.07
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	1.28
Asphalt 10/28/2013-11/29/2013	0.04	0.19	0.13	0.00	0.00	0.01	0.01	0.00	0.01	0.01	21.43
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	0.03	0.16	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	14.15
Paving On Road Diesel	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.73
Paving Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.55
Building 12/02/2013-02/26/2016	0.04	0.17	0.23	0.00	0.00	0.01	0.01	0.00	0.01	0.01	33.23
Building Off Road Diesel	0.03	0.15	0.11	0.00	0.00	0.01	0.01	0.00	0.01	0.01	17.83
Building Vendor Trips	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.10
Building Worker Trips	0.00	0.01	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.30
2014	1.27	1.88	2.60	0.00	0.01	0.12	0.12	0.00	0.11	0.11	395.30
Building 12/02/2013-02/26/2016	0.39	1.88	2.59	0.00	0.01	0.12	0.12	0.00	0.11	0.11	394.25
Building Off Road Diesel	0.34	1.69	1.29	0.00	0.00	0.11	0.11	0.00	0.10	0.10	211.57
Building Vendor Trips	0.01	0.13	0.11	0.00	0.00	0.00	0.01	0.00	0.00	0.00	36.74
Building Worker Trips	0.04	0.06	1.19	0.00	0.01	0.00	0.01	0.00	0.00	0.01	145.95
Coating 01/15/2014-03/11/2016	0.88	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.05
Architectural Coating	0.88	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	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.05
2015	1.27	1.74	2.47	0.00	0.01	0.11	0.12	0.00	0.10	0.10	395.40

Building 12/02/2013-02/26/2016	0.36	1.74	2.46	0.00	0.01	0.11	0.12	0.00	0.10	0.10	394.30
Building Off Road Diesel	0.31	1.57	1.26	0.00	0.00	0.10	0.10	0.00	0.09	0.09	211.57
Building Vendor Trips	0.01	0.11	0.10	0.00	0.00	0.00	0.01	0.00	0.00	0.00	36.74
Building Worker Trips	0.03	0.06	1.10	0.00	0.01	0.00	0.01	0.00	0.00	0.01	146.00
Coating 01/15/2014-03/11/2016	0.92	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09
Architectural Coating	0.92	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	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09
2016	0.23	0.25	0.37	0.00	0.00	0.02	0.02	0.00	0.01	0.01	62.16
Building 12/02/2013-02/26/2016	0.05	0.25	0.37	0.00	0.00	0.02	0.02	0.00	0.01	0.01	61.95
Building Off Road Diesel	0.04	0.23	0.19	0.00	0.00	0.01	0.01	0.00	0.01	0.01	33.23
Building Vendor Trips	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.77
Building Worker Trips	0.00	0.01	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.94
Coating 01/15/2014-03/11/2016	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21
Architectural Coating	0.18	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21

Phase Assumptions

Phase: Fine Grading 9/30/2013 - 10/25/2013 - Fine Grading

Total Acres Disturbed: 31.7

Maximum Daily Acreage Disturbed: 7.92

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

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

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 4/1/2013 - 9/27/2013 - Mass Grading

Total Acres Disturbed: 31.7

Maximum Daily Acreage Disturbed: 7.92

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 22.88

Off-Road Equipment:

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

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day
2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 10/28/2013 - 11/29/2013 - Roadways
Acres to be Paved: 7.92
Off-Road Equipment:
4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day
1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day
2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day
1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

Phase: Building Construction 12/2/2013 - 2/26/2016 - Bldg Construction
Off-Road Equipment:
1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day
2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day
1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day
3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Building Construction 7/1/2013 - 10/25/2013 - Bridge Construction
Off-Road Equipment:
1 Bore/Drill Rigs (291 hp) operating at a 0.75 load factor for 4 hours per day
1 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 8 hours per day
1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day
2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day
1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day
1 Pavers (100 hp) operating at a 0.62 load factor for 8 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day
3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 1/15/2014 - 3/11/2016 - Coating
Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
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

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.01	0.17	0.07	0.00	0.00	0.00	221.86
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.40
Landscape	0.06	0.00	0.31	0.00	0.00	0.00	0.49
Consumer Products	0.68						
Architectural Coatings	0.20						
TOTALS (tons/year, unmitigated)	0.95	0.17	0.38	0.00	0.00	0.00	222.75

Area Source Changes to Defaults

Percentage of residences with wood stoves changed from 35% to 0%

Percentage of residences with wood fireplaces changed from 10% to 0%

Percentage of residences with natural gas fireplaces changed from 55% to 100%

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Single family housing	0.87	1.22	10.43	0.01	1.95	0.37	1,070.85
TOTALS (tons/year, unmitigated)	0.87	1.22	10.43	0.01	1.95	0.37	1,070.85

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2013 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	31.70	9.57	dwelling units	76.00	727.32	6,218.37
					727.32	6,218.37

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	54.5	0.6	99.2	0.2
Light Truck < 3750 lbs	12.3	0.8	96.8	2.4

Light Truck 3751-5750 lbs	19.8	0.5	99.5	0.0
Med Truck 5751-8500 lbs	6.3	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.8	0.0	75.0	25.0
Lite-Heavy Truck 10,001-14,000 lbs	0.6	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	1.3	0.0	15.4	84.6
Heavy-Heavy Truck 33,001-60,000 lbs	0.7	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	2.9	55.2	44.8	0.0
School Bus	0.0	0.0	0.0	0.0
Motor Home	0.6	0.0	83.3	16.7

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	7.4
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)

Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name:

Project Name: Garaventa

Project Location: Alameda County

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

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2013 TOTALS (lbs/day unmitigated)	8.01	51.80	42.51	0.02	158.47	2.94	161.42	33.11	2.70	35.81	7,484.88
2014 TOTALS (lbs/day unmitigated)	10.02	14.42	19.95	0.01	0.07	0.89	0.95	0.02	0.81	0.84	3,029.47
2015 TOTALS (lbs/day unmitigated)	9.76	13.34	18.89	0.01	0.07	0.82	0.89	0.02	0.75	0.78	3,029.87
2016 TOTALS (lbs/day unmitigated)	9.51	12.36	17.96	0.01	0.07	0.73	0.80	0.02	0.67	0.69	3,030.17

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	5.48	0.99	3.80	0.00	0.01	0.01	1,221.15

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	4.67	5.76	56.31	0.06	10.70	2.05	6,140.58

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	10.15	6.75	60.11	0.06	10.71	2.06	7,361.73

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

Time Slice 4/1/2013-6/28/2013 Active Days: 65	3.58	28.30	16.98	0.00	158.41	1.43	159.84	33.08	1.32	34.40	3,227.29
Mass Grading 04/01/2013-09/27/2013	3.58	28.30	16.98	0.00	158.41	1.43	159.84	33.08	1.32	34.40	3,227.29
Mass Grading Dust	0.00	0.00	0.00	0.00	158.40	0.00	158.40	33.08	0.00	33.08	0.00
Mass Grading Off Road Diesel	3.51	27.76	15.68	0.00	0.00	1.41	1.41	0.00	1.30	1.30	3,007.48
Mass Grading On Road Diesel	0.03	0.48	0.16	0.00	0.00	0.02	0.02	0.00	0.02	0.02	92.13
Mass Grading Worker Trips	0.04	0.06	1.14	0.00	0.01	0.00	0.01	0.00	0.00	0.00	127.68
Time Slice 7/1/2013-9/27/2013 Active Days: 65	8.01	51.80	42.51	0.02	**158.47**	2.94	161.42	**33.11**	2.70	35.81	7,484.88
Building 07/01/2013-10/25/2013	4.43	23.50	25.53	0.01	0.07	1.51	1.58	0.02	1.39	1.41	4,257.59
Building Off Road Diesel	4.04	21.89	14.67	0.00	0.00	1.44	1.44	0.00	1.33	1.33	2,858.25
Building Vendor Trips	0.09	1.08	0.91	0.00	0.01	0.04	0.05	0.00	0.04	0.04	281.50
Building Worker Trips	0.31	0.54	9.94	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,117.85
Mass Grading 04/01/2013-09/27/2013	3.58	28.30	16.98	0.00	158.41	1.43	159.84	33.08	1.32	34.40	3,227.29
Mass Grading Dust	0.00	0.00	0.00	0.00	158.40	0.00	158.40	33.08	0.00	33.08	0.00
Mass Grading Off Road Diesel	3.51	27.76	15.68	0.00	0.00	1.41	1.41	0.00	1.30	1.30	3,007.48
Mass Grading On Road Diesel	0.03	0.48	0.16	0.00	0.00	0.02	0.02	0.00	0.02	0.02	92.13
Mass Grading Worker Trips	0.04	0.06	1.14	0.00	0.01	0.00	0.01	0.00	0.00	0.00	127.68
Time Slice 9/30/2013-10/25/2013 Active Days: 20	7.97	51.33	42.35	0.01	158.47	2.92	161.40	33.11	2.69	35.79	7,392.75
Building 07/01/2013-10/25/2013	4.43	23.50	25.53	0.01	0.07	1.51	1.58	0.02	1.39	1.41	4,257.59
Building Off Road Diesel	4.04	21.89	14.67	0.00	0.00	1.44	1.44	0.00	1.33	1.33	2,858.25
Building Vendor Trips	0.09	1.08	0.91	0.00	0.01	0.04	0.05	0.00	0.04	0.04	281.50
Building Worker Trips	0.31	0.54	9.94	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,117.85
Fine Grading 09/30/2013-10/25/2013	3.54	27.83	16.82	0.00	158.41	1.41	159.82	33.08	1.30	34.38	3,135.16
Fine Grading Dust	0.00	0.00	0.00	0.00	158.40	0.00	158.40	33.08	0.00	33.08	0.00
Fine Grading Off Road Diesel	3.51	27.76	15.68	0.00	0.00	1.41	1.41	0.00	1.30	1.30	3,007.48
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	0.04	0.06	1.14	0.00	0.01	0.00	0.01	0.00	0.00	0.00	127.68
Time Slice 10/28/2013-11/29/2013 Active Days: 25	3.12	14.89	10.50	0.01	0.02	1.17	1.19	0.01	1.07	1.08	1,714.31
Asphalt 10/28/2013-11/29/2013	3.12	14.89	10.50	0.01	0.02	1.17	1.19	0.01	1.07	1.08	1,714.31
Paving Off-Gas	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.10	12.84	8.03	0.00	0.00	1.09	1.09	0.00	1.00	1.00	1,131.92
Paving On Road Diesel	0.13	1.95	0.65	0.00	0.01	0.07	0.08	0.00	0.06	0.07	378.10
Paving Worker Trips	0.06	0.10	1.82	0.00	0.01	0.01	0.02	0.00	0.00	0.01	204.29

Time Slice 12/2/2013-12/31/2013 Active Days: 22	3.27	15.52	21.06	0.01	0.07	1.00	1.06	0.02	0.92	0.94	3,020.54
Building 12/02/2013-02/26/2016	3.27	15.52	21.06	0.01	0.07	1.00	1.06	0.02	0.92	0.94	3,020.54
Building Off Road Diesel	2.88	13.91	10.20	0.00	0.00	0.93	0.93	0.00	0.86	0.86	1,621.20
Building Vendor Trips	0.09	1.08	0.91	0.00	0.01	0.04	0.05	0.00	0.04	0.04	281.50
Building Worker Trips	0.31	0.54	9.94	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,117.85
Time Slice 1/1/2014-1/14/2014 Active Days: 10	2.99	14.42	19.88	0.01	0.07	0.89	0.95	0.02	0.81	0.84	3,021.09
Building 12/02/2013-02/26/2016	2.99	14.42	19.88	0.01	0.07	0.89	0.95	0.02	0.81	0.84	3,021.09
Building Off Road Diesel	2.63	12.97	9.89	0.00	0.00	0.82	0.82	0.00	0.76	0.76	1,621.20
Building Vendor Trips	0.08	0.96	0.85	0.00	0.01	0.04	0.05	0.00	0.03	0.04	281.52
Building Worker Trips	0.28	0.49	9.14	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,118.38
Time Slice 1/15/2014-12/31/2014 Active Days: 251	**10.02**	14.42	19.95	0.01	0.07	0.89	0.95	0.02	0.81	0.84	3,029.47
Building 12/02/2013-02/26/2016	2.99	14.42	19.88	0.01	0.07	0.89	0.95	0.02	0.81	0.84	3,021.09
Building Off Road Diesel	2.63	12.97	9.89	0.00	0.00	0.82	0.82	0.00	0.76	0.76	1,621.20
Building Vendor Trips	0.08	0.96	0.85	0.00	0.01	0.04	0.05	0.00	0.03	0.04	281.52
Building Worker Trips	0.28	0.49	9.14	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,118.38
Coating 01/15/2014-03/11/2016	7.03	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.38
Architectural Coating	7.03	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	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.38
Time Slice 1/1/2015-12/31/2015 Active Days: 261	9.76	13.34	18.89	0.01	0.07	0.82	0.89	0.02	0.75	0.78	3,029.87
Building 12/02/2013-02/26/2016	2.73	13.33	18.83	0.01	0.07	0.82	0.89	0.02	0.75	0.78	3,021.48
Building Off Road Diesel	2.40	12.04	9.62	0.00	0.00	0.76	0.76	0.00	0.70	0.70	1,621.20
Building Vendor Trips	0.07	0.85	0.79	0.00	0.01	0.03	0.04	0.00	0.03	0.03	281.54
Building Worker Trips	0.25	0.44	8.41	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,118.75
Coating 01/15/2014-03/11/2016	7.03	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.38
Architectural Coating	7.03	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	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.38
Time Slice 1/1/2016-2/26/2016 Active Days: 41	9.51	12.36	17.96	0.01	0.07	0.73	0.80	0.02	0.67	0.69	3,030.17
Building 12/02/2013-02/26/2016	2.48	12.35	17.90	0.01	0.07	0.73	0.80	0.02	0.67	0.69	3,021.78
Building Off Road Diesel	2.19	11.19	9.40	0.00	0.00	0.67	0.67	0.00	0.62	0.62	1,621.20
Building Vendor Trips	0.07	0.76	0.74	0.00	0.01	0.03	0.04	0.00	0.03	0.03	281.56
Building Worker Trips	0.23	0.41	7.76	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,119.02
Coating 01/15/2014-03/11/2016	7.03	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.39

Architectural Coating	7.03	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	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.39
Time Slice 2/29/2016-3/11/2016 Active Days: 10	7.03	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.39
Coating 01/15/2014-03/11/2016	7.03	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.39
Architectural Coating	7.03	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	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.39

Phase Assumptions

Phase: Fine Grading 9/30/2013 - 10/25/2013 - Fine Grading

Total Acres Disturbed: 31.7

Maximum Daily Acreage Disturbed: 7.92

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

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

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 4/1/2013 - 9/27/2013 - Mass Grading

Total Acres Disturbed: 31.7

Maximum Daily Acreage Disturbed: 7.92

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 22.88

Off-Road Equipment:

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

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 10/28/2013 - 11/29/2013 - Roadways

Acres to be Paved: 7.92

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

Phase: Building Construction 12/2/2013 - 2/26/2016 - Bldg Construction

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Building Construction 7/1/2013 - 10/25/2013 - Bridge Construction

Off-Road Equipment:

1 Bore/Drill Rigs (291 hp) operating at a 0.75 load factor for 4 hours per day

1 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 8 hours per day

1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

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

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 1/15/2014 - 3/11/2016 - Coating

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

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

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

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.07	0.95	0.41	0.00	0.00	0.00	1,215.70
Hearth - No Summer Emissions							
Landscape	0.61	0.04	3.39	0.00	0.01	0.01	5.45
Consumer Products	3.72						
Architectural Coatings	1.08						
TOTALS (lbs/day, unmitigated)	5.48	0.99	3.80	0.00	0.01	0.01	1,221.15

Area Source Changes to Defaults

Percentage of residences with wood stoves changed from 35% to 0%

Percentage of residences with wood fireplaces changed from 10% to 0%

Percentage of residences with natural gas fireplaces changed from 55% to 100%

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Single family housing	4.67	5.76	56.31	0.06	10.70	2.05	6,140.58
TOTALS (lbs/day, unmitigated)	4.67	5.76	56.31	0.06	10.70	2.05	6,140.58

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2013 Temperature (F): 85 Season: Summer

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	31.70	9.57	dwelling units	76.00	727.32	6,218.37
					727.32	6,218.37

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	54.5	0.6	99.2	0.2
Light Truck < 3750 lbs	12.3	0.8	96.8	2.4
Light Truck 3751-5750 lbs	19.8	0.5	99.5	0.0
Med Truck 5751-8500 lbs	6.3	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	0.8	0.0	75.0	25.0
Lite-Heavy Truck 10,001-14,000 lbs	0.6	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	1.3	0.0	15.4	84.6
Heavy-Heavy Truck 33,001-60,000 lbs	0.7	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0

Motorcycle	2.9	55.2	44.8	0.0
School Bus	0.0	0.0	0.0	0.0
Motor Home	0.6	0.0	83.3	16.7

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	7.4
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)

Bay Area Air Quality Management District Greenhouse Gas Model (BGM) Version: 1.1.9 Beta

Summary Results

Project Name: Garaventa

Project and Baseline Years:	2016	N/A
Results	**Unmitigated Project-Baseline CO2e (metric tons/year)** [1]	**Mitigated Project-Baseline CO2e (metric tons/year)**
Transportation:	796.29	796.29
Area Source:	1.01	1.01
Electricity:	94.76	79.60
Natural Gas:	200.16	168.14
Water & Wastewater:	14.68	14.68
Solid Waste:	39.37	39.37
Agriculture:	0.00	0.00
Off-Road Equipment:	0.00	0.00
Refrigerants:	0.00	0.00
Sequestration:	0.00	0.00
Purchase of Offsets:	0.00	0.00
Total:	1,146.27	1,099.08

Baseline is currently: **OFF**
Baseline Project Name:
Go to Settings Tab to Turn On Baseline

[1] The unmitigated project includes the City of Livermore's current 64% reduction in solid waste.
Source: Livermore Sanitation website: http://www.livermoresanitation.com/residential-services.html , accessed January 2012.

Detailed Results

Unmitigated [1]	CO2 (metric tpy)	CH4 (metric tpy)	N2O (metric tpy)	CO2e (metric tpy)	% of Total
Transportation:[2]				796.29	69.47%
Area Source:	0.81	0.00	0.00	1.01	0.09%
Electricity:[3]	94.61	0.00	0.00	94.76	8.27%
Natural Gas:	199.65	0.02	0.00	200.16	17.46%
Water & Wastewater:	14.66	0.00	0.00	14.68	1.28%
Solid Waste:	0.28	1.86	N/A	39.37	3.43%
Agriculture:	0.00	0.00	0.00	0.00	0.00%
Off-Road Equipment:	0.00	0.00	0.00	0.00	0.00%
Refrigerants:	N/A	N/A	N/A	0.00	0.00%
Sequestration:	N/A	N/A	N/A	0.00	0.00%
Purchase of Offsets:	N/A	N/A	N/A	0.00	0.00%
Total:				1,146.27	100.00%

Mitigated [4]	CO2 (metric tpy)	CH4 (metric tpy)	N2O (metric tpy)	CO2e (metric tpy)	% of Total
Transportation:[2]				796.29	72.45%
Area Source:	0.81	0.00	0.00	1.01	0.09%
Electricity:[3]	79.47	0.00	0.00	79.60	7.24%
Natural Gas:	167.71	0.02	0.00	168.14	15.30%
Water & Wastewater:	14.66	0.00	0.00	14.68	1.34%
Solid Waste:	0.28	1.86	N/A	39.37	3.58%
Agriculture:	0.00	0.00	0.00	0.00	0.00%
Off-Road Equipment:	0.00	0.00	0.00	0.00	0.00%
Refrigerants:	N/A	N/A	N/A	0.00	0.00%
Sequestration:	N/A	N/A	N/A	0.00	0.00%
Purchase of Offsets:	N/A	N/A	N/A	0.00	0.00%
Total:				1,099.08	100.00%

[2] Several adjustments were made to transportation emissions after they have been imported from URBEMIS.
After importing from URBEMIS, CO2 emissions are converted to metric tons and then adjusted to account for the "Pavley" regulation. Then, CO2 is converted to CO2e by multiplying by 100/95 to account for the contribution of other GHGs (CH4, N2O, and HFCs [from leaking air conditioners]). Finally, CO2e is adjusted to account for th low carbon fuels rule.

[3] Electricity was adjusted to account for PG&E's lower emission factor, which is 45.99% of than the state-wide average.
The model does not allow for adjustment of the emission factors, so the electricity usage was instead adjusted by this amount.
Source: PG&E Greenhouse Gas Emission Factors Info Sheet, last updated 4/8/2011, projection for 2016
available at: 2016 from http://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf

[4] Mitigated includes Energy Efficiency 16% above Title 24.

Construction-Period Health Risk Assessment
Calculations for Diesel Particulate Matter (DPM) Cancer Risk,
DPM Non-Cancer Hazard and PM 2.5 Exposure

Garaventa Hills Project

CANCER RISK:

1. URBEMIS Output

Specifics of construction phases were entered into URBEMIS. Default assumptions regarding construction equipment were used.

Total emissions (all years) were added together and divided by the total construction period in years (0.2 + 0.12 + 0.11 + 0.02 / 3 years = 0.15 average yearly short tons as the average yearly emissions rate).

2. Screen3

The average yearly emissions rate was converted to micro-grams/second/square meter (using a conversion factor of 1 short ton per year = 0.0287 g/s) then dividing by the project area (128,285 m^2). This emission rate, calculated at 3.3614E-08 g/s/m^2 was entered into Screen3 with these other parameters:

- Source type: area
- Urban dispersion coefficient
- Source release height: 3 meters
- Simple terrain – flat
- Automated distances
- Full meteorology

This resulted in a maximum 1-hour concentration of 0.9674 ug/m^3, which would occur at a distance of 270 meters. (Screen3 output is attached.)

3. Scaling to Annual

GLC = (X1-hour) (Scalar)

Where GLC is the annual average ground level concentration.

The maximum 1-hour concentration from the Screen3 output was then multiplied by the BAAQMD recommended hourly to annual Scalar of 0.1 for the following:

GLC = (0.9674 ug/m3) (0.1)

Ground Level Concentration = 0.09674 ug/m3

4. Calculate Risk

This GLC was used as the concentration in air ("C air") for calculation of inhalation dose as follows:

Inhalation Dose = (C air*DBR*A*EF*ED*1x10^{-6})/AT

DBR = daily breathing rate = 302

A = inhalation absorption rate for DPM = 1

EF = Exposure frequency = 250 days/yr (assuming 5 days a week for 50 weeks for the entire year)

ED = Exposure duration = 3 years (full construction period)

AT = Averaging time = 25,550 (for a 70 year cancer risk)

Inhalation Dose = (0.09674) (302) (1) (250) (3) (10^-6) / 25550

Inhalation Dose = 8.576E-07

And from there calculated the Inhalation Cancer Risk:

Inhalation Cancer Potency factor (for DPM) = 1.1

Inhalation Cancer Risk per million = (Inhalation Dose)*Inhalation Cancer Potency factor*10^6

Inhalation Cancer Risk per million = (8.576E-07)*1.1*10^6

Inhalation Cancer Risk per million (adult) = 0.943 - compared to Threshold of 10.0

Because an infant could be exposed during the construction, an age sensitivity factor of 10 is used.

Inhalation Cancer Risk * ASF = risk adjusted for age sensitivity

0.943*10 = 9.43

Inhalation Cancer Risk per million (infant) = 9.43 compared to Threshold of 10.00

PM10 is below threshold levels, even when analyzing worst case scenario.

FOR CHRONIC NON-CANCER:

Hazard Quotient = C air/REL

REL = DPM inhalation non-cancer chronic (long-term) reference exposure level = 5 ug/m^3

Hazard Quotient = 0.0.09674 / 5.0

Hazard Quotient = 0.019 compared to Threshold of 1.000

Chronic hazards are below threshold levels.

FOR PM2.5

The total PM2.5 emissions from URBEMIS (all years added together) were summed then divided by the total construction period in years.

Total PM2.5 emissions (all years) were added together and divided by the total construction period in years (0.18 + 0.11 + 0.1 + 0.01/ 3 years = 0.133 average yearly short tons as the average yearly emissions rate).

The average yearly emissions rate was converted to micro-grams/second/square meter (using a conversion factor of 1 short ton per year = 0.0287 g/s) then dividing by the project area as above. This emission rate, calculated at 2.9879E-08 g/s/m^2 was entered into Screen3 with the same parameters as for PM10 above and scaled to an annual average.

Annual Average PM2.5 concentration of 0.086 ug/m^3 compared to the threshold of 0.300 ug/m^3

PM2.5 is below threshold levels.

02/21/12

16:40:36
  *** SCREEN3 MODEL RUN ***
  *** VERSION DATED 96043 ***

 C:\Users\bruce\Documents\Lakes\Screen View\Garaventa.scr

 SIMPLE TERRAIN INPUTS:
    SOURCE TYPE   =   AREA
    EMISSION RATE (G/(S-M**2)) =   0.336140E-07
    SOURCE HEIGHT (M)   =   3.0000
    LENGTH OF LARGER SIDE (M)   =   375.0000
    LENGTH OF SMALLER SIDE (M) =   350.0000
    RECEPTOR HEIGHT (M)   =   0.0000
    URBAN/RURAL OPTION   =   URBAN
 THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
 THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS
ENTERED.

    MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION

 BUOY. FLUX =   0.000 M**4/S**3; MOM. FLUX =   0.000 M**4/S**
2.

 *** FULL METEOROLOGY ***

 ****
 *** SCREEN AUTOMATED DISTANCES ***
 ****

 *** TERRAIN HEIGHT OF   0. M ABOVE STACK BASE USED FOR
FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
1.	0.6775	5	1.0	1.0	10000.0	3.00	42.
100.	0.8069	5	1.0	1.0	10000.0	3.00	42.
200.	0.9061	5	1.0	1.0	10000.0	3.00	42.
300.	0.8478	5	1.0	1.0	10000.0	3.00	43.
400.	0.5478	5	1.0	1.0	10000.0	3.00	43.
500.	0.4177	5	1.0	1.0	10000.0	3.00	42.
600.	0.3407	5	1.0	1.0	10000.0	3.00	42.
700.	0.2885	5	1.0	1.0	10000.0	3.00	41.
800.	0.2502	5	1.0	1.0	10000.0	3.00	40.
900.	0.2207	5	1.0	1.0	10000.0	3.00	40.
1000.	0.1971	5	1.0	1.0	10000.0	3.00	40.

 MAXIMUM 1-HR CONCENTRATION AT OR BEYOND   1. M:

```
   270.  0.9674        5     1.0    1.0 10000.0    3.00     43.

      ************************************
      *** SUMMARY OF SCREEN MODEL RESULTS ***
      ************************************

 CALCULATION        MAX CONC    DIST TO   TERRAIN
  PROCEDURE        (UG/M**3)    MAX (M)    HT (M)
--------------    -----------   -------   -------
SIMPLE TERRAIN     0.9674          270.        0.


**************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
**************************************************
```

02/21/12

16:45:57
  *** SCREEN3 MODEL RUN ***
  *** VERSION DATED 96043 ***

 C:\Users\bruce\Documents\Lakes\Screen View\Garaventa.scr

 SIMPLE TERRAIN INPUTS:
    SOURCE TYPE   =   AREA
    EMISSION RATE (G/(S-M**2)) =   0.298790E-07
    SOURCE HEIGHT (M)   =   3.0000
    LENGTH OF LARGER SIDE (M)   =   375.0000
    LENGTH OF SMALLER SIDE (M) =   350.0000
    RECEPTOR HEIGHT (M)   =   0.0000
    URBAN/RURAL OPTION   =   URBAN
 THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
 THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

    MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION

 BUOY. FLUX =   0.000 M**4/S**3; MOM. FLUX =   0.000 M**4/S**2.

 *** FULL METEOROLOGY ***

 ****
 *** SCREEN AUTOMATED DISTANCES ***
 ****

 *** TERRAIN HEIGHT OF   0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
1.	0.6022	5	1.0	1.0	10000.0	3.00	42.
100.	0.7173	5	1.0	1.0	10000.0	3.00	42.
200.	0.8054	5	1.0	1.0	10000.0	3.00	42.
300.	0.7536	5	1.0	1.0	10000.0	3.00	43.
400.	0.4870	5	1.0	1.0	10000.0	3.00	43.
500.	0.3713	5	1.0	1.0	10000.0	3.00	42.
600.	0.3029	5	1.0	1.0	10000.0	3.00	42.
700.	0.2565	5	1.0	1.0	10000.0	3.00	41.
800.	0.2224	5	1.0	1.0	10000.0	3.00	40.
900.	0.1962	5	1.0	1.0	10000.0	3.00	40.
1000.	0.1752	5	1.0	1.0	10000.0	3.00	40.

 MAXIMUM 1-HR CONCENTRATION AT OR BEYOND   1. M:

```
   270.  0.8599        5     1.0    1.0 10000.0    3.00     43.

      ************************************
      *** SUMMARY OF SCREEN MODEL RESULTS ***
      ************************************

 CALCULATION        MAX CONC    DIST TO   TERRAIN
  PROCEDURE        (UG/M**3)    MAX (M)    HT (M)
--------------    -----------   -------   -------
SIMPLE TERRAIN     0.8599          270.        0.

**************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
**************************************************
```

Appendix C:

California Natural Diversity Database Results and Biological Reports and Related Documents

BIOLOGICAL RESOURCES ANALYSIS

FOR THE

GARAVENTA HILLS ESTATES PROPERTY

ALAMEDA COUNTY, CALIFORNIA

Prepared for:

RL COMMUNITIES
5000 Executive Parkway, Suite 530
San Ramon, California 94583

Prepared by:

OLBERDING ENVIRONMENTAL, INC.
Wetland Regulatory Consultants
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583

Phone: (925) 866-2111 ~ FAX: (925) 866-2126
Contact: Jeff Olberding

FEBRUARY 2011

TABLE OF CONTENTS

SUMMARY 1
1.0 INTRODUCTION 3
2.0 LOCATION 3
3.0 PROPERTY DESCRIPTION 3
4.0 REGULATORY SETTING 4
4.1 Federal Regulatory Setting 4
4.1.1 Plants and Wildlife 4
4.1.2 Wetlands/Waters 4
4.1.3 Migratory Bird Treaty Act 5
4.2 State Regulatory Setting 6
4.2.1 Plants and Wildlife 6
4.2.2 Wetlands/Waters 7
5.0 METHODS OF ANALYSIS FOR GENERAL BIOLOGICAL RESOURCES 7
5.1 Soils Evaluation 8
5.2 Plant Survey Methods 8
5.2.1 Review of Literature and Data Sources 9
5.2.2 Field Surveys 9
5.3 Wildlife Survey Methods 9
5.3.1 Review of Literature and Data Sources 9
5.3.2 Field Surveys 9
6.0 RESULTS FOR GENERAL BIOLOGICAL RESOURCES 10
6.1 Soil Evaluation Results 10
6.2 Plant Survey Results 13
6.2.1 Floristic Inventory and Habitat Characterization 13
6.2.2 Special-Status Plant Species 15
6.3 Wildlife Survey Results 13
6.3.1 General Wildlife Species and Habitats 21
6.3.2 Special-Status Wildlife Species 22
7.0 CONCLUSIONS 37
7.1 Wetlands 37
7.2 Special-Status Plants 37
7.3 Special-Status Wildlife 38
8.0 RECOMMENDATIONS 39
9.0 LITERATURE CITED 43

ATTACHMENTS

ATTACHMENT 1 FIGURES

Figure 1 Regional Map
Figure 2 Vicinity Map
Figure 3 USGS Quadrangle Map for Altamont
Figure 4 Aerial Photograph
Figure 5 Jurisdictional Waters Map
Figure 6 Map of CNDDB Reports of Special-Status Plants
Figure 7 Map of CNDDB Reports of Special-Status Wildlife
Figure 8 USFWS Designated Critical Habitat Map
Figure 9 Soils Map

ATTACHMENT 2 TABLES

Table 1 Plant and Wildlife Species Observed Within/Adjacent to the Survey Area

Table 2 Special-Status Species Occurring within the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 Minute Quadrangle Maps

ATTACHMENT 3 SITE PHOTOGRAPHS

This report should be cited as: Olberding Environmental, Inc. February 2011. *Biological Resources Analysis for the Garaventa Hills Estates Property, Alameda County, California.* Prepared for RL Communities, San Ramon, California.

SUMMARY

In November 2010 and January/February 2011, field reconnaissance investigations of the Garaventa Hills Estates property and adjacent Hom & Lai property were conducted for the purpose of identifying sensitive plant and wildlife species, sensitive habitats, and potential biological constraints. The survey area for this report incorporates two separate (connecting) properties, collectively referred to as "the Property". The first parcel includes the 31.7 acre Garaventa Hills Estates site located at the western terminus of Bear Creek Drive. The second parcel is the 9.7 acre Hom & Lai property located at the terminus of Meadow Glen Drive. Both parcels are located within the City of Livermore, Alameda County, California.

A jurisdictional delineation was conducted on January 13 and February 9, 2011 in order to determine the extent of regulated waters of the United States and State of California. Based on this delineation, it was found that the Property contains: 0.004-acre of seasonal wetlands, 0.484-acre of seasonal swales, 0.025-acre of vernal pools, and 0.36-acre of "other waters" in the form of 1,590 linear feet of Altamont Creek to the south (Altamont Creek is a "blue line" water feature on the USGS topographic map for Altamont). Therefore, the total jurisdictional acreage on the Property is 0.873-acre. It is assumed that these features would be regulated by the US Army Corps of Engineers (Corps), Regional Water Quality Control Board (Regional Board) and California Department of Fish & Game (CDFG). As such, permit applications would have to be prepared and submitted to these agencies seeking authorization of any fill or impact associated with these features. Mitigation would also be required to compensate for all impacts to jurisdictional features.

Due to the presence of suitable habitat types, soil conditions, and recent occurrences in the vicinity of the Property, the Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*) (blooms June to November) has the potential to occur on the site. The initial survey performed on November 15, 2010 resulted in a negative finding for this plant species. However, the survey was performed at the end of the identified blooming period. A pre-construction survey should be performed during this species' blooming period prior to any grading to identify its presence or absence on the Property.

Potentially suitable breeding habitat occurs on the Property for California tiger salamander (*Ambystoma californiense*) (CTS). Seasonal wetland and vernal pool features were identified on and adjacent to the Property (see Attachment 1, Figure 5). The site also provides suitable upland habitat for CTS in the form of ground squirrel burrows. The grassland and vernal pool habitat along the eastern portion of the Property also represent suitable conditions to support the western spadefoot toad (*Spea hammondii*). California red-legged frog (*Rana draytonii*) (CRLF) could potentially utilize the channel features and wetlands for breeding and foraging purposes. Both CTS and CRLF have been recorded on adjacent properties and are assumed to be present based on the suitability of the habitat to support both species. US Fish & Wildlife Service (USFWS) protocol surveys would be required to determine absence of these species. Development activities taking place on the Property would need USFWS and CDFG approval.

The federally threatened vernal pool fairy shrimp (*Branchinecta lynchi*) has the potential to occur on the Property. This species could occur within the seasonal wetland, seasonal swale, and vernal pool habitats located on the eastern parcel. In addition, the Property lies within USFWS

designated critical habitat (VERFS 19C) (Attachment 1, Figure 8). Surveys for this species should be conducted from December to May (depending on the timing of winter and spring rains) to determine presence or absence on the site. USFWS protocol surveys would be required to determine absence of these species. Development activities taking place on the Property would need USFWS approval.

Several migratory songbird, wading, and raptor species were determined to have a potential to forage on the Property based on suitable habitat types and recent occurrences. Nesting is unlikely due to the absence of tall trees and cliffs in the area. One white-tailed kite (*Elanus leucurus*) was observed foraging along the western Property boundary during the January 2011 survey. The Property and adjacent lands currently provide nesting and foraging habitat for the burrowing owl (*Athene cunicularia*). One adult burrowing owl was observed near an occupied burrow along the northern Property boundary during the November 2010 survey. Due to the presence of burrowing owls protocol surveys would be required prior to any site disturbance. Pre-construction surveys would also need to be performed in advance of any work to identify nesting raptors and/or migratory bird species.

The Property is located within the USFWS designated San Joaquin kit fox (*Vulpes macrotis mutica*) (SJKF) dispersal corridor linking Mt. Diablo with the Altamont range. Fossorial soils and open grassland habitat on the Property make this area suitable for SJKF use. The American badger (*Taxidea taxus*) could also occur on the Property. Development activities taking place on the Property would need USFWS approval to cover potential impacts to the SJKF.

1.0 INTRODUCTION

At the request of RL Communities, Olberding Environmental conducted a biological resources analysis of the Property which is located in Alameda County, California. This biological resources analysis includes a review of pertinent literature on relevant background information and habitat characteristics of the site including the California Natural Diversity Database (CNDDB 2011) and the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Vascular Plants of California, and a review of information related to species of plants and animals that could potentially utilize the described habitats observed. A general field reconnaissance investigation of the Property was conducted on November 15, 2010 with additional site visits performed on January 13 and February 9, 2011. This report documents the methods, results and conclusions for the reconnaissance-level surveys for the Property.

2.0 LOCATION

The Property is located north of intersection of Vasco Road and Interstate-580, roughly 4.2 miles northeast of downtown Livermore in Alameda County, California. The northeast portion of the survey area is located west of Laughlin Road between the north and south terminus of Meadow Glen Drive (subject parcel bisects the unfinished road), while the primary portion of the Property is located to the west of the terminus of Bear Creek Drive. Attachment 1, Figure 1 depicts the regional location of the Property in Alameda County. Figure 2 illustrates the vicinity of the Property in relationship to the City of Livermore. Figure 3 identifies the location of the Property on the USGS 7.5 Quadrangle Map for Altamont. An aerial photograph of the Property is contained in Figure 4, Attachment 1.

Access to the Property is attained by taking the Vasco Road exit from Interstate-580 (either approaching from east of west). Go north on Vasco Road to the intersection of Northfront Road. Turn right (east) onto Northfront Road and continue for approximately 0.8-mile. Turn north onto Laughlin Road and proceed for 0.56-mile to Bear Creek Drive. Turn left (west) onto Bear Creek Drive. The Property is located at the terminus of the street.

3.0 PROPERTY DESCRIPTION

The Property consists of an undeveloped parcel consisting predominantly of non-native grassland habitat, which, until recently, was grazed by cattle and is bounded along the majority of the perimeter by various types of fencing (i.e., chain-link, barbed wire, and wooden). The far eastern portion of the Property is in the shape of a "panhandle" and was previously disked for weed abatement. The undulating topography is moderate to moderately steep sloping, with a constrained and somewhat channelized intermittent stream feature (i.e., Altamont Creek) forming a portion of the southern boundary of the Property. The elevation ranges from approximately 600 feet in the center of the Property, to approximately 536 feet in the extreme southwestern corner along Altamont Creek. The highest point lies along a ridgeline in the center of the Property; this ridgeline forms a natural watershed divide, with runoff draining either towards the north or south. The Property is surrounded by open space (i.e., grazed rangeland) along the entire western boundary and with the exception of some interface with residential

developments, most of the northern, eastern, and southern boundaries. Clusters of ultramafic rock outcroppings were observed along the ridgeline and hill slopes in the center and western portions of the Property. A low terrace flanks Altamont Creek along the north bank and appears to have been graded in the past. Plants observed during the November 2010 and January and February 2011 field survey can be viewed in Attachment 2.

4.0 REGULATORY SETTING

4.1 Federal Regulatory Setting

4.1.1 Plants and Wildlife

The federal Endangered Species Act (ESA) of 1973 (16 USC 1531 et seq., as amended) prohibits federal agencies from authorizing, permitting, or funding any action that would result in biological jeopardy to a plant or animal species listed as Threatened or Endangered under the Act. Listed species are taxa for which proposed and final rules have been published in the Federal Register (U.S. Fish and Wildlife Service [USFWS], 2011b). If a proposed project may jeopardize listed species, Section 7 of the ESA requires consideration of those species through formal consultations with the USFWS. Federal Proposed species (USFWS 2011a) are species for which a proposed listing as Threatened or Endangered under ESA has been published in the Federal Register. If a proposed project may jeopardize proposed species, Section 7 of the ESA affords consideration of those species through informal conferences with USFWS. The USFWS defines federal Candidate species as "those taxa for which we have on file sufficient information on biological vulnerability and threats to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded by other higher priority listing actions" (USFWS, 2007c). Federal Candidate species are not afforded formal protection, although USFWS encourages other federal agencies to give consideration to Candidate species in environmental planning.

4.1.2 Wetlands/Waters

The federal government, acting through the U.S. Army Corps of Engineers (Corps) and the Environmental Protection Agency (EPA), has jurisdiction over all "waters of the United States" as authorized by §404 of the Clean Water Act (CWA) and §10 of the Rivers and Harbors Act of 1899 (33 CFR Parts 320-330). Projects that cause the discharge of dredged or fill material into waters of the United States require permitting by the Corps. Actions affecting small areas of jurisdictional waters of the United States may qualify for a Nationwide Permit (NWP), provided conditions of the permit are met, such as avoiding impacts to threatened or endangered species or to important cultural sites. Projects that affect larger areas or which do not meet the conditions of an NWP require an Individual Permit. The process for obtaining an Individual Permit requires a detailed alternatives analysis and development of a comprehensive mitigation and monitoring plan.

Waters of the United States are classified as wetlands, navigable waters, or other waters. Wetlands are transitional habitats between upland terrestrial areas and deeper aquatic habitats such as rivers and lakes. Under federal regulation, wetlands are defined as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to

support, and that under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR Part 328.3[b]). Swamps, marshes, bogs, fens and estuaries are all defined as wetlands, as are seasonally saturated or inundated areas such as vernal pools, alkali wetlands, seeps, and springs. In addition, portions of the riparian habitat along a river or stream may be a wetland where the riparian vegetation is at or below the ordinary high water mark and thus also meets the wetland hydrology and hydric soil criteria.

Navigable waters include all waters subject to the ebb and flow of the tides, including the open ocean, tidal bays, and tidal sloughs. Navigable waters also include some large, non-tidal rivers and lakes, which are important for transportation in commerce. The jurisdictional limit over navigable waters extends laterally to the entire water surface and bed of the waterbody landward to the limits of the mean high tide line. For non-tidal rivers or lakes, which have been designated (by the Corps) to be navigable waters, the limit of jurisdiction along the shoreline is defined by the ordinary high water mark. Other waters refer to waters of the United States other than wetlands or navigable waters. Other waters include streams and ponds, which are generally open water bodies and are not vegetated. Other waters can be perennial or intermittent water bodies and waterways. The Corps regulates other waters to the outward limit of the ordinary high water mark. Streams should exhibit a defined channel, bed and banks to be delineated as other waters.

The Corps does not generally consider "non-tidal drainage and irrigation ditches excavated on dry land" to be jurisdictional waters of the United States (and such ditches would therefore not be regulated by the Corps (33 CFR Parts 320-330, November 13, 1986). Other areas generally not considered jurisdictional waters include: 1) artificially irrigated areas that would revert to upland habitat if the irrigation ceased; 2) artificial lakes and ponds created by excavating and/or diking of dry land to collect and retain water, used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing; 3) waste treatment ponds; 4) ponds formed by construction activities including borrow pits until abandoned; and 5) ponds created for aesthetic reasons such as reflecting or ornamental ponds (33 CFR Part 328.3). However, the preamble also states that "the Corps reserves the right on a case-by-case basis to determine that a particular waterbody within these categories" can be regulated as a jurisdictional water. The EPA also has authority to determine jurisdictional waters of the U.S. on a case-by-case basis. Riparian habitat that is above the ordinary high water mark and does not meet the three-parameter criteria for a wetland, would not be regulated as jurisdictional waters of the United States.

4.1.3 Migratory Bird Treaty Act

Raptors are migratory bird species protected by international treaty under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711). The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 C.F.R. Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 C.F.R. 21). Sections 3503, 3503.5, and 3800 of the California Department of Fish and Game Code prohibit the take, possession, or destruction of birds, their nests or eggs. Implementation of the take provisions requires that project-related disturbance at active nesting territories be reduced or eliminated during critical phases of the nesting cycle (March 1 - August 15, annually). Disturbance that causes nest abandonment and/or loss of reproductive effort (e.g.,

killing or abandonment of eggs or young) or the loss of habitat upon which the birds depend is considered "taking" and is potentially punishable by fines and/or imprisonment. Such taking would also violate federal law protecting migratory birds (e.g., MBTA).

4.2 State Regulatory Setting

4.2.1 Plants and Wildlife

Project permitting and approval requires compliance with California Environmental Quality Act (CEQA), the 1984 California Endangered Species Act (CESA), and the 1977 Native Plant Protection Act (NPPA). The CESA and NPPA authorize the California Fish and Game Commission to designate Endangered, Threatened and Rare species and to regulate the taking of these species (§§2050-2098, Fish & Game Code). The California Code of Regulations (Title 14, §670.5) lists animal species considered Endangered or Threatened by the State.

The Natural Heritage Division of the California Department of Fish and Game (CDFG) administers the state rare species program. The CDFG maintains lists of designated Endangered, Threatened, and Rare plant and animal species (CDFG 2011a, b). Listed species either were designated under the NPPA or designated by the Fish and Game Commission. In addition to recognizing three levels of endangerment, the CDFG can afford interim protection to candidate species while they are being reviewed by the Fish and Game Commission.

The CDFG also maintains a list of animal species of special concern (CDFG 2011b), most of which are species whose breeding populations in California may face extirpation. Although these species have no legal status, the CDFG recommends considering them during analysis of proposed project impacts to protect declining populations and avoid the need to list them as endangered in the future.

Under the provisions of §15380(d) of the CEQA Guidelines, the project lead agency and CDFG, in making a determination of significance, must treat non-listed plant and animal species as equivalent to listed species if such species satisfy the minimum biological criteria for listing. In general, the CDFG considers plant species on List 1A (Plants Presumed Extinct in California), List 1B (Plants Rare, Threatened, or Endangered in California and elsewhere), or List 2 (Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere) of the California Native Plant Society's (CNPS) *Inventory of Rare and Endangered Vascular Plants of California* (Skinner and Pavlik 1994) as qualifying for legal protection under §15380(d). Species on CNPS List 3 or 4 may, but generally do not, qualify for protection under this provision.

Sensitive habitats include riparian corridors, wetlands, critical habitats for legally protected species and CDFG Species of Special Concern, areas of high biological diversity, areas providing important wildlife habitat, and unusual or regionally restricted habitat types. Habitat types considered sensitive include those listed on the California Natural Diversity Data Base's (CNDDB) working list of "high priority" habitats (i.e., those habitats that are rare or endangered within the borders of California) (Holland 1986).

4.2.2 Wetlands/Waters

The Regional Water Quality Control Board (RWQCB) regulates activities in wetlands and other waters through §401 of the Clean Water Act. Section 401 requires a state water quality certification for projects subject to 404 regulation. Requirements of the certification include mitigation for loss of wetland habitat. In the San Francisco Bay region, the RWQCB may take the lead over the Corps in determining wetland mitigation requirements. California Fish and Game Code §§1600-1607 require the CDFG be notified of any activity that could affect the bank or bed of any stream that has value to fish and wildlife. Upon notification, the CDFG has the discretion to execute a Streambed Alteration Agreement. The CDFG defines streams as follows:

> *"... a body of water that flows at least periodically...through a bed or channel having banks and supporting fish and other aquatic life. This includes watercourses having a subsurface flow that supports or has supported riparian vegetation."*
> (Stream Bed Alteration Program, California Department of Fish and Game).

In practice, CDFG authority is extended to any "blue line" stream shown on a USGS topographic map, as well as unmapped channels with a definable bank and bed. Wetlands, as defined by the Corps, need not be present for CDFG to exert authority.

5.0 METHODS OF ANALYSIS FOR GENERAL BIOLOGICAL RESOURCES

A special-status plant and wildlife species database search and review was conducted using the CNDDB and other sources. An additional search was conducted for special-status plants using California Native Plant Society Inventory On-Line (CNPS). Special-status species reports were accessed by searching the CNDDB database by the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5-minute quadrangles, which surround the Property, and by examining those species that have been identified in the vicinity of the Property. The CNDDB report was used to focus special-status species analysis of the site prior to the reconnaissance surveys.

Olberding Environmental biologists conducted reconnaissance-level surveys of the Property on November 15, 2010 and on January 13 and February 9, 2011. The surveys consisted of walking throughout the area and evaluating it and adjacent lands for potential biological resources. Existing conditions, observed plants and wildlife, adjacent land use, soils and potential biological resource constraints were recorded during the visit. Plant and wildlife species observed within and adjacent to the Property during the reconnaissance survey are included in Attachment 2, Table 1.

The objectives of the field surveys were to determine the potential presence or absence of special-status species habitat listed in the CNDDB database report (CNDDB 2011) and to identify any wetland areas that could be potentially regulated by the Corps. In addition, the Olberding Environmental biologist looked for other potential sensitive species or habitats, which may not have been obvious from background database reports or research. Surveys conducted after the growing season or conducted outside of the specific flowering period for a special-status plant cannot conclusively determine the presence or absence of such plant species; therefore, site

conditions and habitat type were used to determine potential for occurrence. When suitable habitat was observed to support a special-status plant or animal species it was noted in the discussion for that particular species. Regulatory agencies evaluate the possibility of occurrence based on habitats observed on-site and the degree of connectivity with other special-status animal habitats in the vicinity of the Property. These factors are discussed in each special-status plant or animal section. Potential for occurrence of each special-status or protected plant and animal species was evaluated using the following criteria.

- **Present**: The species has been recorded by CNDDB or other literature as occurring on the Property and/or was observed on the Property during the reconnaissance survey or protocol surveys.
- **May Occur**: The species has been recorded by CNDDB or other literature as occurring within five miles of the Property, and/or was observed within five miles of the Property, and/or suitable habitat for the species is present on the Property or its immediate vicinity.
- **Not Likely to Occur**: The species has historically occurred on or within five miles of the Property, but has no current records. The species occurs within five miles of the Property but only marginally suitable habitat conditions are present. The Property is likely to be used only as incidental foraging habitat or as an occasional migratory corridor.
- **Presumed Absent**: The species will not occur on the Property due to the absence of suitable habitat conditions, and/or the lack of current occurrences. Alternatively if directed or protocol-level surveys were done during the proper occurrence period and the species was not found it will be presumed absent.

Sources consulted for agency status information include USFWS (2011a, 2011b) for federally listed species and CDFG (2011a, b) for State of California listed species. Based on information from the above sources, Olberding Environmental developed a target list of special-status plants and animals with the potential to occur within or in the vicinity of the Property (Attachment 2, Table 2).

5.1 Soils Evaluation

The soils present on a Property may determine if habitat on the site is suitable for certain special-status plants and animals. The host plants of some special-status invertebrates may also require specific soil conditions. In the absence of suitable soil conditions, special-status plants or animals requiring those conditions would be presumed absent. Information regarding soil characteristics for the Property was obtained by viewing the Natural Resources Conservation Service (NRCS) Web Soil Survey report for the Property (NRCS 2011).

5.2 Plant Survey Methods

The purposes of the botanical surveys were (1) To characterize the habitat types (plant communities) of the study area; (2) to determine whether any suitable habitat for any special-status plant species, occurs within the study area; and (3) to determine whether any sensitive habitat types (wetlands) occur within the study area, (4) and to determine if any special-status plant species occur in the Property area. Site conditions and plant habitat surveys are important tools in determining the potential occurrence of plants not recorded during surveys (e.g., special-

status plants) because presence cannot conclusively be determined if field surveys are conducted after the growing season or conducted outside a specific flowering period.

5.2.1 Review of Literature and Data Sources

A botanist from Olberding Environmental conducted focused surveys of literature and special-status species databases in order to identify special-status plant species and sensitive habitat types with potential to occur in the study area. Sources reviewed include: CNDDB occurrence records (CNDDB 2011) and CNPS *Inventory* (Skinner and Pavlik 1994) for the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain USGS 7.5 quadrangles; and standard flora (Hickman 1993). From the above sources, a list of special-status plant species with potential to occur in the Property vicinity was developed (Attachment 2, Table 2).

5.2.2 Field Surveys

Olberding Environmental biologists conducted reconnaissance-level surveys to determine habitat types and the potential for special-status plants based on the observed habitat types in November 2010 and January/February 2011. All vascular plant species that were identifiable at the time of the survey were recorded and identified using keys and descriptions in Hickman (1993). The habitat types occurring within the Property were characterized according to pre-established categories. In classifying the habitat types on the site, the generalized plant community classification schemes of *A Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995) were consulted. The final classification and characterization of the habitat types of the study area were based on field observations.

5.3 Wildlife Survey Methods

The purposes of the wildlife surveys were to identify special-status wildlife species and/or potential special-status wildlife habitats within the study area.

5.3.1 Review of Literature and Data Sources

A focused review of literature and data sources was conducted in order to determine which special-status wildlife species had potential to occur in the vicinity of the Property. Current agency status information was obtained from USFWS (2011a, b) for species listed as Threatened or Endangered, as well as Proposed and Candidate species for listing, under the federal ESA; and from CDFG (2011a, b) for species listed as Threatened or Endangered by the state of California under the CESA, or listed as "species of special concern" by CDFG. From the above sources, a list of special-status wildlife species with potential to occur in the Property vicinity was developed (Attachment 2, Table 2).

5.3.2 Field Surveys

General Wildlife Survey – Olberding Environmental biologists conducted surveys of species habitat within the entire study area, including visible portions of the adjacent properties in November 2010 and on January/February 2011. The purpose of the habitat surveys was to

evaluate wildlife habitats and the potential for any protected species to occur on or adjacent to the Property.

Reconnaissance-Level Raptor Survey – Reconnaissance-level raptor surveys were conducted and on the Property in November 2010 and January/February 2011. Observation points were established on the periphery of the area to view raptor activity over a fifteen to thirty-minute time period. This survey was conducted with the use of binoculars and notes were taken for each species occurrence. Additionally, utility poles and perch sites in the vicinity of the Property were observed. All raptor activity within and adjacent to the area was recorded during the reconnaissance-level observation period.

Reconnaissance-Level Burrowing Owl (Athene cunicularia) Survey – Reconnaissance-level burrowing owl surveys were also conducted on the Property in November 2010 and January/February 2011 to identify potential burrow sites or burrowing owl use of on-site habitat. The general presence and density of suitable burrow sites (e.g., rodent burrows) was evaluated for the area. Rodent burrows encountered during the site visit were investigated for presence of potential burrowing owl residence. Each potential burrow observed was evaluated for the presence of castings, whitewash, bones, feathers or other signs of burrowing owl habitation. Observations were recorded. The fence line around the Property and any potential perching sites were investigated for signs of castings at the base of the posts.

6.0 RESULTS FOR GENERAL BIOLOGICAL RESOURCES

The search and review of the CNDDB database reports revealed the occurrence of special-status plant and wildlife species that occur in degraded grassland, riparian, seasonal wetland, seasonal swale, and vernal pool feature habitats (CNDDB 2011). The CNDDB database and background data were reviewed for the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 minute quadrangles (Attachment 2, Table 2). A map showing the locations of special-status plants and animals reported in the vicinity of the Property is included as Attachment 1, Figures 6 and 7, respectively. An additional map showing USFWS designated critical habitat areas of special-status animals in the vicinity of the Property is included as Attachment 1, Figure 8. Those animals listed in Attachment 2, Table 2 were reviewed for their potential to occur on the Property based on general habitat types. Some of the plant and animal species identified by the CNDDB in the quadrangles require a specific habitat microclimate that was found not to occur within the Property.

6.1 Soil Evaluation Results

The USDA Natural Resources Conservation Service (formerly the Soil Conservation Service) mapped three soil types on the Property: Positas gravelly loam, San Ysidro loam, and Solano fine sandy loam (NRCS 2011). A detailed map of these soils for the Property can be found in Attachment 1, Figure 9. The numbers in parentheses next to the soil types represent the approximate percentage amount on the Property. The soils mapped included the following types:

- **PoC2: Positas gravelly loam, 2-20 percent slopes, eroded (59.4%) –** The Positas series are on stream terraces, have slopes of 2 to 75 percent, and occurs at elevations between 200 and 1,600 feet. The composition of this soil type within the Property consists of 85 percent Positas and similar soils and 15 percent of minor components including Perkins (5%), Azule (5%), and Pleasanton (5%).

  The Positas series consists of deep and very deep, moderately well drained soils that formed in alluvial material from mixed rock sources such as sandstone and shale. This series exhibits medium to very high runoff and slow and very slow permeability. These soils are primarily used as rangeland. Some soils are used for dryland grain and vineyards. Vegetation is annual grasses, forbs, and scattered oaks. This series shows no frequency of ponding or flooding and is nonsaline. Its stratified layers consist of the following (colors are for dry soil unless otherwise stated):

  Ap--0 to 8 inches; brown gravelly loam, dark brown moist; hard, friable, nonsticky and nonplastic; medium acid (pH 6.0).

  A--8 to 11 inches; similar to above in all respects except color values are nearly 1/2 chip higher.

  Bt1--11 to 20 inches; reddish brown clay, dark reddish brown moist; extremely hard, extremely firm, sticky and very plastic; slightly acid (pH 6.5).

  Bt2--20 to 29 inches; reddish brown dry and moist, clay; extremely hard, extremely firm, sticky and very plastic; moderately alkaline (pH 8.0).

  Bt3--29 to 39 inches; brown clay loam, brown and yellowish red moist; very hard, firm, sticky and plastic; moderately alkaline (pH 8.0).

  Bt4--39 to 54 inches; light yellowish brown clay loam, brown and yellowish red moist; very hard, firm, sticky and slightly plastic; moderately alkaline (pH 8.0).

  2C--54 to 60 inches; light yellowish brown very gravelly sandy clay loam, yellowish brown moist; slightly hard, friable, nonsticky; moderately alkaline (pH 8.0).

- **Sa: San Ysidro loam (39.8%) –** The San Ysidro series consists of deep, moderately well drained soils that formed in alluvium from sedimentary rocks. San Ysidro soils are on old, low terraces and have slopes of 0 to 9 percent at elevations of less than 1,500 feet. The composition of this soil type within the Property consists of 85 percent San Ysidro and similar soils and 15 percent of minor components including Rincon (5%), Solano (5%), Pescadero (3%), and Unnamed (2%).

  Typically, San Ysidro soils exhibit slow to medium runoff and very slow permeability. These soils are used for growing dryland grains, dryland pasture, and shallow rooted row crops, and pasture under irrigation. Uncultivated areas have a cover of annual grasses and forbs. Its stratified layers consist of the following (colors are for dry soil unless otherwise stated):

Ap--0 to 7 inches; light brownish gray fine sandy loam, dark brown moist; hard, friable, nonsticky; slightly acid (pH 6.5).

A--7 to 14 inches; light brownish gray fine sandy loam, dark brown moist; hard, friable, nonsticky; medium acid (pH 6.0).

Bt1--14 to 28 inches; dark yellowish brown clay, dark brown moist; extremely hard and sticky; slightly acid (pH 6.5).

Bt2--28 to 40 inches; yellowish brown sandy clay loam, dark yellowish brown moist; extremely hard and sticky; neutral (pH 7.0).

C1--40 to 54 inches; yellowish brown light sandy clay loam, dark yellowish brown moist; extremely hard and sticky; neutral (pH 7.0).

C2--54 to 68 inches; yellowish brown light clay loam, dark yellowish brown moist; hard and sticky; moderately alkaline (pH 8.0).

- **Sf: Solano fine sandy loam (0.8%) –** Solano soils are on nearly level low terraces and in valley plains with slightly irregular or hummocky surface at elevation of less than 100 feet. The soils formed in mixed, moderately fine textured, sedimentary alluvium. The composition of this soil type within the Property consists of 85 percent Solano and similar soils, and 15 percent of minor components including Pescadero (5%), San Ysidro (5%), and Rincon (5%).

  Typically, Solano soils have strongly acid to very strongly acid loam A2 horizons and neutral to strongly alkaline clay loam Bt horizons. The Solano series consists of very deep, somewhat poorly drained soils that formed in alluvium derived from sandstone and shale. Solano soils exhibit very slow permeability and very slow or slow runoff. These soils are used mainly for dryland pasture. Some areas have bee leveled and planted to irrigate pasture. Vegetation consists of salt and alkali tolerant grasses and forbs. This series shows no frequency of ponding or flooding. Solano soils range from nonsaline to slightly saline. Its stratified layers consist of the following (colors are for dry soil unless otherwise stated):

  A1--0 to 4 inches; light brownish gray fine sandy loam, dark grayish brown moist; few fine distinct yellowish brown mottles, yellowish red moist; hard, friable; very strongly acid (pH 5.0).

  A2--4 to 9 inches; light gray fine sandy loam, dark grayish brown moist; few fine distinct yellowish brown mottles, dark reddish brown moist; hard, friable; strongly acid (pH 5.5).

  Btn--9 to 21 inches brown clay loam, brown moist; dark grayish brown moist; extremely hard, firm; neutral (pH 7.0).

Btnss1--21 to 32 inches; light yellowish brown clay loam, olive brown moist, dark reddish brown stains moist; extremely hard, firm; moderately alkaline (pH 8.4).

Btnss2--32 to 48 inches; light yellowish brown clay loam, yellowish brown moist, light olive brown moist with dark reddish brown stains; very hard, friable; strongly alkaline (pH 8.6).

Btck--48 to 62 inches; light yellowish brown silty clay loam, light olive brown moist with dark reddish brown stains; very hard, friable; strongly alkaline (pH 8.8).

6.2 Plant Survey Results

6.2.1 Floristic Inventory and Habitat Characterization

In classifying the habitat types in the Property area, generalized plant community classification schemes were used (Sawyer and Keeler-Wolf 1995). The final classification and characterization of the habitat types of the study area were based on field observations.

The Property supports five habitat types that consist of degraded grassland, riparian, seasonal wetland, seasonal swale, and a single vernal pool feature. Each habitat is described in further detail below. A description of the plant species present within each habitat type is provided below. Dominant plant species are noted. A complete list of plant species observed on the Property can be found in Attachment 2, Table 1.

Degraded Grassland Habitat

The vegetation observed in the annual grassland habitat consists of species typical to grazed grassland communities. The dominant grasses observed on the open hillslopes and upland flats of the Property consist of non-native species including soft chess (*Bromus hordeaceous*), rip-gut brome (*Bromus diandrus*), hare barley (*Hordeum murinum* ssp. *leporinum*), wild oat (*Avena fatua*), and Italian rye grass (*Lolium multiflorum*). Forb (i.e., wildflower) species found intermixed with the grasses consist of non-native annual and biennial weeds such as prickly lettuce (*Lactuca serriola*), dove geranium (*Geranium molle*), red-stem filaree (*Erodium cicutarium*), Italian thistle (*Carduus pycnocephalus*), yellow-star thistle (*Centaurea solstitialis*), and black mustard (*Brassica nigra*). Although native species were largely absent in the groundlayer at the time of the November 2010 and January/February 2011 field survey, species such as needlegrass (*Nasella* sp.), poppy (*Eschscholzia* sp.), fiddleneck (*Amsinckia* sp.), soap plant (*Chlorogalum* sp.), red maids (*Calandrinia ciliata*), dove weed (*Croton setigerus*), vinegarweed (*Trichostema lanceolatum*), pitgland tarweed (*Holocarpha virgata*), and tarweed (*Centromadia* sp. – likely *C. pungens pungens*), were observed; it is anticipated that despite livestock grazing, a modest cryptic flora of geophytes (e.g., *Brodiaea, Triteleia, Calochortus*) and other native early-spring blooming species likely persist in the sod.

Riparian Habitat (Altamont Creek)

Altamont Creek contains herbaceous riparian (i.e., “streamside”) habitat within a fairly confined channel. There is no shrub or tree layer associated with this feature, and the herbaceous

groundlayer along the banks consists largely of graminoids (i.e., grasses and grass-like plants) including California tule (*Schoenoplectus californicus*), Baltic rush (*Juncus balticus*), iris-leaved rush (*Juncus xiphioides*), tall flatsedge (*Cyperus eragrostis*) foxtail (*Setaria* sp.), creeping wild rye (*Leymus triticoides*), and sparse patches of salt grass (*Distichlis spicata*). Forbs observed included hedge-nettle (*Stachys* sp.), milkweed (likely *A. fasicularis*), and dock (*Rumex crispus* and *R. conglomeratus*).

A low terrace flanks the northern bank of Altamont Creek. This area is slightly elevated and likely receives overflows during high precipitation events. Vegetation observed included a mix of upland and hydrophytic species including rip-gut brome, soft chess, Mediterranean barley (*Hordeum marinum* var. *gussoneanum*), bird's-foot trefoil (*Lotus corniculatus*), Mediterranean lineseed (*Bellardia trixago*), annual fireweed (*Epilobium brachycarpum*), bull thistle (*Cirsium vulgare*), English plantain (*Plantago lanceolatum*), rose clover (*Trifolium hirtum*), and stinkweed (*Dittrichia graveolens*).

Seasonal Wetland Habitat

A single seasonal wetland was mapped in the western portion of the Property. This feature was located at the toe of a slope below rock outcroppings, and appears to have been an old borrow pit. Hydrophytes observed along the edges of this feature included Mediterranean barley, Italian rye grass, curly dock (*Rumex crispus*), and seedlings of popcorn-flower (*Plagiobothrys* sp.).

Seasonal Swale Habitat

A fairly extensive drainage way occurs in the far eastern portion of the Property. This low-gradient feature conveys sheetflow runoff and wetland overflows from outside the southern boundary, and conveys this runoff into a series of shallow alkali depressions and wetlands to the north. Dominant species observed within the mapped portion included extensive patches of tarweed, Italian rye grass, rabbit's-foot grass (*Polypogon monspeliensis*), and seedlings of fiddle dock (*Rumex pulcher*).

Vernal Pool Habitat

A single vernal pool was mapped in the eastern portion of the Property and is embedded in the mapped seasonal swale (see above) along the southern boundary. Vernal pools are depressional features of varying size, and are characterized as having a layer of claypan or hardpan below the surface that inhibits percolation of precipitation during the rainy season. This results in prolonged inundation and saturation regimes that allow a unique assemblage of native plants and animals (many of them restricted to this habitat type) to complete their life cycles before the vernal pools dry out completely at the beginning of the dry season. There are a number of annual herbs and grasses that are considered either "indicator species" or strongly allied with this habitat type; some of the plants detected during the January/February 2011 field survey fall within these categories and include seedlings of popcorn-flower, water starwort (*Callitriche marginata*), and annual hairgrass (*Deschampsia danthanioides*).

6.2.2 Special-Status Plant Species

Special-status plant species include species listed as Rare, Threatened, or Endangered by the USFWS (2011a) or by the State of California (CDFG 2011a). Federal Proposed and Candidate species (USFWS 2011b) are also special-status species. Special-status species also include species listed on List 1A, List 1B, or List 2 of the CNPS Inventory (Skinner and Pavlik, 1994; CNPS 2011). All species in the above categories fall under state regulatory authority under the provisions of CEQA, and may also fall under federal regulatory authority. Considered special-status species are species included on List 3 (Plants About Which We Need More Information—A Review List) or List 4 (Plants of Limited Distribution—A Watch List) of the CNPS *Inventory*. These species are considered to be of lower sensitivity and generally do not fall under specific state or federal regulatory authority. Specific mitigation considerations are not generally required for List 3 and List 4 species.

Attachment 2, Table 2 includes a list of special-status plants with the potential to occur within or in the immediate vicinity of the Property based on a review of the USGS 7.5 minute quadrangles for Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain. The special-status plant species identified by the CNDDB as potentially occurring on the Property are known to grow only from specific habitat types. The specific habitats or "micro-climate" necessary for some of the plant species to occur are not found within the boundaries of the subject Property. The habitats necessary for the CNDDB reported plant species consist of valley and foothill grassland, meadows and sinks, seeps, chenopod scrub, cismontane woodland, chaparral, playas, coastal bluff scrub, coastal prairie, coastal salt marshes and swamps, freshwater and brackish marshes and swamps, vernal pools, swales, riparian woodland, coastal dunes, sandy soils, serpentine soils, adobe clay soils, alkaline soils, rocky soils, seasonal and perennial drainages, boggy meadows, lower montane coniferous forest, closed-cone coniferous forest, North Coast coniferous forest, pinyon and juniper woodland, and broadleafed upland forest. The following special-status plant species were reviewed for their potential to occur on the Property (Attachment 1, Figure 6).

Large-Flowered Fiddleneck (*Amsinkia grandiflora*). Federally Endangered, State Endangered, CNPS List 1B.1

Large-flowered fiddleneck is an annual herb of the family *Boraginaceae* with red-orange flowers that approach one inch in size and bloom from April through May. This species occurs in valley and foothill grasslands and cismontane woodlands on various soil types, but is currently known from only five natural populations. This plant is in cultivation and is being successfully reestablished in some areas. It is recorded to grow in association with non-native and native grasses.

The most recent occurrence of this species in the vicinity of the Property took place in 2003 (Occurrence #4), approximately 10.5 miles southeast of the Property. The annual grassland habitat and soil conditions on the Property provide potentially suitable habitat to support this species. However, due to historic grazing practices and absence of recent occurrences in the area, this species is likely extirpated and is presumed absent. It was not observed during the rare plant surveys conducted in 2011.

Bent-Flowered Fiddleneck (*Amsinckia lunaris*). CNPS List 1B.2

Bent-flowered fiddleneck is an annual of the family *Boraginaceae*. The inflorescence is spike-like and coiled at the tip with multiple small orange flowers. It is distributed throughout the inner north coast ranges of California, in the west Central Valley, and the San Francisco Bay Area. Habitat consists of coastal bluff scrub, cisomontane woodlands, and valley and foothill grasslands. The blooming period is between March and June.

The most recent occurrence of this species in the vicinity of the Property took place in 1999 (Occurrence #35), approximately 2.9 miles northeast of the Property. The annual grassland habitat on the Property provides marginally suitable habitat to support this species as it generally prefers coastal bluff scrub and woodland habitats. This species was not observed during the rare plant surveys conducted in 2011. Due to the presence of marginally suitable habitat, regular grazing, and lack of recent occurrences, this species is likely extirpated and is presumed absent.

Alkali Milk-Vetch (*Astragalus tener* var. *tener*). CNPS List 1B.2

Alkali milk-vetch is an annual herb in the family *Fabaceae*. Alkali milk-vetch is endemic to California with habitat for this species including playas, valley and foothill grasslands, and vernal pools with alkaline soils. Its purple flowers bloom from March to June. This species is now considered extirpated in Contra Costa, Monterey, San Benito, Santa Clara, San Francisco, San Joaquin, Sonoma and Stanislaus Counties. It is considered rare and restricted to isolated patches in Alameda, Merced, Napa, Solano, and Yolo Counties.

The most recent occurrence of this species in the vicinity of the Property took place in 1989 (Occurrence #9), approximately 9.2 miles northeast of the Property. While the single vernal pool on the eastern portion of the Property may provide potentially suitable habitat and soil substrates, historic grazing and disking practices likely precludes the presence of this species on the Property. It was not observed during the rare plant surveys conducted in 2011 and is presumed absent and likely extirpated in this area.

Heartscale (*Atriplex cordulata*). CNPS List 1B.2

Heartscale is an annual shrub of the family *Chenopodiaceae*, the Goosefoot family. Leaves and stems of this bush are gray and scaly. It has a pistillate inflorescence with bracts in fruit of 3.5 to 5 millimeters, fused to the middle. Heartscale can be found in Alameda, and Contra Costa, and Merced Counties among others, but is considered extirpated in San Joaquin, Stanislaus, and Yolo Counties. It occurs in chenopod scrub, meadow, seep, and saline or alkaline valley and foothill grassland habitats with sandy soil substrates. It blooms from April through October.

The most recent occurrence of this species in the vicinity of the Property took place in 2006 (Occurrence #78), approximately 5.7 miles west of the Property. While the degraded annual grassland on the Property may provide potentially suitable habitat and soil substrates, historic grazing practices likely precludes the presence of this species on the Property. It was not observed during the rare plant surveys conducted in 2011 and is presumed absent.

Brittlescale (*Atriplex depressa*). CNPS List 1B.2

Brittlescale is an annual herb in the *Chenopodiaceae* family. The leaves of this plant are ovate to cordate and covered in a dense white scale. It has a pistillate inflorescence with bracts in fruit two to 3.5 millimeters fused near the top. The fruit is ovate or diamond-shaped and covered in a white scale. This species is generally found in chenopod scrub, meadow, seep, playa, valley and foothill grassland, and vernal pool habitats in alkaline or clay soils. It occurs in Alameda, Contra Costa, Colusa, Fresno, Glenn, Merced, Solona, Tulare, and Yolo Counties. The blooming period is from May to October. Threats to brittlescale include grazing and development.

The most recent occurrence of this species in the vicinity of the Property took place in 2008 (Occurrence #27), approximately 1.3 miles southwest of the Property (Attachment 1, Figure 6). While the margins of the vernal pool on the eastern portion of the Property may provide suitable soil substrates and habitat to support this species, historic grazing and disking practices likely precludes the presence of this species on the Property. It was not observed during the rare plant surveys conducted in 2011 and is presumed absent.

San Joaquin Spearscale (*Atriplex joaquiniana*). CNPS List 1B.2

San Joaquin spearscale is an annual herb in the family *Chenopodiaceae*. Leaves of the San Joaquin spearscale are ovate to triangular, with fine gray scales above. Flowers are dense and spike or panicle-like with dark brown seeds. It is found in Alameda, Contra Costa, Merced, Monterey, Napa, Sacramento, San Benito, Solano, and Yolo Counties. It is considered extirpated in Santa Clara, San Joaquin, and Tulare Counties. Habitat for the San Joaquin spearscale includes chenopod scrub, meadows, seeps, playas, and valley and foothill grasslands with alkaline soils. Blooming occurs between April and October.

The most recent occurrence of this species took place within a five-mile radius of the Property in 2008 (Occurrence #1), approximately 0.6 miles north of the Property (Attachment 1, Figure 6). Several sightings of this species have been made within the vicinity of the Property from 2003 to 2008. The annual grassland habitat and soils on the Property provide potentially suitable habitat to support this species. However, this species was not observed during the rare plant surveys conducted in 2011 and is presumed absent from the site.

Congdon's Tarplant (*Centromadia parryi* ssp. *congdonii*). CNPS List 1B.2

Congdon's tarplant is a member of the genus *Centromadia* in the sunflower family (*Asteraceae*). It is one of four subspecies of Parry's tarplant (*Hemizonia parryi*). Congdon's tarplant is a prostrate to erect, annual herb with rigidly spine-tipped leaves and yellow ray- and disk-flowers (head). It occurs in valley and foothill grasslands in moist alkaline soils and blooms between June and November. Historically, Congdon's tarplant was distributed from Solano County south to San Luis Obispo County.

There have been several occurrences of Congdon's tarplant within the vicinity of the Property in the last ten years. The closest occurrence of this species to the site took place in 2005 (Occurrence #68), roughly 2.3 miles northeast of the Property (Attachment 1, Figure 6). The

annual grassland habitat and soil conditions on the Property represent highly suitable conditions to support this species. Grazing usually poses little threat to this hearty species. While this species was not observed during the surveys in November 2010 or January 2011, it has the potential to occur.

Hispid Bird's-Beak (*Cordylanthus mollis* ssp. *hispidus*). CNPS List 1B.1

Hispid bird's-beak is a hemiparasitic annual herb of the family *Scrophulariaceae*, the Figwort family. This plant is bristly with many branches spreading from near the base. Hispid bird's-beak is found in meadows and seeps, playas, and valley and foothill grasslands with alkaline soils. It occurs in Alameda, Kern, Merced, Placer, and Solano Counties. The blooming period is between June and September.

The most recent occurrence of this species took place within a five-mile radius of the Property in May 1999 (Occurrence #15) at the Springtown Wetlands Reserve in Livermore, roughly 1.2 miles west of the site. The low-gradient swale on the eastern portion of the Property provides potentially suitable alkaline soil substrates and habitat to support this species. However, this species was not observed during the rare plant surveys conducted in 2011. Based on historic grazing and disking practices this species is considered unlikely to occur on the site.

Palmate-Bracted Bird's-Beak (*Cordylanthus palmatus*). Federally Endangered, State Endangered, CNPS List 1B.1

Palmate-bracted bird's-beak is endemic to California. It is considered seriously endangered in this state. This plant is gray-green in color, glandular and hairy. Flowers are whitish with pale lavender sides. This species occurs in Alameda, Colusa, Fresno, Madera, and Yolo Counties, but is considered extirpated in San Joaquin County. It is found in chenopod scrub and valley and foothill grassland habitats with alkaline soils. Blooming occurs between May and October.

The palmate-bracted bird's beak is hemiparisitic, meaning that it manufactures its own food but obtains water and nutrients from the roots of other (host) plants. The host plants most commonly associated with palmate-bracted bird's beak are saltgrass (*Distichlis spicata*) and alkali heath (*Frankenia salina*). The combination of hemiparisitism, salt excretion and a deep root system allows palmate-bracted bird's beak to grow during the hot, dry months after most other annuals have died. Bumblebees are the primary pollinators of palmate-bracted bird's beak, and both self and cross pollination can contribute to seed set. Individual plants can produce up to 1,000 seeds in a single growing season, which form a persistent seedbank. The number of plants in a population varies annually in response to environmental conditions, particularly precipitation. This species is restricted to seasonally-flooded, saline-alkali soils in lowland plains and basins at elevations less than 500 feet. Within these areas, palmate-bracted bird's beak grows primarily along the edges of channels and drainages, with some individuals scattered in seasonally wet depressions, or alkali scalds. Suitability of microhabitats for palmate-bracted bird's beak depends primarily on soil pH. Under natural conditions, this species occurs on neutral to alkaline soils.

The most recent occurrence of this species took place within a five-mile radius of the Property in September 2008 (Occurrence #10) at the Springtown Wetlands Reserve in Livermore, approximately 1.6 miles west of the site (Attachment 1, Figure 6). The low-gradient swale on the eastern portion of the Property provides marginally suitable alkaline soil substrates and habitat to support this species. Because this species requires highly site-specific microhabitats, assemblages of specific host plants, and requires a high salt content within the soils in which it grows, it is unlikely that the Property supports populations of this species. In addition, historic grazing practices and past disking practices would likely preclude the presence of this species on the Property. This species was not observed on the site during the rare plant surveys conducted in 2011 and is presumed absent.

Livermore Tarplant (*Deinandra bacigalupii*). CNPS List 1B.2

Livermore tarplant is a member of the *Asteraceae* family (Sunflower). This yellow flower's petals occur in sets of three and bloom from June through October. It occurs in meadow and seep habitats with alkaline soils and is known from only five occurrences in the Livermore area where it is threatened by development.

The most recent occurrence of this species in the vicinity of the Property took place in 2004 (Occurrence #2), approximately 1.1 miles west of the Property (Attachment 1, Figure 6). While the low-gradient swale on the eastern portion of the Property may provide marginally suitable habitat to support this species, historic grazing and disking practices likely precludes the presence of this species on the Property. It was not observed during the rare plant surveys conducted in 2011 and is presumed absent.

Recurved Larkspur (*Delphinium recurvatum*). CNPS List 1B.2

Recurved Larkspur is a perennial herb of the family *Ranunculaceae*. It is native to California and is typically found in alkaline soils in chenopod scrub, cismontane woodlands, and valley and foothill grasslands. It is found in Alameda, Contra Costa, Fresno, Kings, Kern, Madera, Merced, Monterey, San Luis Obispo, Solano, and Tulare Counties, but is considered potentially extirpated in Butte and Colusa Counties. It blooms between March and May.

The most recent occurrence of this species in the vicinity of the Property took place in 1993 (Occurrence #2), approximately 8.5 miles northeast of the site. The annual grassland habitat on the Property provides moderately suitable conditions to support this species. However, historic grazing practices and the lack of recent occurrences in the vicinity of the site makes it unlikely that this species will occur. This plant was not observed during the rare plant surveys conducted in 2011 and is presumed absent.

Diamond-Petaled California Poppy (*Eschscholzia rhombipetala*). CNPS List 1B.1

This annual herb is an inconspicuous member of the poppy family (Papaveraceae). It occurs in valley and foothill grasslands with alkaline and clay soils substrates and blooms between March to April. Thought to be extinct, it was rediscovered on the Carrizo Plain in 1992. It was also

rediscovered near the Lawrence Livermore Laboratory Site 300 in 1997, and presumed extant as of 2003.

The most recent occurrence of this species in the vicinity of the Property took place in 2003 (Occurrence #6), approximately 10 miles southeast of the Property. While potentially suitable grassland habitat may be present, historic grazing practices and the rarity of this species likely precludes its presence on the Property and is presumed absent. It was not detected during the rare plant surveys conducted in the spring of 2011 and is presumed absent.

Legenere (*Legenere limosa*). CNPS List 1B.1

Legenere is an annual herb in the family *Campanulaceae* (Bellflower). This inconspicuous, prostrate-growing plant contains small elongate leaves. It occurs in vernal pools and its small white flowers bloom between April and June. Many historical occurrences of this species are extirpated. Threats to legenere include grazing and development.

The most recent occurrence of this species in the vicinity of the Property took place in 2003 (Occurrence #55), approximately 13.7 miles south of the site. The single vernal pool on the eastern portion of the Property may provide potentially suitable habitat to support this species. However, historic grazing and disking practices makes it unlikely that this plant will occur. This plant was not observed during the rare plant surveys conducted in 2011 and is presumed absent from the Property.

Saline Clover (*Trifolium hydrophilum*). CNPS List 1B.2

Saline clover is member of the pea family, *Fabaceae*. It blooms between April and June. This species is found in marshes and swamps, mesic valley and foothill grasslands with alkaline soils, and vernal pools, between zero and 300 meters in elevation. It is thought to occur in Alameda, Colusa, Monterey, Napa, San Benito, Santa Clara, San Luis Obispo, San Mateo, Solano, and Sonoma Counties. It is threatened by development and current fieldwork is needed to determine if populations still exist in many counties.

The most recent occurrence of this species took place within a five-mile radius of the Property at an unknown date (Occurrence #6), roughly 4.2 miles southwest of the site (Attachment 1, Figure 6). The single vernal pool on the eastern portion of the Property could provide potentially suitable habitat to support this species. However, historic grazing and disking practices likely precludes the presence of this species. It was not observed during the rare plant surveys conducted in 2011 and is presumed absent.

Caper-Fruited Tropidocarpum (*Tropidocarpum capparideum*). CNPS List 1B.1

Caper-fruited tropidocarpum is an annual herb from the mustard family (*Brassicaceae*). This species was once found in Alameda, Contra Costa, Glenn, Monterey, Santa Clara and San Joaquin Counties. It is now presumed extirpated throughout most of its historic range. This species can be found in valley and foothill grassland habitats on alkaline hills. The stem and

leaves are covered with fine hairs and its yellow flower clusters bloom from March through April.

The most recent occurrence of this species took place in 1933 (Occurrence #3), approximately 7.8 miles northeast of the site. While potentially suitable habitat may be favorable for this species on the Property, it is likely extirpated from the region and is presumed absent.

6.3 Wildlife Survey Results

6.3.1 General Wildlife Species and Habitats

A complete list of wildlife species observed on the Property can be found in Attachment 2, Table 1. Wildlife species commonly occurring within habitat types present on the Property are discussed below:

Degraded Grassland Habitat

Given the amount of cover offered by the dominant non-native annual grassland habitat, wildlife species that are supported include raptors such as red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), white-tailed kite (*Elanus leucurus*), and American kestrel (*Falco sparverius*). One white-tailed kite was observed foraging over the western boundary of the Property during the January 2011 survey. Aerial foragers such as American crow (*Corvus brachyrhynchos*) and turkey vulture (*Cathartes aura*) were also observed circling over the Property. Songbirds such as Savannah sparrow (*Passerculus sandwichensis*) and western meadowlark (*Sturnella neglecta*) were also observed foraging on the Property. One adult resident burrowing owl (*Athene cunicularia*) was observed along the northern Property boundary during the November 2010 survey.

Several burrow colonies belonging to the California ground squirrel (*Spermophilus beecheyi*), field mouse (*Peromyscus sp.*), Botta's pocket gopher (*Thomomys bottae*), and California vole (*Microtus californicus*) were also observed throughout the Property during the November 2010 and January 2011 surveys. Reptiles such as the gopher snake (*Pituophis melanoleucus*) and common garter snake (*Thamnophis sirtalis*) would also be expected to occur in this habitat. The ground nesting burrowing owl (*Athene cunicularia*) was observed during the November 2010 survey along the northern Property hillside boundary. This habitat is also within the range of and considered suitable habitat for the federally endangered and state threatened San Joaquin kit fox (*Vulpes macrotis mutica*).

Riparian Habitat (Altamont Creek)

Due to the overlap of the creek habitat with the grassland habitat on the site, this area supports much the same suite of wildlife species as mentioned above. In addition, the mallard duck (*Anas platyrhynchos*) and green heron (*Butorides sundevalli*) can also be expected to occur within this habitat. Trees adjacent to this habitat have the potential to support nesting red-shouldered hawks. This habitat is also expected to attract wading birds such as the snowy egret (*Egretta thula*), great egret (*Ardea alba*), and great blue heron (*Ardea herodias*). Black-tailed deer (*Odocoileus hemionus*) are likely to occur in this habitat. The pacific tree frog (*Pseudacris*

regilla) and western toad (*Bufo boreas*) could also be expected to occur in this area on the Property.

Seasonal Wetland Habitat

During periods when there is no water present within the seasonal wetland habitat, this area supports much the same suite of wildlife species as the adjacent grassland and riparian habitats. During periods when saturation occurs to the surface, aquatic invertebrates and amphibians such as the pacific tree frog and western toad are present. This habitat is also expected to attract wading birds such as the snowy egret, great egret, mallard duck, and great blue heron. Bird species such as killdeer (*Charadrius vociferous*) and black phoebe (*Sayornis nigricans*) were observed during the surveys. This small, deep circular wetland at the base of the rock outcroppings in the western portion (possibly an old borrow pit) is deep enough that it could support California tiger salamander (CTS) (*Ambystoma californiense*) and California red-legged frog (CRLF) (*Rana draytonii*) larvae.

Seasonal Swale Habitat

During periods when there is no water present within the seasonal swale habitat, this area supports much the same suite of wildlife species as the adjacent grassland, creek, and wetland habitats. During periods when saturation occurs to the surface, aquatic invertebrates and amphibians such as the pacific tree frog, western toad, the federally threatened CRLF, and the federally and state threatened CTS may be present. This habitat is also expected to attract killdeer and the wading birds mentioned above.

Vernal Pool Habitat

This habitat is also expected to attract killdeer and the wading birds mentioned above. A variety of reptiles, amphibians, and invertebrates can also be expected to occur within these habitats during periods when saturation occurs to the surface.

6.3.2 Special-Status Wildlife Species

Attachment 2, Table 2 includes a list of special-status wildlife species with potential to occur in the Property area. Special-status wildlife species include species listed as Rare, Threatened, or Endangered by the USFWS (2011a, b), as well as those species covered by the MBTA, or those species given special protection by the State of California (CDFG 2011b).

The search and review of the CNDDB database reports revealed the occurrence of special-status species that could potentially occur in the degraded grassland, riparian, seasonal wetland, seasonal swale, and vernal pool habitats supported by the Property (Attachment 1, Figure 7). It should be noted that four species have been removed from the "Special-Status Wildlife" map located in Attachment 1, Figure 7 in order to avoid clutter and make the map easier to read. These four species include California red-legged frog (*Rana draytonii*), California tiger salamander (*Ambystoma californiense*), Alameda whipsnake (*Masticophis lateralis euryxanthus*), and prairie falcon (*Falco mexicanus*). Numerous occurrences of each of these species have made within a five-mile radius of the Property to the north within the last ten years.

In addition, some state-protected raptors could forage on the Property. Attachment 2, Table 2 provides a summary of the species, their status, and habitat requirements. Some species do not have any special protection, but are included in the CNDDB due to their local rarity. For the analysis of the site, the following specific discussions on the special-status wildlife included the following species:

INVERTEBRATES

Longhorn Fairy Shrimp (*Branchinecta longiantenna*). Federally Endangered.

This small aquatic crustacean is 0.5 to 0.8 inches in length and has an elongated boy, large compound eyes on stalks, and eleven pairs of swimming legs. They can be found in clear to turbid vernal pools feeding on algae, bacteria, and detritus. Eggs are laid in vernal pools and become encysted during the dry season, hatching when the pools refill. The longhorn fairy shrimp is found in isolated locations from Contra Costa County to San Luis Obispo County.

The most recent occurrence of this species in the vicinity of the Property took place in 1994 (Occurrence #2) near Byron Hot Springs in Contra Costa County. Due to the sensitive nature of this species, its location information has been suppressed. The on-site seasonal wetland, swale, and vernal pool habitats serve as only marginally suitable for this species as longhorn fairy shrimp generally prefer sandstone or clay substrates. The lack of recent occurrences of this species in the vicinity of the Property likely precludes their habitation of the site. In addition, given that the site has been regularly grazed and this species prefers relatively undisturbed habitats, the longhorn fairy shrimp is presumed absent from the site.

Vernal Pool Fairy Shrimp (*Branchinecta lynchi*). Federally Threatened.

The vernal pool fairy shrimp is approximately three quarters of an inch in length. This species inhabits seasonal wetlands such as alkaline pools, intermittent drainages, drainage ditches, oxbows, stock ponds, and vernal pools and swales. Like the longhorn fairy shrimp, eggs become encysted during dry periods and hatch when seasonal wetlands refill. Threats to the vernal pool fairy shrimp include loss of habitat, agriculture, foot traffic, and off-road vehicles.

Several occurrences of this species have been made within the last five years near the vicinity of the Property. The closest occurrence of this species took place in 2005 (Occurrence #411), roughly 0.3 miles southeast of the site (Attachment 1, Figure 7). In addition to this occurrence, the Property also lies within USFWS designated critical habitat (VERFS 19C) for vernal pool fairy shrimp (Attachment 1, Figure 8). The seasonal wetland, swale, and vernal pool habitats on the Property represent suitable conditions to support this species. Based on a recent communication by an Olberding Environmental biologist with a local shrimp expert, this species occurs in alkaline pools of varying depth, such as those that occur on the site. Based on the recent occurrences, critical habitat designation, and suitable habitats, this species has the potential to occur on the Property.

Midvalley Fairy Shrimp (*Branchinecta mesovallensis*). Federal Species of Special Concern.

The midvalley fairy shrimp inhabits vernal pools, feeding on algae, bacteria and protozoa. They are known to occur in Sacramento, Solano, Merced, Madera, San Joaquin, Fresno, and Contra Costa counties. Threats to this species include loss of habitat, off-road vehicles, and cattle grazing.

The most recent occurrence of this species in the vicinity of the Property took place in 2006 (Occurrence #66), approximately 8.2 miles northeast of the site. Based on a recent communication by an Olberding Environmental biologist with a local shrimp expert, this species is most common north of the Sacramento County border and typically not found in alkaline pools. Although seasonal wetland, swale, and vernal pool habitats occur on the Property, this species is considered unlikely to occur on the Property based on lack of recent occurrences and habitat suitability.

Curved-Foot Hygrotus Diving Beetle (*Hygrotus curvipes*). California Species of Special Concern.

The curved-foot hygrotus diving beetle inhabits vernal pools and other seasonal wetlands within Alameda and Contra Costa Counties. Threats to this species include habitat loss and wetlands management for mosquito control.

The most recent occurrence of this species in the vicinity of the Property took place in 1990 (Occurrence #2) near Brushy Creek in Contra Costa County, roughly 6.3 miles north of the site. Although the seasonal wetland, swale, and vernal pool habitats represent suitable conditions for this species, it is considered unlikely to occur on the Property based on lack of recent occurrences.

California Linderiella (*Linderiella occidentalis*). Federal Species of Special Concern.

Found in the same vernal pool habitats as the fairy shrimp, California linderiella occur in clear vernal pools and lakes. They are tolerant of a wide rage of conditions withstanding turbid conditions and pH levels between 6.1 and 8.5. They are able to tolerate temperature conditions from 41° to 85° F. Like the fairy shrimp, eggs become encysted during dry conditions and hatch when the vernal pools refill. Threats to this species include habitat loss, alteration of vernal pool hydrology, water contamination, off-road vehicle use and invasive non-native species.

The most recent occurrence of this species in the vicinity of the Property took place in 2003 (Occurrence #229), roughly 8.9 miles southwest of the site. Although the seasonal wetland, swale, and vernal pool habitats represent suitable conditions for this species, it is considered unlikely to occur on the Property based on lack of recent occurrences.

Based on a recent communication by an Olberding Environmental biologist with a local shrimp expert, this species occurs in alkaline pools of varying depth, such as those found on the Property. They are very widespread and common, but they occur more so in the Sacramento

Valley. Although seasonal wetland, swale, and vernal pool habitats occur on the Property, this species is considered unlikely to occur based on lack of recent occurrences and habitat range.

AMPHIBIANS

California Tiger Salamander (*Ambystoma californiense*). Federally Threatened, State Threatened.

Adult California tiger salamanders (CTS) inhabit rolling grassland and oak savannah. Adults spend most of the year in subterranean retreats such as rodent burrows, but may be found on the surface during dispersal to and from breeding sites. The preferred breeding sites are vernal pools and other temporary ponds. However, CTS may use permanent manmade ponds as breeding habitat. CTS adults begin migrating to ponds after the first heavy rains of fall and can be found in or around the breeding ponds during and after winter rainstorm events. In extremely dry years, CTS may not reproduce.

After mating, females lay several small clusters of eggs, which contain from one to over 100 eggs. The eggs are deposited on both emergent and submerged vegetation, as well as submerged detritus. A minimum of ten weeks is required to complete larval development through metamorphosis, at which time the larvae will normally weigh about ten grams. Larvae remaining in pools for a longer time period can grow to much larger sizes. Upon metamorphosis, juvenile CTS migrate in large masses at night from the drying breeding sites to refuge sites. Prior to this migration, the juveniles spend anywhere from a few hours to a few days near the pond margin. Adult CTS are largely opportunistic feeders, preying upon arthropod and annelid species that occur in burrow systems, as well as aquatic invertebrates found within seasonal pools. The larvae feed on aquatic invertebrates and insects, showing a distinct preference for larvae of the Pacific tree frog.

On August 4, 2004, the U.S. Fish and Wildlife Service (USFWS) announced the listing of the CTS as threatened throughout its range with the exception of the Sonoma and Santa Barbara County populations which are listed as endangered (USFWS 2011b). On March 3, 2010, the California Fish and Game Commission designated CTS as threatened under the California Endangered Species Act. On August 23, 2005, the Service designated 199,109 acres of critical habitat in 19 counties for the central California population of the CTS. On August 2, 2005, they proposed 74,223 acres of critical habitat for CTS in Sonoma County, California. This habitat is located in the Santa Rosa Plain in central Sonoma and includes lands bordered on the west by Laguna de Santa Rosa, to the south by Skillman Road, northwest of Petaluma, to the east by foothills, and to the north by Windsor Creek. On December 14, 2005, in a final decision, USFWS designated and excluded 17,418 acres of critical habitat for CTS, so that no critical habitat is being designated for the Sonoma County population. On August 18, 2009, USFWS again proposed to designate critical habitat for the Sonoma County distinct population segment (DPS). In total, approximately 74,223 acres are being proposed for designation as critical habitat within Sonoma County, California.

The nine-quad CNDDB search of the site produced 225 occurrences of this species surrounding the Property. Of these, roughly half have occurred within the last ten years and within the

vicinity of the Property. Due to the high number of recent occurrences of this species within a five-mile radius to the north of the Property, CTS was removed from the CNDDB map located in Attachment 1, Figure 7 to avoid clutter.

Suitable habitat in the form a seasonal wetland along the western portion of the Property and a vernal pool along the eastern portion occurs for CTS. Suitable habitat also occurs within areas adjacent to the Property (within 1.24 miles, which represents the dispersal ability of the CTS). With little to no migratory barriers to the north, west, and east of the Property, it is expected that CTS have the ability to freely migrate onto the Property. Suitable upland habitat is present on and surrounding the Property in the form of small mammal burrows. Several large colonies of ground squirrels were observed on the Property during the surveys in close proximity to CTS breeding habitat. Due to the presence of upland and breeding habitat within the Property boundaries and the surrounding area coupled with the numerous known occurrences of CTS in close proximity to the Property, this species has a high potential to occur on the site.

California Red-Legged Frog (*Rana draytonii*). Federally Threatened, California Species of Special Concern.

The CRLF is considered a California species of special concern and was listed as a Federal threatened species on May 31, 1996 (61 FR 25813). It is considered threatened throughout its range. If a proposed project may jeopardize listed species, Section 7 of the ESA requires consideration of those species through formal consultations with the USFWS. Federal Proposed species (USFWS 2011b) are species for which a proposed listing as Threatened or Endangered under ESA has been published in the Federal Register. If a proposed project may jeopardize proposed species, Section 7 of the ESA affords consideration of those species through informal conferences with USFWS. On April 13, 2006 USFWS designated critical habitat for the CRLF. In total, approximately 450,288 acres fall within the boundaries of critical habitat designation. The critical habitat is located in 21 California counties including units 1A and 1B in Alameda County. On March 17, 2010, the USFWS revised the designation of critical habitat for CRLF in a final ruling (75 FR 12815 12959). In total, approximately 1,636,609 acres of critical habitat in 27 California counties fall within the boundaries of the final revised critical habitat designation. This rule became effective on April 16, 2010. Based on this new ruling, the Property falls within critical habitat for the CRLF (Attachment 1, Figure 8).

The CRLF is a rather large frog, measuring one and a half to five inches in length. They are reddish-brown to gray in color, with many poorly defined dark specks and blotches. Dorsolateral folds are present. The underside of the CRLF is washed with red on the lower abdomen and hind legs. The CRLF has a dark mask bordered by a light stripe on the jaw, smooth eardrums, and not fully webbed toes. The male has enlarged forearms and swollen thumbs. Its vocals consist of a series of weak throaty notes, rather harsh, and lasting two to three seconds. Breeding occurs from December to March with egg masses laid in permanent bodies of water.

The CRLF is found in lowlands, foothill woodland and grasslands, near marshes, lakes, ponds or other water sources. These amphibians require dense shrubby or emergent vegetation closely associated with deep still or slow moving water. Generally these frogs favor intermittent streams with water at least two and a half feet deep and where the shoreline has relatively intact emergent

or shoreline vegetation. CRLF is known from streams with relatively low gradients and those waters where introduced fish and bullfrogs are absent. CRLF are known to take refuge upland in small mammal burrows during periods of high water flow. CRLF occurs west of the Sierra Nevada-Cascade and in the Coast Ranges along the entire length of the state. Historically, they occurred throughout the Central Valley and Sierra Nevada foothills south to northern Baja California. Now they are found from Sonoma and Butte Counties south to Riverside, but mainly in Monterey, San Luis Obispo, and Santa Barbara Counties.

The nine-quad CNDDB search of the site produced 259 occurrences of this species surrounding the Property. Of these, roughly half have occurred within the last ten years. Due to the high number of recent occurrences of this species within a five-mile radius to the north of the Property, CRLF was removed from the CNDDB map located in Attachment 1, Figure 7 to avoid clutter. Suitable upland habitat is present on and surrounding the Property in the form of small mammal burrows. Several large colonies of ground squirrels were observed on the Property during the surveys. With few migratory barriers surrounding the Property, it is expected that CRLF have the ability to freely migrate onto the site.

Western Spadefoot Toad (*Spea hammondii*). California Species of Special Concern.

Western spadefoot toads, from the family *Pelobatidae*, are distinguished from true toads (genus *Bufo*) by their cat-like eyes (due to vertically elliptical pupils), single black sharp-edged "spades" on their hind feet, teeth in their upper jaws, and smooth skin. Adults range in length from one and a half to two and a half inches long. They are dusky green or gray above, often with four irregular light-colored stripes on their back, with the central pair of stripes sometimes distinguished by a dark, hourglass-shaped area. The irises of western spadefoot toads' eyes are usually pale gold. Their abdomens are whitish without any markings. Typical of toads, adult western spadefoot toads will forage on a variety of insects, worms, and other invertebrates. They are found primarily in grasslands, but also in valley-foothill hardwood woodlands. Breeding and egg-laying occurs exclusively in vernal pools from January to May.

The most recent occurrence of this species in the vicinity of the Property took place in 2004 (Occurrence #404), roughly 3.4 miles south of the site (Attachment 1, Figure 7). The grassland and vernal pool habitat along the eastern portion of the Property represent suitable conditions to support this species. Although this species was not observed during the surveys, it may occur.

REPTILES

Silvery Legless Lizard (*Anniella pulchra pulchra*). California Species of Special Concern.

Silvery legless lizards are shiny in appearance, silvery above with yellow underparts. A dark stripe runs down the middle of the back and down each side. This species mates in the early summer with females giving birth to live young in fall or early winter. Their habitats consist of loose soils such as found in stream banks, sand dunes, canyon bottoms and ravines. They prefer areas with scattered vegetation.

The most recent occurrence of this species in the vicinity of the Property took place in 2004 (Occurrence #18), roughly 10.2 miles southeast of the site. While the sandy loam soil conditions

are moderately suitable to support this species, the grassland and seasonal wetland habitat on the Property represent only marginally suitable conditions to support this species as it generally prefers a higher soil moisture content. Due to marginal habitats and the lack of recent occurrences, this species is considered unlikely to occur on the Property.

Western Pond Turtle (*Emys marmorata*). California Species of Special Concern.

The western pond turtle is a thoroughly aquatic turtle that may be found in marshes, ponds, streams and irrigation ditches where aquatic vegetation is present. The turtles, which range from nine to ten inches in size, require basking sites and suitable upland habitat for egg laying. Suitable breeding upland habitats may consist of sandy banks or grassy open fields. The western pond turtle has a dark brown to olive-colored carapace with hexagonal scales that lack prominent markings.

Nesting and incubation occur from April to September, with a peak time for mating and egg laying occurring from March to May. Most nests are with 90 meters (300 feet) of water. Activity slows from November to February. During the winter when water and air temperatures cool, usually from September to March, the turtles begin to hibernate. During hibernation, turtles either bury themselves in the mud at the bottom of ponds or will bury themselves on land in duff (top layer of decomposing vegetation and soil). Some turtles travel more than a half mile to over-winter on land, though many select the nearest wooded or shrubby area they can bury in. Turtles then emerge from hibernation in the spring to start the yearly cycle again.

The nine-quad CNDDB search of the site produced 37 occurrences of this species surrounding the Property. Of these, roughly half have occurred within the last ten years (Attachment 1, Figure 7). Despite these recent occurrences, the western pond turtle is considered unlikely to occur on the Property due to the lack of basking habitat, refugia, and deep pools on the site. Although riparian habitat occurs along the southern portion of the Property, this species is considered unlikely to occur based on suitable habitat.

San Joaquin Whipsnake (*Masticophis flagellum ruddocki*). California Species of Special Concern.

The San Joaquin whipsnake resides in open, dry habitats with little or no tree cover. They can be found in valley grassland and saltbush scrub in the San Joaquin Valley with mammal burrows for refuge and oviposition sites. Adults of this species can reach three to five feet in length. It is a very fast-moving, slender snake with smooth scales, a large head and eyes, and a thin neck. The coloration of this species varies from tan, olive brown, to yellowish brown, lacking the dark head and neckbands of other subspecies. This species hunts during the day, seeking small mammals, nestling and adult birds, bird eggs, lizards, snakes, amphibians, and carrion.

The closest occurrence of this species in the vicinity of the Property took place in 2000 (Occurrence #28), roughly 3.9 miles south of the site (Attachment 1, Figure 7). While the Property contains refuge and oviposition sites in the form of small mammal burrows throughout the site, this species generally prefers dry habitats and shrub cover that the Property does not provide. Due to marginal habitats and the lack of recent occurrences, this species is considered unlikely to occur on the Property.

Coast Horned Lizard (*Phrynosoma blainvillii*). California Species of Special Concern.

One of six subspecies of *P. coronatum*, the coast horned lizard is distinguished from its relatives by the placement and shape of the spines or "horns" that cover its body. The coast horned lizard can be distinguished from other horned lizard species by the following: two rows of lateral abdominal fringe scales; two occipital spines, three to four times longer than basal width, not in contact; four to five temporal spines; smooth ventral scales; three or more rows of enlarged gular scales. The coast horned lizard frequents a wide variety of habitats, but prefers lowlands along sandy washes with scattered low bushes. They require open areas for sunning, bushes for cover, patches of loose soil for burial, and an abundant supply of ants and other insects. This species ranges from central California west of the Sierra Nevada, south throughout southern California west of the Mojave Desert, and throughout Baja California, Mexico.

The most recent occurrence of this species in the vicinity of the Property took place in 2009 (Occurrence #594), roughly 11.5 miles south of the site. While this species prefers a wide variety of habitats and fossorial soil conditions occur on the Property, this species generally prefers more scattered low shrub cover that the Property does not provide. Due to marginal habitats and the lack of recent occurrences, this species is considered unlikely to occur on the Property.

BIRDS

Cooper's Hawk (*Accipiter cooperii*). State Protected.
Sharp-Shinned Hawk (*Accipiter striatus*). State Protected.

The sharp-shinned hawk is a small raptor with short, rounded wings. This hawk has a long tail that is squared-off at tip with prominent corners. This raptor typically flies with several quick, snappy wingbeats and a short glide, but also soars. Its small rounded head does not project far beyond the wings when soaring. The adult sharp-shinned hawk exhibits a red eye, black cap, and a blue-gray back and upperwings. The white breast, belly and underwing coverts are marked by fine, thin, reddish bars.

The Cooper's hawk is quite similar looking to the sharp-shinned hawk, although it is slightly larger in size and has a long rounded tail. Both hawks hunt in woodlands, riparian areas and even densely vegetated urban areas. These raptors capture small birds, rodents and reptiles. They often hunt along the edges of woodlands, shorelines, and riparian habitats where migrating passerines are found. Nesting habitat for these raptors consists of woodlands, coniferous forest, and dense oak woodland adjacent or close to open areas.

The most recent occurrence of the Cooper's hawk in the vicinity of the Property took place in June 2009 (Occurrence #124) at Sandia National Laboratory, roughly 3.4 miles south of the Property. The most recent occurrence of the sharp-shinned hawk in the vicinity of the Property took place in June 1987 (Occurrence #2), roughly 15.9 miles southwest of the Property. Foraging habitat exists for both species throughout the 31.67-acre Property in the form of the annual grassland and riparian habitats on the site. Prey items such as passerines, squirrels, and other small mammals were observed foraging on the Property throughout the surveys. While nesting habitat for these species occurs adjacent to the Property, none was observed during the

2010 and 2011 surveys due to the absence of suitable nest trees. Based on these surveys, the Cooper's hawk may forage on the Property, but the sharp-shinned hawk is unlikely to occur based on the lack of recent occurrences. Neither species were observed during the surveys and neither species is expected to nest on the Property.

Tricolored Blackbird (*Agelaius tricolor*). Federal Species of Special Concern, California Species of Special Concern.

A close relative of the red-winged blackbird (*Agelaius phoeniceus*), the tricolored blackbird is distinguished by a white patch underscoring the bright red epaulettes that are prominent in the males of both species. Often found in large flocks of red-winged blackbirds, this species is highly colonial. Nesting colonies usually occur in marshy habitats, often in large stands of blackberry.

The most recent occurrence of this species in the vicinity of the Property took place in June 2009 (Occurrence #449) near Sandia Laboratories in Livermore, approximately 3.5 miles south of the site. Due to the absence of suitable nesting habitat (i.e., extensive stands of brambles, emergent vegetation, etc.), this species is considered unlikely to occur on the Property.

Golden Eagle (*Aquila chrysaetos*). California Species of Special Concern, State Protected.

The golden eagle is typically found in open grasslands, pastures, and oak woodland, often near lakes and rivers. Their plumage is dark brown overall, with some white at the base of the tail, and golden-to-blonde feathers on the nape of the neck. The bill and talons are black and the cere (soft membrane that covers the nostrils) and feet are yellow. Immature birds have a broad, white tail band with a black edge and large white patches on the undersides of the wings at the base of the primary feathers. Adult males weigh nine pounds with adult females weighing 12.5 pounds. Masters of soaring, golden eagle can reach speeds up to 200 miles per hour with their 6.5 to 7.5 foot wingspans. Eggs are laid between February and May, usually with two to four eggs per nest. Golden eagles build large stick nests in tall trees, isolated ledges, or cliff walls where they have plenty of room to maneuver. The nest may become huge, as much as eight to ten feet across and three to four feet deep. Threats include human disturbance, loss of habitat, shooting, lead poisoning, and electrocution from power lines.

The most recent occurrence of this species in the vicinity of the Property took place in 2008 (Occurrence #69), approximately 7.7 miles northwest of the site. This species was not observed during the 2010 and 2011 surveys and nesting habitat does not occur within the vicinity of the site. Based on these surveys, the golden eagle may forage on the Property, but is not expected to nest on the Property.

Great Egret (*Ardea alba*). Rookeries.

The great egret can be distinguished from the snowy egret by its larger size, yellow beak and black legs and toes. It can be found feeding in shallow aquatic habitats such as drainage ditches, irrigated fields, and shorelines of streams, lakes and salt ponds. Great egrets are colonial nesters

and will nest in emergent marsh habitats as well as in tall trees. The nesting colonies of great egrets are protected in California.

Foraging habitat exists throughout the Property for the great egret, especially along Altamont Creek to the south, the seasonal swale and vernal pool to the east, and the seasonal wetland to the west. Nesting habitat for this species does not occur on or near the Property. This species was not observed on the Property during the surveys, but may occur in a foraging capacity.

Great Blue Heron (*Ardea herodias*). Rookeries.

This tall, grayish blue wading bird is frequently observed near streams and wet meadow foraging for frogs, small fish and other prey items. Typical nesting habitat for the great blue heron consists of tall eucalyptus trees adjacent to foraging sites. This colonial nester can also be found nesting in electrical towers adjacent to salt ponds. The nesting colonies of great blue herons are protected in California. Foraging habitat exists throughout the Property for the great blue heron, especially along the creek and within the seasonal swale, vernal pool, and the seasonal wetland habitats. Nesting habitat for this species does not occur on or near the Property. This species was not observed on the Property during the surveys, but may occur in a foraging capacity.

Burrowing Owl (*Athene cunicularia*). Federal Species of Special Concern, California Species of Special Concern.

The U.S. Fish and Wildlife Service has identified the burrowing owl is as a "candidate" species. Candidate species are animals and plants that may warrant official listing as threatened or endangered, but there is no conclusive data to give them this protection at the present time. As a candidate species, burrowing owls receive no legal protection under the Endangered Species Act (ESA). However, this species does receive some legal protection from the U.S. through the Migratory Bird Treaty Act, which forbids the destruction of the birds and active nests. In California, the burrowing owl considered a "species of special concern."

Burrowing owls are ground dwelling members of the owl family and are small brown to tan colored birds with bold spots and barring. Burrowing owls generally require open annual grassland habitats in which to nest, but can be found on abandoned lots, roads, airports, and other urban areas. Burrowing owls generally use abandoned California ground squirrel holes for their nesting burrow, but are also known to use pipes or other debris for nesting purposes. Burrowing owls prefer annual grassland habitats with low vegetative cover. The breeding season for burrowing owls occurs from March through August. Burrowing owls often nest in loose colonies about 100 yards apart. They lay three to twelve eggs from mid-May to early June. The female incubates the clutch for about 28 days, while the male provides her with food. The young owls begin appearing at the burrow's entrance two weeks after hatching and leave the nest to hunt for insects on their own after about 45 days. The chicks can fly well at six weeks old.

The nine-quad CNDDB search of the site produced 92 occurrences of this species surrounding the Property. Of these, roughly half have occurred within the last ten years, with the most recent occurring just to the east of the Property (Attachment 1, Figure 7). Foraging habitat exists throughout the 31.67-acre Property. Prey items such as insects and small rodents were observed

on the Property throughout the surveys. Nesting habitat also exists throughout the site in the form of ground squirrel burrows. One adult resident burrowing owl was observed along the northern Property boundary during the November 2010 survey and is currently **present** on the Property.

Red-Tailed Hawk (*Buteo jamaicensis*). State Protected.

The red-tailed hawk is a large *Buteo* that is distinct due to the red color of its tail feathers in contrast to the brown color of its body. Not all red-tailed hawks exhibit the distinct coloration on their tail and gradations may occur especially in young birds. Red-tailed hawks hunt rodents by soaring over grassland habitat. Nest trees for red-tailed hawks are usually tall trees with a well developed canopy that includes a strong branching structure on which to build a nest.

Foraging habitat exists for the red-tailed hawk throughout the 31.67-acre Property in the form of the annual grassland and riparian habitats on the site. Prey items such as passerines, squirrels, and other small mammals were observed foraging throughout the Property during the surveys. While nesting habitat for this species occurs adjacent to the Property, none was observed during the 2010 and 2011 surveys due to the absence of suitable nest trees. Based on these surveys, the red-tailed hawk may forage on the Property, but is not expected to nest on the Property.

Red-Shouldered Hawk (*Buteo lineatus*). State Protected.

The red-shouldered hawk is a medium-sized, slender *Buteo* with long legs and a long tail and is smaller than the red-tailed hawk. Upperparts are dark with pale spotting, and rusty-reddish feathers on the wing create the distinctive shoulder patch. The tail has several wide, dark bars; the intervening narrow stripes and the tip of the tail are white, and there is variation in the number of tail bars among adults and juveniles. The habitat that the red-shouldered hawk prefers varies from bottomland hardwoods and riparian areas to upland deciduous or mixed deciduous-conifer forest, and almost always includes some form of water, such as a swamp, marsh, river, or pond. In the west, the red-shouldered hawk sometimes occurs in coniferous forests, and has been expanding its range of occupied habitats to include various woodlands, including stands of eucalyptus trees amid urban sprawl.

Foraging habitat exists for the red-shouldered hawk throughout the Property in the form of the annual grassland and riparian habitats on the site. Prey items were observed foraging on the Property during the surveys. While nesting habitat for this species occurs adjacent to the Property, none was observed during the 2010 and 2011 surveys due to the absence of suitable nest trees. Based on these surveys, the red-shouldered hawk may forage on the Property, but is not expected to nest on the Property.

Ferruginous Hawk (*Buteo regalis*). State Protected.

The ferruginous hawk is named for the rusty coloration of the back, shoulder, and leg feathers, which distinguish it from other similar species. It is also distinguished by the white, crescent-shaped patch of feathers that appear on outer feathers of the upperwing. Ferruginous hawks are found foraging in open country such as grasslands, along streams, and in agricultural areas.

Nests are constructed in rock outcrops or in trees and may be constructed on the ground. The breeding range of the ferruginous hawk includes northeastern Nevada, eastern Oregon, southeastern Washington, Idaho, Montana, and Wyoming.

The most recent occurrence of this species took place in January 2003 (Occurrence #67), where one wintering adult was observed northeast of Livermore, along Tassajara Road, roughly 8.9 miles northwest of the site. Foraging habitat exists throughout the Property for this species. While the ferruginous hawk does not nest in California, it may occur based on suitable foraging habitat. This species was not observed during the surveys.

Northern Harrier (*Circus cyaneus*). California Species of Special Concern.

Northern harriers require open annual grassland habitats and prefer dense ground vegetation or grasses in which to build nests. They are distinguished from other similar species by their prominent white rump patch. Males are pale gray in color, while females are brown with dark streaking on the breast. These birds are ground nesters and utilize habitats ranging from annual grassland to seasonal wetland for this purpose.

The most recent occurrence of this species took place in June 1992 (Occurrence #27) in Tassajara Valley, roughly 8.1 miles northwest of the site. Foraging habitat exists throughout the Property in the form of the annual grassland, creek, and wetland habitats. Prey items such as songbirds, squirrels, and other small mammals were observed foraging on the Property throughout the surveys. While nesting habitat for this species occurs adjacent to the Property, the groundcover throughout the Property is considered to be too low to be suitable nesting habitat. Based on these surveys, this species may forage on the Property, but is not expected to nest on the Property.

Snowy Egret (*Egretta thula*). Rookeries.

The snowy egret is commonly found foraging along the shorelines of various wetland habitats. This medium-sized wader is a colonial nester, often nesting in mixed-species colonies with great egrets (*Ardea alba*) and black crowned night herons (*Nycticorax nycticorax*). It can be identified by its pure white plumage, black bill, black legs and yellow toes. The nesting colonies of snowy egrets are protected in California. Typical nesting habitat includes dense bulrush marsh or low trees.

Foraging habitat exists throughout the Property for the snowy egret. Nesting habitat for this species does not occur on or near the Property. This species was not observed on the Property during the surveys, but may occur in a foraging capacity.

White-Tailed Kite (*Elanus leucurus*). Federal Species of Concern, CDFG: Fully Protected.

The white-tailed kite is falcon-shaped with a long white tail. This raptor has black patches on the shoulders that are highly visible while the bird is flying or perching. White-tailed kites forage in annual grasslands, farmlands, orchards, chaparral, and at the edges of marshes and meadows. They are found nesting in trees and shrubs such as willows (*Salix* sp.), California sycamore

(*Platanus racemosa*), and live oak (*Quercus agrifolia*) often near marshes, lakes, rivers, or ponds. This raptor often hovers while inspecting the ground below for prey. Annual grasslands are considered good foraging habitat for white-tailed kites, which will forage in human-impacted areas.

Foraging habitat exists throughout the Property for this species. Prey items were observed foraging on the Property throughout the surveys. While nesting habitat for this species occurs adjacent to the Property, none was observed during the 2010 and 2011 surveys due to the absence of suitable nest trees. One white-tailed kite was observed foraging over the western boundary of the Property during the January 2011 survey. This species is currently **present** on the Property.

California Horned Lark (*Eremophila alpestris actia*). California Species of Special Concern.

The California horned lark is one of five subspecies of the horned lark. Males of this species have a distinct crest of black feathers originating above the eye that gives the appearance of "horns." The subspecies *actia* is distinguished from other subspecies by the pale yellow shading that is restricted to the face and throat. This species typically inhabits dry, open grasslands and alkali flats. California horned larks prefer open terrain where they construct nests on the ground, often in sparsely vegetated areas. The highest nesting densities are generally found in annual grassland and oak savannah habitats in the foothill regions.

The most recent occurrence of this species took place in 2007 (Occurrence #75), roughly 9.5 miles northeast of the site. Foraging habitat exists throughout the Property in the form of the annual grassland and wetland habitats. Habitats on the Property are not conducive to nesting as this species generally prefers sparsely vegetated areas. Based on the lack of recent occurrences and nesting habitat, this species is unlikely to occur on the Property.

Prairie Falcon (*Falco mexicanus*). California Species of Special Concern.

This raptor is known to inhabit dry open terrain either in level or hilly habitats. Prairie falcons nest on cliffs, but will forage far afield. Similar in appearance to the female of the smaller merlin (*Falco columbarius*), it shows a darker facial stripe than the merlin. The wings and tale are pale brown and the underside is cream-colored and heavily spotted. Prey species are birds and small mammals.

The nine-quad CNDDB search of the site produced 8 occurrences of this species from 2006-2008 surrounding the Property. Due to the high number of recent occurrences of this species within a five-mile radius to the north of the Property, this species was removed from the CNDDB map located in Attachment 1, Figure 7 to avoid clutter. In addition, due to the sensitive nature of this species, its location information has been suppressed. Foraging habitat and prey items exist for this species throughout the Property. As this species nests on cliffs, nesting habitat does not occur within or adjacent to the Property. Based on these surveys, this species may forage on the Property, but is not expected to nest on the Property.

American Peregrine Falcon (*Falco peregrinus anatum*). Federally Delisted, State Endangered, CDFG: Fully Protected.

The American peregrine falcon forages on the wing, catching prey in the air or on the ground. It is found mostly in open terrain including farmland, marshes and even urban environments. Prey items include waterbirds, rock doves, and other small birds and mammals. Peregrine falcons need tall sheltered areas such as cliffs or tall buildings for cover. They are increasingly able to exploit urban habitats for both foraging and nesting sites.

The most recent occurrence of this species in the vicinity of the site occurred in 2006 (Occurrence #36), in Alameda County. Due to the sensitive nature of this species, its location information has been suppressed. Foraging habitat and prey items exist for this species throughout the Property, however, as nesting habitat does not occur for this species on or near the Property, it is considered unlikely to occur on the site.

American Kestrel (*Falco sparverius*). State Protected.

The American kestrel is the smallest of raptor species and is distinct due to the black barring on its face. The female kestrel is slightly larger than the male bird and is differentiated by its brown and red coloration. The male kestrel is slightly smaller than the female and has gray wing patches near the top of the wing. Kestrels utilize cavities in trees for nesting and hunt small rodents and birds.

Foraging habitat exists throughout the Property for this species. Prey items were observed foraging on the Property throughout the surveys. While nesting habitat occurs adjacent to the Property, none was observed during the surveys due to the absence of suitable nest trees. Based on these surveys, the American kestrel may forage on the Property, but is not expected to nest on the Property.

Loggerhead Shrike (*Lanius ludovicianus*). Federal Species of Special Concern, California Species of Special Concern.

The loggerhead shrike is a black and white perching bird with a black face mask that extends over the bill. This species hunts large insects, small rodents and even small birds. Loggerhead shrikes are known for their habit of impaling their food on thorns or barb wire for future consumption. The range and habitat for the loggerhead shrike has steadily shrunk due to human development within grasslands; however, this species is often found on lands grazed by cattle that are fenced with barb wire. These birds use shrubs, dense trees, and thickets of vegetation for nesting sites.

The most recent occurrence of this species in the vicinity of the Property took place in July 2009 (Occurrence #25) at Sandia National Laboratory in Livermore, roughly 3.8 miles south of the Property. Foraging habitat exists throughout the Property in the form of the annual grassland and wetland habitats. Prey items such as insects, passerines, and small mammals were observed foraging on the Property throughout the surveys. Potential nest sites also exist on and adjacent to the Property in the form of low shrubs. While this species was not observed during the surveys, it has the potential to occur on the site.

MAMMALS

Special-Status Bats

Bats (Order - *Chiroptera*) are the only mammals capable of "true" flight. They are nocturnal feeders and locate their prey which consists of small to medium sized insects by echolocation. Bats consume vast amounts of insects making them very effective pest control agents. They may eat as much as their weight in insects per day. Maternity roosts comprised of only females, may be found in buildings or mine shafts with temperatures up to 40 degrees Celsius and a high percentage of humidity to ensure rapid growth in the young. Female bats give birth to only one or two young annually and roost in small or large numbers. Males may live singly or in small groups, but scientists are still unsure of the whereabouts of most males in summer.

Special-status bats with the potential to forage on the Property are listed below. These bats roost in rock crevices, caves, tree hollows, and buildings, none of which occur on the Property. Bats usually seek buildings or other protected sites with warm roosting areas away from human disturbance.

Pallid bat (*Antrozous pallidus*), California Special Concern species;
Townsend's western big-eared bat (*Corynorhinus townsendii*), California Special Concern species; and
Hoary bat (*Lasiurus cinereus*), California Special Concern species

The most recent occurrence of the pallid bat in the vicinity of the Property took place in 2001 (Occurrence #105) in Alameda County. Due to the sensitive nature of this species, its location information has been suppressed. The most recent occurrence of the Townsend's western big-eared bat in the vicinity of the Property took place in 2007 (Occurrence #141), roughly 7.5 miles southwest of the Property. The most recent occurrence of the hoary bat in the vicinity of the Property took place in 1941 (Occurrence #15), roughly 7.7 miles southwest of the Property.

Foraging habitat exists for each of these species throughout the Property in the form of the annual grassland and riparian habitats. Suitable roosting habitat does not occur on the site. Due to the lack of recent occurrences within the vicinity of the Property, regular site maintenance, and regular human disturbance, none of these bat species are likely to occur on the site.

American Badger (*Taxidea taxus*). California Species of Special Concern.

This large member of the weasel family has a flat body with short legs ideally suited to digging burrows. Found in open plains, prairies, forests and grasslands, this species feeds on ground squirrels, mice, and gophers. Badgers mate between July and August, but do not give birth until March.

The 9-quad CNDDB search of the Property revealed 20 occurrences of this species, most of which took place from 1994-2007. The most recent occurrence of this species in the vicinity of the Property took place in July 2007 (Occurrence #410) east of San Ramon, roughly 7.6 miles northeast of the site. With little to no migratory barriers to the north, west, and east of the Property, it is expected that this species has the ability to freely migrate onto the Property.

Foraging and burrowing habitat exists throughout the Property for the American badger. This species was not observed during surveys, but may occur.

San Joaquin Kit Fox (*Vulpes macrotis mutica*). Federally Endangered, State Threatened.

The San Joaquin kit fox (SJKF) has a slim body with large, conspicuous ears, and a long, bushy, black tipped tail. It is the smallest canid species in North America. The SJKF lives in annual grassland habitats where friable soils are present in which they may excavate den sites. The general habitat requirement for the kit fox is annual grasslands or grassy open habitat stages with scattered shrubby vegetation. Food requirements for the SJKF are rodents, insects, and even garbage in urbanized areas. Grassland habitats with a large rodent prey base and loose textured soils are thought to provide the best habitat for the SJKF.

The 9-quad CNDDB search of the Property revealed 36 occurrences of this species within the vicinity of the Property from 1975-2002. Several sightings of this species have been made in Alameda County from the late 1980s to 2002. The most recent occurrence of this species in the vicinity of the Property took place in August 2002 (Occurrence #58), 0.6 miles directly east of Brushy Peak, roughly 2.9 miles northeast of the site (Attachment 1, Figure 7). With little to no migratory barriers to the north, west, and east of the Property, it is expected that this species has the ability to freely migrate onto the Property. Foraging and burrowing habitat exists throughout the Property for the SJKF. This species was not observed during surveys, but may occur.

7.0 CONCLUSIONS

7.1 Wetlands

Results of the biological resources analysis survey conducted by Olberding Environmental in November 2010 and January/February 2011 identified the presence of regulated wetlands and waters of the United States and State of California within the Property. A Corps jurisdictional delineation has been completed and submitted to the Corps for verification. In summary, the Property contains: 0.004-acre of seasonal wetlands, 0.484-acre of seasonal swales, 0.025-acre of vernal pools, and 0.36-acre of "other waters" in the form of 1,590 linear feet of Altamont Creek to the south (Altamont Creek is a "blue line" water feature on the USGS topographic map for Altamont). Therefore, the total Corps jurisdictional acreage on the Property is 0.873-acre. Prior to any activities associated with any of these features, the appropriate permits will be required by the Corps, the CDFG, and the Regional Board.

7.2 Special-Status Plants

Fifteen special-status plant species have the potential to occur on the Property based on the presence of suitable habitats and soil types. However, due to the lack of recent occurrences in the area, grazing, and marginal habitat types, most of these plants are presumed absent or unlikely to occur on the Property (Attachment 2, Table 2). Only one special-status plant has the potential to occur on the Property based on recent occurrences and suitable habitats. This lone plant is Congdon's tarplant (Attachment 1, Figure 6). Congdon's tarplant was not observed on the Property during the November 2010 or January/February 2011 surveys, but may occur. These

surveys were performed outside the blooming period for all other special-status plants identified as having the potential to occur based on our review of the CNDDB.

7.3 Special-Status Wildlife

Special-Status Invertebrates – Based on a recent communication by an Olberding Environmental biologist with a local shrimp expert, the federally threatened vernal pool fairy shrimp is the only crustacean with the potential to occur on the Property (Attachment 1, Figure 7). This species occurs in alkaline pools of varying depth, such as those that occur on the site. This species could occur within the seasonal wetland, seasonal swale, and vernal pool habitats supported by the Property. In addition, the Property lies within USFWS designated critical habitat (VERFS 19C) for vernal pool fairy shrimp (Attachment 1, Figure 8).

Special-Status Amphibians – Suitable habitat occurs on the Property for CTS in the form a seasonal wetland and a vernal pool. Suitable habitat also occurs within areas adjacent to the Property. With few migratory obstacles surrounding the site, it is expected that CTS have the ability to freely migrate onto the Property. Suitable upland habitat is also present on the Property. Based on suitable habitats and recent occurrences in the area, CTS has a high potential to occur on the site. The grassland and vernal pool habitat along the eastern portion of the Property represent suitable conditions to support the western spadefoot toad. As such, this species may occur on the Property (Attachment 1, Figure 7). CRLF are considered unlikely to occur on the Property due to the lack of suitable breeding habitat. The stream corridor and wetland features on the Property lack deep pools and woody riparian cover. However, there is a potential that CRLF could use the creek corridor as a dispersal corridor.

Special-Status Reptiles – While the Property contains marginally suitable habitat for the silvery legless lizard, western pond turtle, San Joaquin whipsnake, and coast horned lizard, none of these species are likely to occur on the site based on the lack of recent occurrences, lack of soil moisture (silvery legless lizard), lack of basking habitat, refugia, and deep pools (western pond turtle), and lack of shrub cover (San Joaquin whipsnake and coast horned lizard.)

Special-Status Raptor Species – Foraging habitat for the Cooper's hawk, sharp-shinned hawk, golden eagle, burrowing owl, red-tailed hawk, red-shouldered hawk, ferruginous hawk, northern harrier, white-tailed kite, prairie falcon, and American kestrel exists throughout the Property in the form of the annual grassland, riparian, and wetland habitats. Prey items such as passerines, squirrels, and other small mammals were observed foraging on the Property throughout the surveys. The white-tailed kite was observed foraging over the western Property boundary throughout the surveys. While nesting habitat for most of these species occurs adjacent to the Property, none was observed during the 2010 and 2011 surveys due to the absence of suitable nest trees and cliffs.

As for the ground nesting raptors, the groundcover throughout the Property is considered to be too low to be suitable nesting habitat for the northern harrier. However, nesting habitat for burrowing owls exists throughout the site in the form of robust ground squirrel burrows (Attachment 1, Figure 7). One adult resident burrowing owl was observed along the northern Property boundary during the November 2010 survey.

Special-Status Bird Species – Foraging habitat for the great egret, great blue heron, and snowy egret exists along the creek and within the seasonal swale, vernal pool, and the seasonal wetland habitats on the Property. Nesting habitat for these species does not occur on or near the Property. Foraging habitat for the loggerhead shrike exists throughout the Property in the form of the annual grassland and wetland habitats. Potential nest sites also exist on and adjacent to the Property in the form of low shrubs like coyote brush.

Special-Status Mammals – Suitable habitat for the American badger and SJKF exists throughout the Property in the form of the annual grassland and creek habitats (Attachment 1, Figure 7). With few migratory barriers surrounding the Property, it is expected that both species have the ability to freely migrate onto the Property. With fossorial soils and a large prey base occurring on the site, foraging and burrowing habitat exists throughout the Property for both of these species.

8.0 RECOMMENDATIONS

- Wetland/Waters Regulatory Permitting - A jurisdictional delineation was conducted by Olberding Environmental in January/February 2011 in accordance with Corps guidelines to determine the extent of Corps jurisdictional wetlands/waters falling within the Property boundaries. Based on this delineation, the Property contains a total of 0.873-acre of jurisdictional features in the form of Altamont Creek, seasonal wetland, a seasonal swale, and a vernal pool. The delineation will be submitted to the Corps for verification purposes. Activities associated with the creek and wetland features will be subject to permits from the Corps, Regional Board, and CDFG. Permit applications should be prepared and submitted along with appropriate compensatory mitigation to off-set wetland/waters impacts.

- Plant Surveys - A CNDDB review concluded that 15 special-status plant species have the potential to occur on the Property. However, subsequent surveys have indicated the lack of optimal conditions for all of these plants with the exception of Congdon's tarplant. Due to the presence of suitable habitat types, soil conditions, and recent occurrences in the vicinity of the Property, the Congdon's tarplant has the potential to occur on the site. The initial survey performed on November 15, 2010 resulted in a negative finding for this plant species. However, the survey was performed at the end of the identified blooming period. In order to provide adequate presence/absence information focused surveys should be performed during the entire blooming period for all plant species identified as having the potential to occur. Surveys should be performed during the blooming periods of these plant species prior to any grading to identify presence or absence on the Property.

- Construction BMP's - Grading and excavation activities could expose soil to increased rates of erosion during project periods. During construction, runoff from the proposed project could adversely affect aquatic life within the creek, wetland, swale, and vernal pool habitats. Surface water runoff could remove particles of fill or excavated soil from the site, or could erode soil down-gradient, if the flow were not controlled. If water is

present within any of these features, deposition of eroded material could increase turbidity, thereby endangering aquatic life. Implementation of appropriate mitigation measures would ensure that impacts to aquatic organisms would be avoided or minimized. Mitigation measures may include best management practices (BMP's) such as hay bales, silt fencing, placement of straw mulch and hydro seeding of exposed soils after construction as identified in the Storm Water Pollution Prevention Plan (SWPPP).

- Nesting Bird Survey - Proposed activities on the Project area may result in vegetation removals that could directly destroy nests, eggs, and immature birds, and would remove future nesting habitat for birds, including sensitive species such as raptors, burrowing owls, and migrating songbirds. If ground disturbance or impacts to on-site shrubs, grassland and wetland habitat occurs during the breeding season (approximately February 1 through August 31), it is recommended that pre-construction breeding bird surveys be conducted by a qualified biologist within 14 days prior to ground disturbance and vegetation removal activities. Surveys should be conducted within suitable nesting habitat on and within 200 feet of the Study Area.

  If the survey does not identify any nesting special-status bird species in the area potentially affected by the proposed activity, no further mitigation is required. If nest sites or young are located, a no-disturbance buffer will be established around the active nest. The biologist will consult with CDFG to determine the size of the no-disturbance buffer, which will be marked off with temporary orange construction fencing. Typically, active non-status passerine nests identified at that time should be protected by a minimum 50-foot radius exclusion zone. Active raptor or special-status species nests should be protected by a minimum 100-foot radius exclusion zone. A qualified biologist will decide the exclusion zone buffer width, which may vary depending on habitat characteristics and species.

  Exclusion zones should remain in place until August 31 or until the young have fledged (typically 3 to 4 weeks). If exclusionary buffers are encroached during the breeding season, work should be immediately halted and a qualified biologist contacted to assess the status of the nest. If the biologist finds that the nest has been abandoned, CDFG and/or USFWS should be contacted.

- Burrowing Owl Survey - The Property and adjacent lands currently provide nesting and foraging habitat for burrowing owls. One adult burrowing owl was observed near an occupied burrow along the northern Property boundary during the November 2010 survey. Due to the presence of burrowing owls CDFG protocol surveys would be required prior to any site disturbance. Pre-construction surveys would also need to be performed in advance of any work to identify nesting raptors and/or migratory bird species.

- Vernal Pool Fairy Shrimp ESA Compliance - The federally threatened vernal pool fairy shrimp has the potential to occur on the Property. This species could occur within the seasonal wetland, seasonal swale, and vernal pool habitats located on the eastern parcel. In addition, the Property lies within USFWS designated critical habitat (VERFS 19C)

(Attachment 1, Figure 8). Surveys for this species should be conducted from December to May (depending on the timing of winter and spring rains) to determine presence or absence on the Property. USFWS protocol surveys would be required to determine absence of these species. If presence/absence surveys are not performed the USFWS will assume presence and require consultation through either Section 7 or Section 10 of the Endangered Species Act. Any Project applicant wishing to develop a site that supports vernal pool fairy shrimp is required to consult with USFWS prior to any construction activities and obtain appropriate permits if "take" of the species is likely to occur. Appropriate mitigation measures to reduce impacts to a less-than-significant level include the permanent preservation of vernal pools capable of supporting viable vernal pool fairy shrimp populations.

- CTS, CRLF and Western Spadefoot Toad ESA Compliance - Habitat occurs on the Property for CTS, CRLF and the western spadefoot toad. Seasonal wetland and vernal pool features where identified on and adjacent to the Property (see Attachment 1, Figure 5) providing potential breeding habitat for the CTS and western spadefoot toad. The site also provides suitable upland habitat for CTS in the form of ground squirrel burrows. The grasslands, wetlands and channel habitat also provide potentially suitable conditions to support CRLF. California red-legged frog could potentially utilize the channel features and wetlands for foraging purposes. CTS and CRLF have been recorded on adjacent properties and are assumed to be present based on the suitability of the habitat to support both species. USFWS protocol surveys would be required to determine absence of these species. If presence/absence surveys are not performed the USFWS will assume presence and require consultation through either Section 7 or Section 10 of the Endangered Species Act. Any Project applicant wishing to develop a site that supports CTS and/or CRLF is required to consult with USFWS and CDFG prior to any construction activities and obtain appropriate permits if "take" of the species is likely to occur. Appropriate mitigation measures to reduce impacts to a less-than-significant level include the permanent preservation of similar habitat capable of supporting CTS and/or CRLF populations.

  Directed pre-construction surveys for CTS, CRLF and the western spadefoot toad are recommended prior to construction activities. Suitable breeding and foraging habitat for both of these species exists within the Property. The abundance of small mammal burrows on the grassland habitat may serve as refuge sites for CTS on the Property.

- San Joaquin Kit Fox ESA Compliance - Based on suitable habitat conditions (grassland and fossorial soils), recent occurrences, and given that the site is in the known historical range of the SJKF, directed surveys for the SJKF are required prior to construction activities. If SJKF are found to be using the Property, mitigation measures would have to be implemented if habitat impacts could not be avoided. The current replacement standard for grassland habitats that support SJKF is 3:1 (three acres of grassland habitat permanently protected for every one acre which is converted to urban land uses).

  In addition, any Project applicant wishing to develop a site which supports SJKF habitat must consult with the CDFG and USFWS prior to any construction activities and obtain

appropriate permits if “take” of the species is likely to occur. Depending on the type of Project proposed, the CDFG or USFWS may also require the Project applicant to implement a number of mitigation measures to reduce, minimize, or avoid Project-related impacts to SJKF and American badger. Such measures may include avoidance of den sites, speed limits on access and Project roads, trapping and relocation programs, on-site pet regulations, restrictions on pesticide use, and any other measures. Pre-construction surveys to determine SJKF use of the Property may be required.

9.0 LITERATURE CITED

Alameda County. 2003. General Plan – Scenic and Conservation Elements. Accessed on October 8, 2010. Available online at http://www.co.alameda.ca.us/ and http://danr.ucop.edu/ihrmp/county/ALAMEDA.pdf.

California Department of Fish and Game Natural Diversity Data Base, computer listings and map locations of historic and current recorded occurrences of special-status species and natural communities of special concern for USGS 7.5 minute quadrangle maps: Altamont, February 2011.

CDFG 2007. California Wildlife Habitat Relationships. http://www.dfg.ca.gov/whdab/index.html

_____. 2011a. State and federally listed Endangered, Threatened, and Rare plants of California. http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/TEPlants.pdf.

_____. 2011b. State and federally listed Endangered and Threatened animals of California. http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/TEAnimals.pdf.

California Native Plant Society (CNPS). 2011. Inventory of Rare and Endangered Plants (on-line edition, v6-04d1). California Native Plant Society. Sacramento, CA. Accessed on January 10, 2011. Available online at http://www.cnps.org/inventory.

Ehrlich, P.R., D.S. Dobkin, and D. Wheye. 1988. The Birder's Handbook: a field guide to the natural history of North American birds. Simon & Schuster, Inc., New York. 785 pp.

Hickman, J. C. (ed.). 1993. The Jepson manual: higher plants of California. University of California Press, Berkeley, CA. 1400 pp.

Holland, R.F. 1986. Preliminary Description of the Natural Communities of California. CDFG.

Mayer, K. E. and Laudenslayer W.F. 1988. A Guide to Wildlife Habitats of California. California

Natural Resources Conservation Service (NRCS), United States Department of Agriculture. Web Soil Survey. Accessed January 10, 2011. Available on-line at http://websoilsurvey.nrcs.usda.gov.

Pierce, Robert J. 1995. Wetland Delineation Lecture Notes. Wetland Training Institute, Inc., Poolesville, MD. WTI 95-2. 200pp.

Sawyer and Keeler-Wolf. 1995. A Manual of California Vegetation. California Native Plant Society.

Skinner, M. W. and B. M. Pavlik (eds.). 1994. Inventory of rare and endangered vascular plants of California. California Native Plant Society Special Publication No. 1 (5th edition). California Native Plant Society, Sacramento, CA. 338 pp.

Sibley, D.A. 2000. The Sibley Guide to Birds. Alfred Knopf, New York.

Sibley, C.G., and B.L. Munroe, Jr. 1990. Distribution and taxonomy of birds of the world. Yale University Press, New Haven and London. 1111 pp.

U.S. Fish and Wildlife Service, Resource Management Group, Inc. 1993. National List of Plant Species that Occur in Wetlands. Region 10-California.

United States Fish and Wildlife Service. 2011a. Endangered and threatened plants and animals. http://ecos.fws.gov/tess_public/pub/stateListingAndOccurrenceIndividual.jsp?state=CA&s8fid=112761032792&s8fid=112762573902&s8fid=24012971022421.

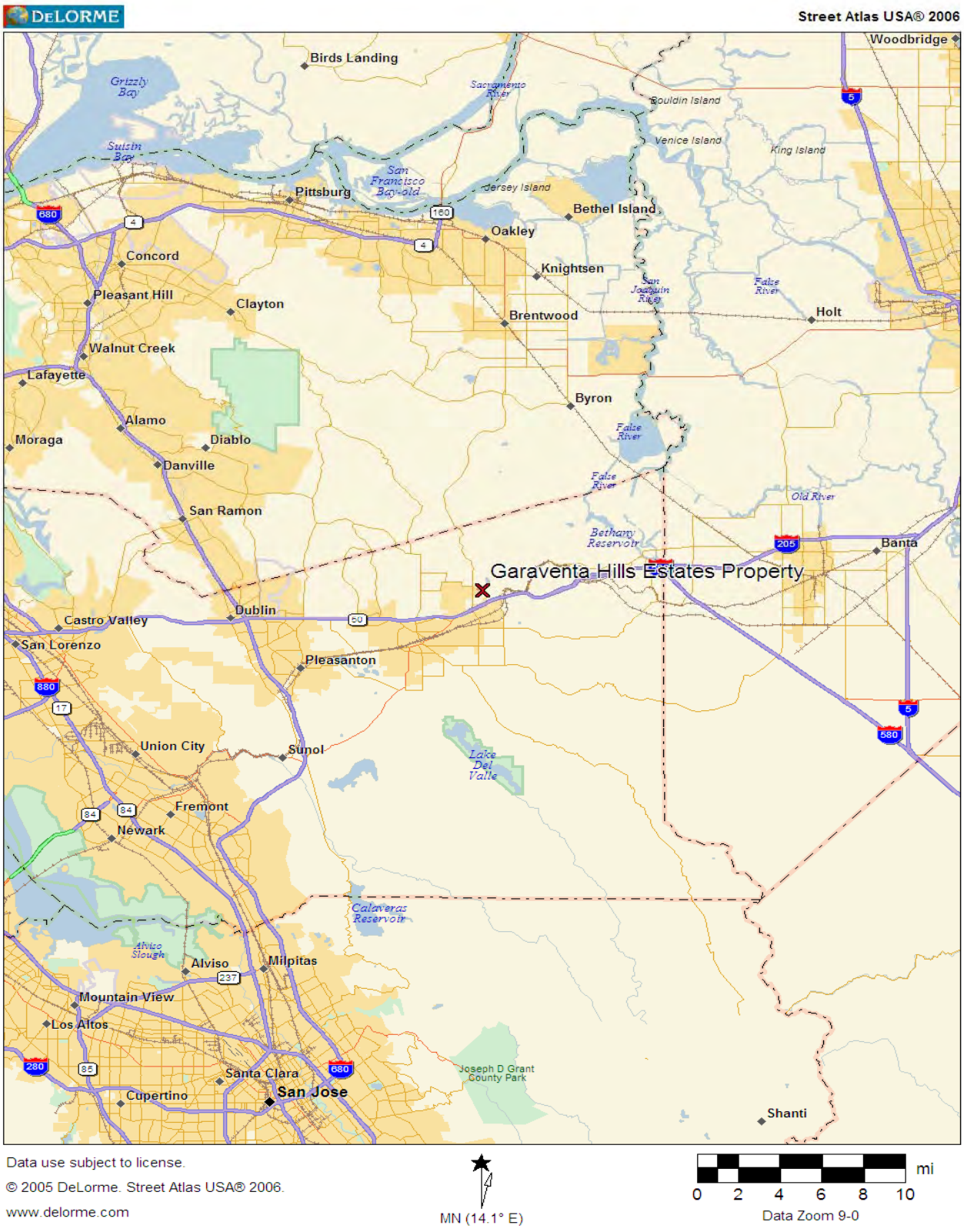
_____. 2011b. Endangered and threatened wildlife and plants; review of plant and animal taxa that are Candidates or Proposed for listing as Endangered or Threatened; annual notice of findings on recycled petitions; annual description of progress on listing actions; proposed rule. Federal Register 64(205): 57534-57547.

ATTACHMENTS

ATTACHMENT 1
FIGURES

Figure 1 **Regional Map**
Figure 2 **Vicinity Map**
Figure 3 **USGS Quadrangle Map for Altamont**
Figure 4 **Aerial Photograph**
Figure 5 **Jurisdictional Waters Map**
Figure 6 **Map of CNDDB Reports of Special-Status Plants**
Figure 7 **Map of CNDDB Reports of Special-Status Wildlife**
Figure 8 **USFWS Designated Critical Habitat Map**
Figure 9 **Soils Map**

Figure 1
Regional Map

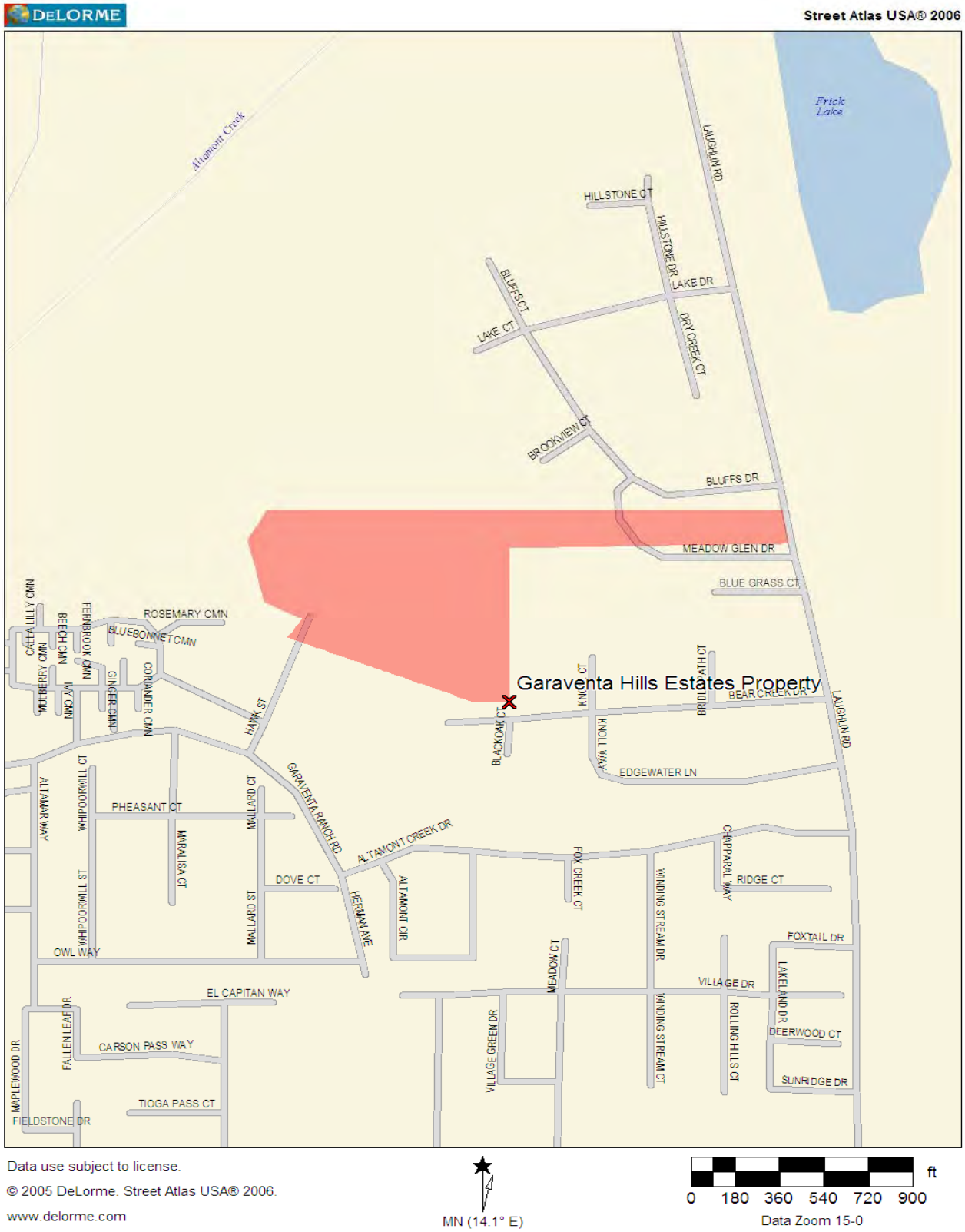


Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583
Phone: (925) 866-2111

This document is not intended for detail design work.

Figure 1
Regional Map of the Garaventa Hills Estates Property
Alameda County, California

Figure 2
Vicinity Map

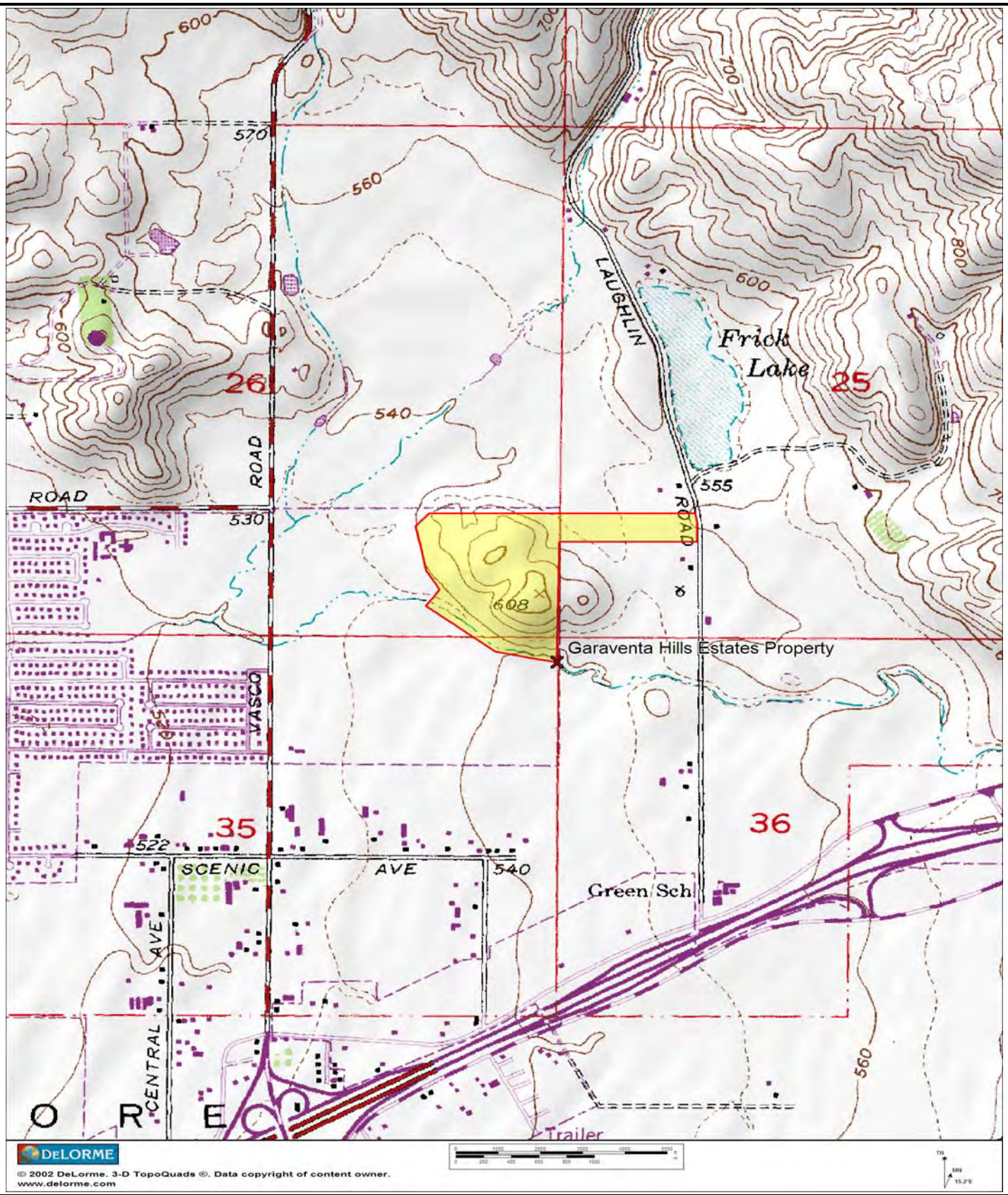


Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583
Phone: (925) 866-2111

This document is not intended for detail design work.

Figure 2
Vicinity Map of the Garaventa Hills Estates Property
Alameda County, California

Figure 3
USGS Quadrangle Map for
Altamont



Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583
Phone: (925) 866-2111

This document is not intended for detail design work.

Figure 3
USGS Quadrangle Map of the Garaventa Hills Estates Property
Altamont Quadrangle
Alameda County, California

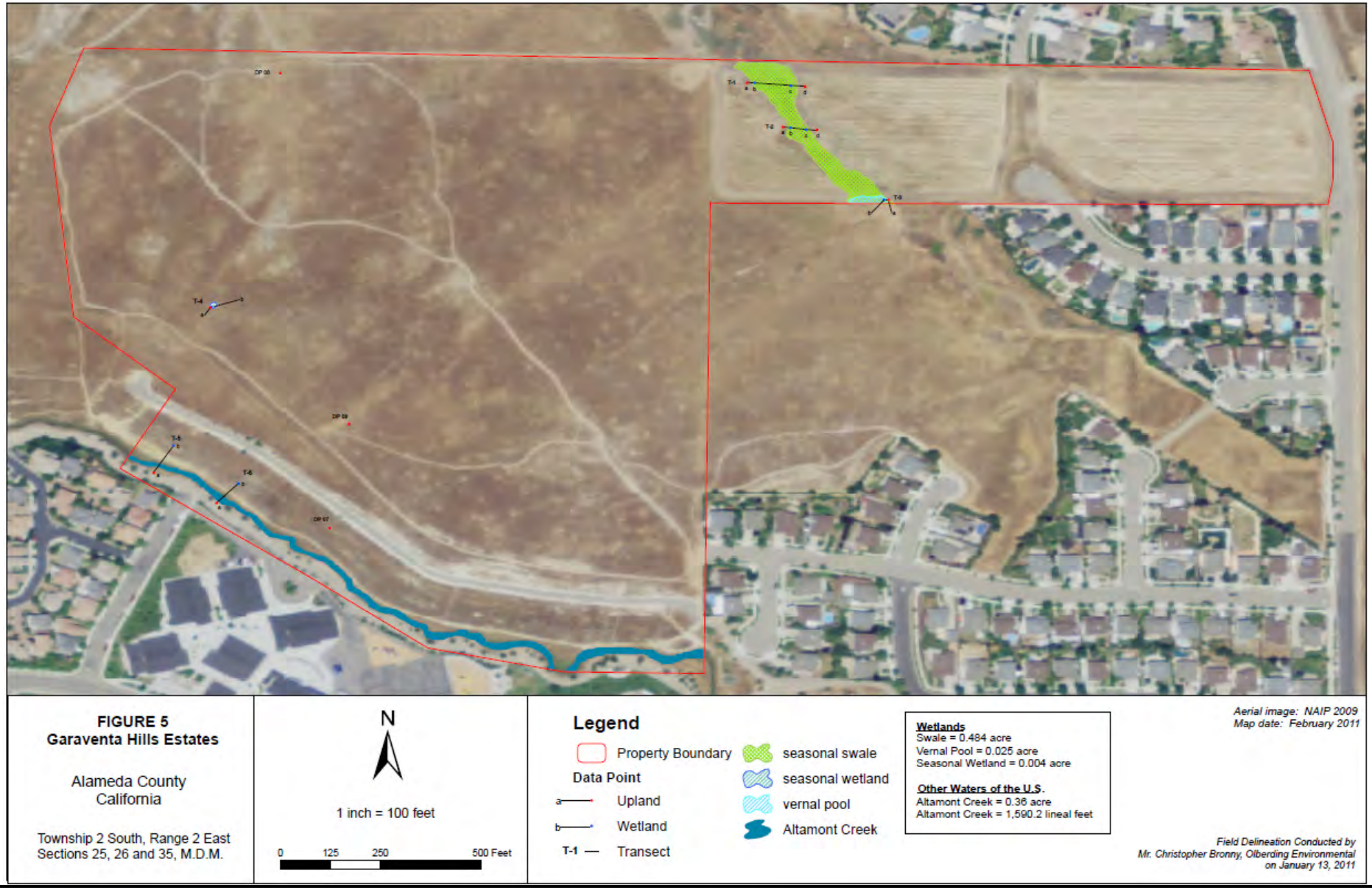
Figure 4
Aerial Photograph

Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583
Phone: (925) 866-2111

This document is not intended for detail design work.

Figure 4
Aerial Photo of the Garaventa Hills Estates Property
Alameda County, California

Figure 5
Jurisdictional Waters Map

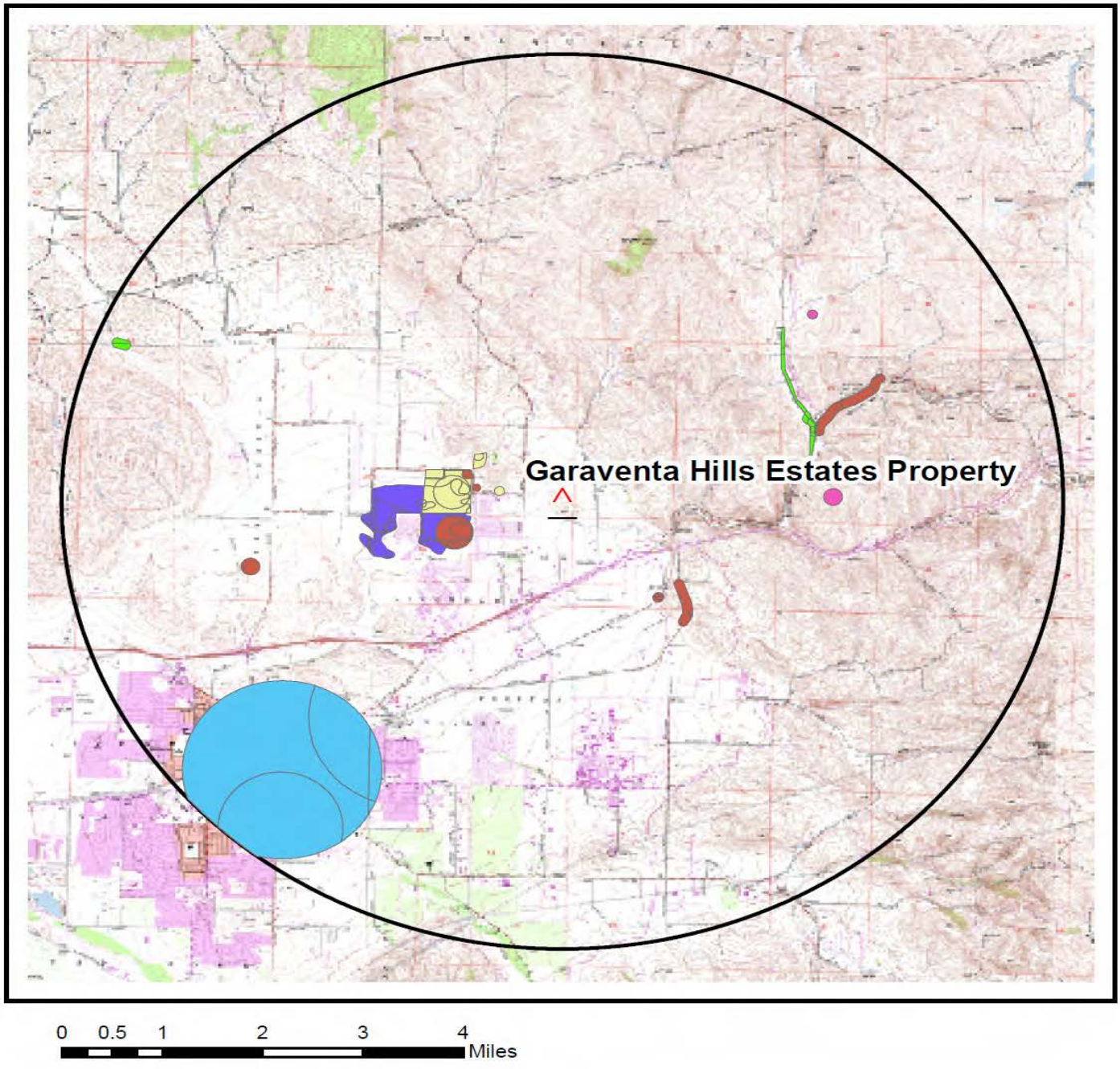


Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583
Phone: (925) 866-2111

This document is not intended for detail design work.

Figure 5
Jurisdictional Waters Map of the Garaventa Hills Estates Property
Alameda County, California

Figure 6
Map of CNDDB Reports of Special-Status Plants

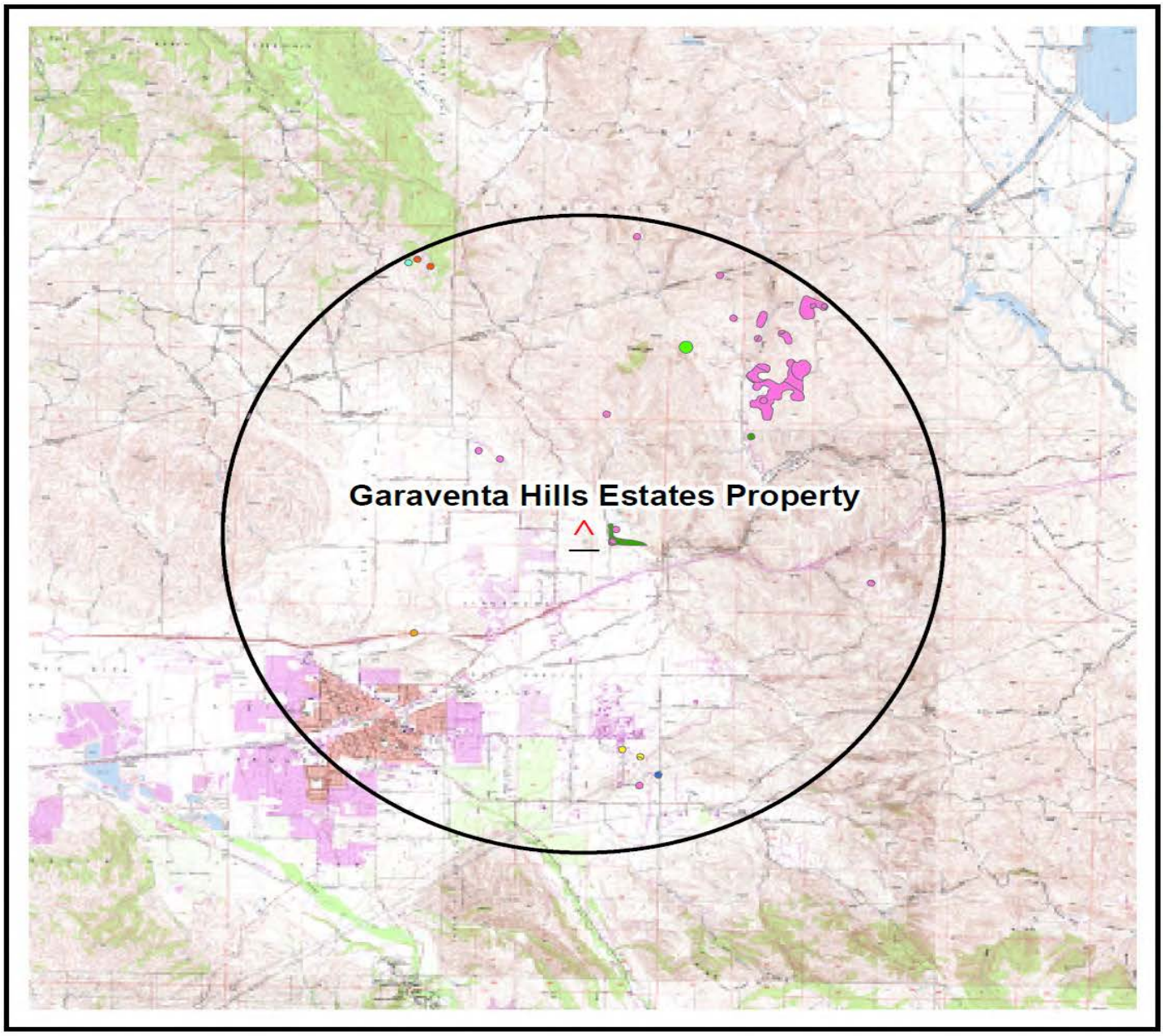


Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583
Phone: (925) 866-2111

This document is not intended for detail design work.

Figure 6
CNDDB Map of Special-Status Plants Near the Garaventa Hills Estates Property Within a 5-Mile Radius and Within the Last 10 Years
Alameda County, California

Figure 7
Map of CNDDB Reports of Special-Status Wildlife

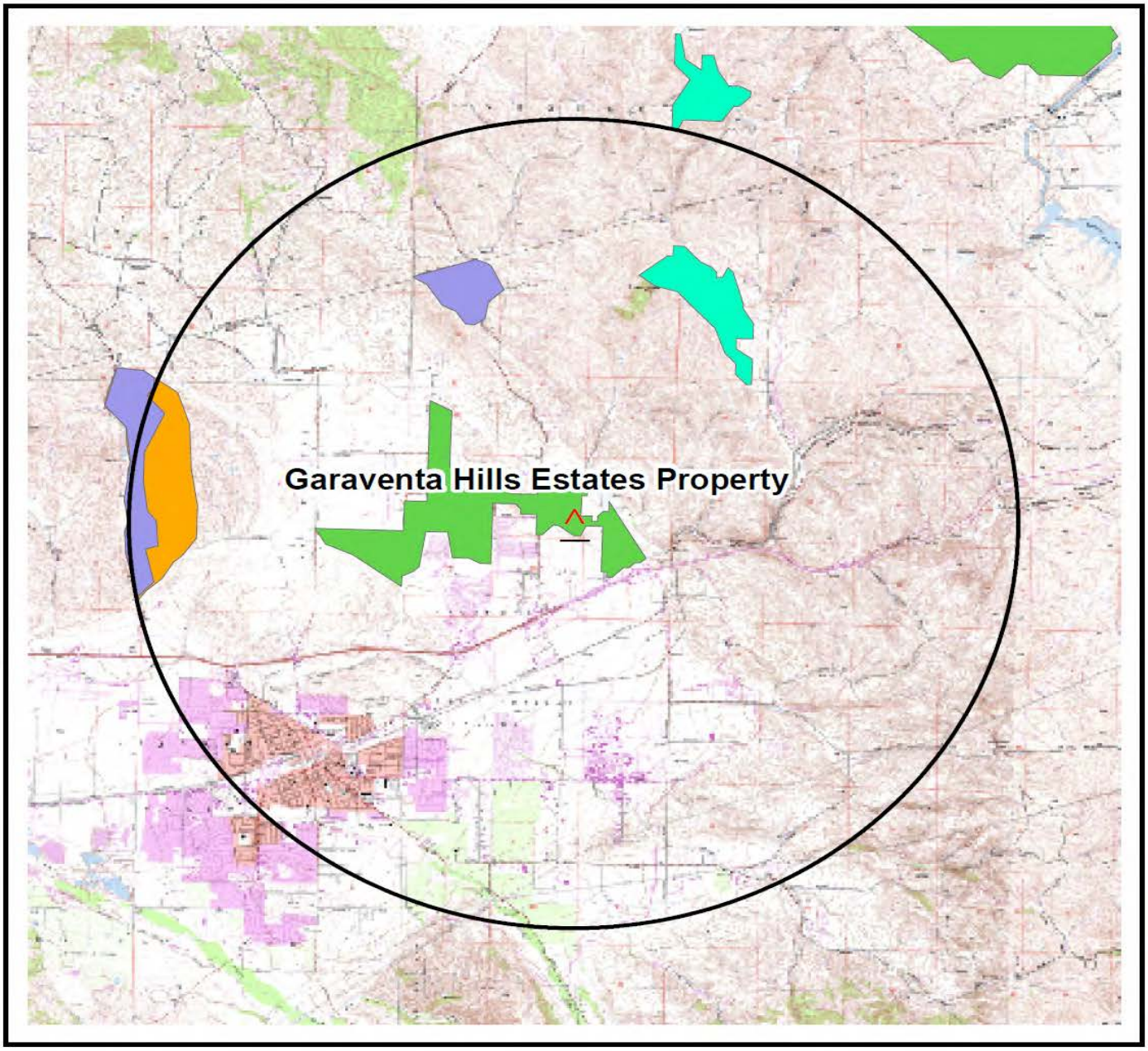


Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583
Phone: (925) 866-2111

This document is not intended for detail design work.

Figure 7
CNDDB Map of Special-Status Wildlife Near the Garaventa Hills Estates Property Within a 5-Mile Radius and Within the Last 10 Years
Alameda County, California

Figure 8
USFWS Designated Critical Habitat Map



Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583
Phone: (925) 866-2111

This document is not intended for detail design work.

Figure 8
USFWS Critical Habitat Map of the Garaventa Hills Estates Property
Alameda County, California

Figure 9
Soils Map

Alameda County, California		
Map Unit Symbol	**Percentage within Property**	**Map Unit Name**
PoC2	59.4 %	Positas gravelly loam, 2 to 20 percent slopes, eroded
Sa	39.8 %	San Ysidro loam
Sf	0.8 %	Solano fine sandy loam

Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583
Phone: (925) 866-2111

This document is not intended for detail design work.

Figure 9
Soils Map of the Garaventa Hills Estates Property
Alameda County, California

ATTACHMENT 2
TABLES

Table 1
Plant and Wildlife Species Observed Within/Adjacent to the Survey Area

Table 1
Plant and Wildlife Species Observed Within/Adjacent to the Survey Area

Scientific Name	Common Name
Plant Species Observed	
Amsinckia sp.	Fiddleneck
Asclepias fascicularis	Narrow-leaved milkweed
Atriplex argentea	Silverscale saltbush
*Avena fatua**	Wild oat
Baccharis pilularis	Coyote brush
*Bellardia trixago**	Mediterranean lineseed
*Brassica nigra**	Black mustard
*Bromus diandrus**	Ripgut brome
*Bromus hordeaceous**	Soft chess
Calandrinia ciliata	Red maids
Callitriche marginata	Water starwort
*Carduus pychnocephalus**	Italian thistle
*Centaurea solstitialis**	Yellow star-thistle
Centromadia sp. (likely *C. pungens*)	Common tarweed
Chlorogalum sp. (likely *C. pomeridianum*)	Soap plant
*Cirsium vulgare**	Bull thistle
*Cortaderia selloana**	Pampas grass
Croton setigerus	Dove weed
Cyperus eragrostis	Tall flatsedge
Deschampsia danthonioides	Annual hair grass
Distichlis spicata	Salt grass
*Dittrichia graveolens**	Stinkweed
Epilobium brachycarpum	Annual fireweed
Epilobium ciliatum	Willow-herb
*Erodium cicutarium**	Red-stemmed filaree
Eschscholzia sp.	California poppy
Frankenia salina	Alkali heath
*Geranium molle**	Dove geranium
Holocarpha virgata	Pitgland tarweed
Hordeum marinum ssp. *gussoneanum**	Mediterranean barley
Hordeum murinum ssp. *leporinum**	Hare barley
*Hypochaeris glabra**	Smooth cat's-ear
Juncus balticus	Baltic rush
Juncus xiphioides	Iris-leaved rush
*Lactuca serriola**	Prickly lettuce
Lepidium nitidum	Little pepper weed
Leymus triticoides	Creeping wild rye
*Lolium multiflorum**	Italian rye grass
*Lotus corniculatus**	Bird's-foot trefoil
*Melilotus albus**	White sweet clover

Table 1 Plant and Wildlife Species Observed Within/Adjacent to the Survey Area	
Scientific Name	**Common Name**
*Melilotus indicus**	Sour clover
Nasella sp. (likely *N. pulchra*)	Needlegrass
*Picris echioides**	Bristly ox-tongue
Plagiobothrys sp.	Popcornflower
*Plantago lanceolata**	English plantain
*Polypogon monspelinensis**	Rabbit's foot grass
Populus fremontii	Fremont's cottonwood
Quercus agrifolia	Coast live oak (southern rec. path)
Quercus lobata	Valley oak (southern rec. path)
*Rumex conglomeratus**	Clustered dock
*Rumex crispus**	Curly dock
*Rumex pulcher**	Fiddle dock
Schoenoplectus californicus	California tule
*Senecio vulgaris**	Common groundsel
Setaria sp.	Foxtail
*Silybum marianum**	Milk thistle
Stachys sp.	Hedge-nettle
*Tragopogon porrifolius**	Salsify
Trichostema lanceolatum	Vinegarweed
*Trifolium hirtum**	Rose clover
Trifolium sp.	Clover
Typha angustifolia	Narrow-leaved cattail
Vicia sativa ssp. *sativa**	Common vetch
*denotes non-native species	
Animal Species Observed	
Birds	
Aphelocoma californica	Western scrub-jay
*Athene cunicularia**	Burrowing owl
Cathartes aura	Turkey vulture
Charadrius vociferous	Killdeer
Corvus brachyrhynchos	American crow
*Elanus leucurus**	White-tailed kite (foraging)
Sayornis nigricans	Black phoebe
Sturnella neglecta	Western meadowlark
Zenaida macroura	Mourning dove
Passerculus sandwichensis	Savannah sparrow
Larus sp.	Gull (transient)
Mammals	
Lepus californicus	Black-tailed jackrabbit
Microtus californicus	California vole

Table 1
Plant and Wildlife Species Observed Within/Adjacent to the Survey Area

Scientific Name	Common Name
Spermophilus beecheyi	California ground squirrel
Thomomys bottae	Botta's pocket gopher
Amphibians	
Pseudacris regilla	Pacific tree frog

*denotes protected raptor species

Olberding Environmental, Inc. 2011

Table 2
Special-Status Species Occurring Within the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 Minute Quadrangle Maps

Table 2
Special-Status Species for the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 Minute Quadrangle Maps[1]

Common Name/ Scientific Name	Status (Fed/State/ CNPS)[2]	Blooming or Survey Period	Habitats of Occurrence	Potential on Site	Status on Site**
PLANTS					
Sharsmith's Onion (*Allium sharsmithiae*)	-/-/1B.3	March – May	Cismontane woodland, chaparral; rocky, serpentine slopes.	No	Presumed Absent
Large-Flowered Fiddleneck (*Amsinckia grandiflora*)	E/E/1B.1	April – May	Cismontane woodland, valley and foothill grassland, annual grassland in various soils.	Low	Possibly Extirpated
Bent-Flowered Fiddleneck (*Amsinckia lunaris*)	-/-/1B.2	March – June	Cismontane woodland, valley and foothill grassland, and coastal bluff scrub.	Low	Possibly Extirpated
Slender Silver Moss (*Anomobryum julaceum*)	-/-/2.2	N/A	Broadleafed upland forest; lower montane coniferous forest; North Coast coniferous forest/damp rock and soil on outcrops, usually on roadcuts.	No	Presumed Absent
Mount Diablo Manzanita (*Arctostaphylos auriculata*)	-/-/1B.3	January – March	Chaparral, in canyons and on slopes, on sandstone.	No	Presumed Absent
Contra Costa Manzanita (*Arctostaphylos manzanita* ssp. *laevigata*)	-/-/1B.2	January – February	Chaparral, rocky slopes.	No	Presumed Absent
Alkali Milk-Vetch (*Astragalus tener* var. *tener*)	-/-/1B.2	March – June	Playas, valley and foothill grasslands in adobe clay soils, and vernal pools in alkaline soils.	Low	Possibly Extirpated
Heartscale (*Atriplex cordulata*)	-/-/1B.2	April – October	Chenopod scrub, valley and foothill grassland on alkaline flats and scalds, sandy soils.	Low	Presumed Absent
Brittlescale (*Atriplex depressa*)	-/-/1B.2	May – October	Chenopod scrub, meadows and sinks, playas, valley and foothill grasslands, and alkaline vernal pools with clay substrate.	Moderate	Presumed Absent
San Joaquin Spearscale (*Atriplex joaquiniana*)	-/-/1B.2	April – October	Chenopod scrub, meadows and seeps, playas, valley and foothill grassland in alkaline soils.	Moderate	Presumed Absent
Big-Scale Balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*)	-/-/1B.2	March – June	Chaparral, cismontane woodland, and valley and foothills grasslands, sometimes in serpentinite outcrops.	No	Presumed Absent

Table 2
Special-Status Species for the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 Minute Quadrangle Maps[1]

Common Name/ Scientific Name	Status (Fed/State/ CNPS)[2]	Blooming or Survey Period	Habitats of Occurrence	Potential on Site	Status on Site**
Big Tarplant (*Blepharizonia plumosa*)	-/-/1B.1	July – October	Valley and foothill grassland, dry hills and plains in annual grassland, clay to clay-loam soils; usually on slopes and often in burned areas.	No	Presumed Absent
Round-Leaved Filaree (*California macrophylla*)	-/-/1B.1	March – May	Cismontane woodland and valley and foothill grassland in clay soils.	No	Presumed Absent
Mount Diablo Fairy-Lantern (*Calochortus pulchellus*)	-/-/1B.2	April – June	Chaparral, cismontane woodland, riparian woodland, and valley and foothill grassland; on wooded and brushy slopes.	No	Presumed Absent
Chaparral Harebell (*Campanula exigua*)	-/-/1B.2	May – June	Chaparral, in rocky, usually serpentine soils.	No	Presumed Absent
Lemmon's Jewelflower (*Caulanthus lemmonii*)	-/-/1B.2	March – May	Pinyon and juniper woodland and valley and foothill grassland.	No	Presumed Absent
Congdon's Tarplant (*Centromadia parryi* ssp. *congdonii*)	-/-/1B.2	June – November	Valley and foothill grasslands in alkaline soils.	High	May Occur
Mount Hamilton Fountain Thistle (*Cirsium fontinale* var. *campylon*)	-/-/1B.2	(February) April – October Months in parentheses are uncommon	Cismontane woodland, chaparral, valley and foothill grassland; in seasonal and perennial drainages on serpentine seeps.	No	Presumed Absent
Santa Clara Red Ribbons (*Clarkia concinna* ssp. a*utomixa*)	-/-/4.3	May – June	Cismontane woodland, chaparral, on slopes and near drainages.	No	Presumed Absent
Hispid Bird's-Beak (*Cordylanthus mollis* ssp. *hispidus*)	-/-/1B.1	June – September	Meadows and seeps, playas, valley and foothill grasslands in alkaline soils.	Low	Not Likely to Occur
Palmate-Bracted Bird's-Beak (*Cordylanthus palmatus*)	E/E/1B.1	May – October	Chenopod scrub, valley and foothill grassland; usually on Pescadero silty clay which is alkaline, with *Distichlis*, *Frankenia*, etc.	Low	Presumed Absent
Livermore Tarplant (*Deinandra bacigalupii*)	-/-/1B.2	June – October	Alkaline meadows and seeps.	Low	Presumed Absent

Table 2
Special-Status Species for the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 Minute Quadrangle Maps[1]

Common Name/ Scientific Name	Status (Fed/State/ CNPS)[2]	Blooming or Survey Period	Habitats of Occurrence	Potential on Site	Status on Site**
Hospital Canyon Larkspur (*Delphinium californicum* ssp. *interius*)	-/-/1B.2	April – June	Cismontane woodland, chaparral; in wet, boggy meadows, openings in chaparral and in canyons, mesic.	No	Presumed Absent
Recurved Larkspur (*Delphinium recurvatum*)	-/-/1B.2	March – May	Chenopod scrub, cismontane woodland, and valley and foothill grasslands in alkaline soils.	Low	Presumed Absent
Diamond-Petaled California Poppy (*Eschscholzia rhombipetala*)	-/-/1B.1	March – April	Valley and foothill grassland, alkaline, clay slopes and flats.	Low	Presumed Absent
Stinkbells (*Fritillaria agrestis*)	-/-/4.2	February – April	Cismontane woodland, chaparral, valley and foothill grassland; sometimes on serpentine, mostly found on non-native grassland or in grassy openings in clay soil.	No	Presumed Absent
Talus Fritillary (*Fritillaria falcata*)	-/-/1B.2	March – May	Chaparral, cismontane woodland, lower montane coniferous forest; on shale, granite, or serpentine talus.	No	Presumed Absent
Diablo Helianthella (*Helianthella castanea*)	-/-/1B.2	March – June	Broadleafed upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland. Usually in chaparral/oak woodland interface in rocky, azonal soils, often in partial shade.	No	Presumed Absent
Brewer's Western Flax (*Hesperolinon breweri*)	-/-/1B.2	May – July	Chaparral, cismontane woodland, valley and foothill grassland. Often in rocky serpentine soils.	No	Presumed Absent
Napa Western Flax (*Hesperolinon serpentinum*)	-/-/1B.1	May – July	Chaparral in serpentine soils.	No	Presumed Absent
Woolly Rose-Mallow (*Hibiscus lasiocarpus*)	-/-/2.2	June – September	Freshwater marshes and swamps; moist, freshwater-soaked river banks and low peat islands in sloughs; in California, known from the Delta watershed.	No	Presumed Absent
Loma Prieta Hoita (*Hoita strobilina*)	-/-/1B.1	May – October	Chaparral, cismontane woodland, riparian woodland, usually in mesic, serpentine soils.	No	Presumed Absent

Table 2
Special-Status Species for the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 Minute Quadrangle Maps[1]

Common Name/ Scientific Name	Status (Fed/State/ CNPS)[2]	Blooming or Survey Period	Habitats of Occurrence	Potential on Site	Status on Site**
Legenere (*Legenere limosa*)	-/-/1B.1	April – June	Vernal pools.	Low	Presumed Absent
Mount Hamilton Coreopsis (*Leptosyne hamiltonii*)	-/-/1B.2	March – May	Cismontane woodland, on steep shale talus with open southwestern exposure.	No	Presumed Absent
Mason's Lilaeopsis (*Lilaeopsis masonii*)	-/R/1B.1	April – November	Brackish or freshwater marshes and swamps.	No	Presumed Absent
Delta Mudwort (*Limosella subulata*)	-/-/2.1	May – August	Riparian scrub, freshwater marsh, brackish marsh, swamps; usually on mud banks of the Delta in marshy or scrubby riparian associations, often with *Lilaeopsis masonii*. Probably the rarest of the suite of Delta rare plants.	No	Presumed Absent
Showy Golden Madia (*Madia radiata*)	-/-/1B.1	March – May	Valley and foothill grassland, cismontane woodland, chenopod scrub, mostly on adobe clay in grassland or among shrubs.	No	Presumed Absent
Hairless Popcorn-Flower (*Plagiobothrys glaber*)	-/-/1A	March – May	Meadows and seeps, marshes and swamps, coastal salt marshes and alkaline meadows.	No	Considered Extinct
Rayless or Chaparral Ragwort (*Senecio aphanactis*)	-/-/2.2	January – April	Cismontane woodland, coastal scrub, drying alkaline flats, chaparral.	No	Presumed Absent
Most Beautiful Jewel-Flower (*Streptanthus albidus* ssp. *peramoenus*)	-/-/1B.2	April – June	Chaparral, cismontane woodland, and valley and foothill grasslands in serpentine soils on ridges and slopes.	No	Presumed Absent
Saline Clover (*Trifolium hydrophilum*)	-/-/1B.2	April – June	Marshes and swamps, valley and foothill grasslands with mesic, alkaline soils, and vernal pools.	Moderate	Presumed Absent
Caper-Fruited Tropidocarpum (*Tropidocarpum capparideum*)	-/-/1B.1	March – April	Valley and foothill grasslands on alkaline hills.	Low	Possibly Extirpated
Oval-Leaved Viburnum (*Viburnum ellipticum*)	-/-/2.3	May – June	Chaparral, cismontane woodlands, and lower montane coniferous forest.	No	Presumed Absent

Table 2
Special-Status Species for the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 Minute Quadrangle Maps[1]

Common Name/ Scientific Name	Status (Fed/State/ CNPS)[2]	Blooming or Survey Period	Habitats of Occurrence	Potential on Site	Status on Site**
INVERTEBRATES					
Longhorn Fairy Shrimp (*Branchinecta longiantenna*)	E/-/-	Resident	Endemic to the eastern margin of the central coast mountains in seasonally astatic grassland vernal pools; inhabit small, clear-water depressions in sandstone and clear-to-turbid clay/grass-bottomed pools in shallow swales.	Low	Presumed Absent
Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)	T/-/-	December – May (dependent on the timing of winter and spring rains)	Endemic to central valley vernal pools and swales.	Moderate	May Occur
Midvalley Fairy Shrimp (*Branchinecta mesovallensis*)	SOC/-/-	Once every two weeks within two weeks of pool inundation, continuing until pool has been inundated for 120 continuous days.	Central Valley vernal pools.	Low	Not Likely to Occur
Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)	T/-/-	Resident	Found in association with blue elderberry (*Sambucus mexicana*) only in the riparian forests of the Central Valley of California from Shasta County to Kern County.	No	Presumed Absent
Curved-Foot Hygrotus Diving Beetle (*Hygrotus curvipes*)	-/-/SC	Resident	Aquatic; known only from Alameda and Contra Costa Counties.	Low	Not Likely to Occur
California Linderiella (*Linderiella occidentalis*)	SOC/-/-	December – May (dependent on the timing of winter and spring rains)	Seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions. Water in the pools has very low alkalinity and conductivity.	Low	Not Likely to Occur

Table 2
Special-Status Species for the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 Minute Quadrangle Maps[1]

Common Name/ Scientific Name	Status (Fed/State/ CNPS)[2]	Blooming or Survey Period	Habitats of Occurrence	Potential on Site	Status on Site**
FISH					
Delta Smelt (*Hypomesus transpacificus*)	T/E/-	Year-round Resident	Sacramento/San Joaquin Delta and seasonally in Suisun Bay, Carquinez Straight and San Pablo Bay. Seldom at salinities greater than 10 ppt.	No	Presumed Absent
Steelhead Central California Coast DPS (*Oncorhynchus mykiss irideus*)	T/-/SC	Spawning in spring (December to April). Fry emerge from gravel spawning beds 5 to 7 weeks later.	From Russian River, south to Soquel Creek and to, but not including Pajaro River, also San Francisco and San Pablo Bay basins. Spawning occurs in cool streams with low turbidity, and suitable sites for egg deposition.	No	Presumed Absent
AMPHIBIANS					
California Tiger Salamander (*Ambystoma californiense*)	T/T/-	Aquatic Surveys - Once each in March, April, and May with at least 10 days between surveys. Upland Surveys - 20 nights of surveying under proper conditions beginning October 15 and ending March 15.	Vernal pools, swales and depressions for breeding, needs underground refugia.	High	May Occur
Foothill Yellow-Legged Frog (*Rana boylii*)	SOC/-/SC	Year-round resident	Partially-shaded, shallow streams and riffles with a rocky substrate in a variety of habitats. Need cobble for egg-laying.	No	Presumed Absent
California Red-Legged Frog (*Rana draytonii*)	T/-/SC	May 1 – November 1	Lowlands and foothills in or near permanent deep water with dense, shrubby or emergent riparian habitat. Requires 11-20 weeks of permanent water for breeding and larval development. Must have access to aestivation habitat.	Low	May Occur

Table 2
Special-Status Species for the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 Minute Quadrangle Maps[1]

Common Name/ Scientific Name	Status (Fed/State/ CNPS)[2]	Blooming or Survey Period	Habitats of Occurrence	Potential on Site	Status on Site**
Western Spadefoot Toad (*Spea hammondii*)	-/-/SC	November – February (Adults) March 15 – May 15 (Larvae)	Found primarily in grasslands, but also in valley-foothill hardwood woodlands. Breeding and egg-laying occur exclusively in vernal pools.	Moderate	May Occur
REPTILES					
Silvery Legless Lizard (*Anniella pulchra pulchra*)	-/-/SC	Summer and early fall.	Sandy or loose loamy soils under sparse vegetation; soil moisture is essential; they prefer soils with a high moisture content.	Low	Not Likely to Occur
Western Pond Turtle (*Emys marmorata*)	-/-/SC	March – October	Aquatic turtle needs permanent water in ponds, streams, irrigation ditches. Nests on sandy banks or grassy fields.	Low	Not Likely to Occur
San Joaquin Whipsnake (*Masticophis flagellum ruddocki*)	-/-/SC	Year-round Resident	Open, dry habitats with little or no tree cover; found in valley grassland and saltbush scrub in the San Joaquin Valley; needs mammal burrows for refuge and oviposition sites.	Low	Not Likely to Occur
Alameda Whipsnake (*Masticophis lateralis euryxanthus*)	T/T/-	Year-round resident	Valley-foothill hardwood habitat of the coast ranges between Monterey and north San Francisco Bay areas. Inhabits south-facing slopes and ravines where shrubs form a vegetative mosaic with oak trees and grasses.	No	Presumed Absent
Coast Horned Lizard (*Phrynosoma blainvillii*)	-/-/SC	Year-round resident	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes; requires open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	Low	Not Likely to Occur
BIRDS					
Cooper's Hawk (*Accipiter cooperii*)	-/CP/-	February – August	Oak woodlands, coniferous forests, riparian corridors. Often hunts on edges between habitats.	Foraging Only	May Occur

Table 2
Special-Status Species for the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 Minute Quadrangle Maps[1]

Common Name/ Scientific Name	Status (Fed/State/ CNPS)[2]	Blooming or Survey Period	Habitats of Occurrence	Potential on Site	Status on Site**
Sharp-Shinned Hawk (*Accipiter striatus*)	-/CP/-	February – August	Oak woodlands, coniferous forests, riparian corridors. Often hunts on edges between habitats. (Nesting) Ponderosa pine, black oak, riparian deciduous, mixed conifer, and Jeffrey pine habitats. Prefers riparian areas. North-facing slopes with plucking perches are critical requirements. Nests usually within 275 feet of water.	Foraging Only	Not Likely to Occur
Tricolored Blackbird (*Agelaius tricolor*)	SOC/-/SC	February – August	Nesting within seasonal wetland marshes, blackberry brambles or other protected substrates. Forages in annual grassland and wetland habitats.	Low	Not Likely to Occur
Golden Eagle (*Aquila chrysaetos*)	-/CP/SC	February – August	Nests in cliff-walled canyons and tall trees in open areas. (Nesting and wintering) Rolling foothills mountain areas, sage-juniper flats, and desert.	Foraging Only	May Occur
Great Egret (*Ardea alba*) ROOKERIES	-/-/-	February – August	(Rookery) Colonial nester in large trees; rookery sites located near marshes, tide-flats, irrigated pastures, and margins of rivers and lakes.	Foraging Only	May Occur
Great Blue Heron (*Ardea herodias*) ROOKERIES	-/-/-	February – August	(Rookery) Nests in tall trees in close proximity to foraging areas such as marshes and streams.	Foraging Only	May Occur
Burrowing Owl (*Athene cunicularia*)	SOC/-/SC	February – August	Dry open annual or perennial grassland, desert and scrubland. Uses abandoned mammal burrows for nesting.	High	**Present**
Red-Tailed Hawk (*Buteo jamaicensis*)	-/CP/-	February – August	Various grassland habitats, urban land, oak woodlands with grassland for foraging.	Foraging Only	May Occur
Red-Shouldered Hawk (*Buteo lineatus*)	-/CP/-	February – August	Forages in variety of semi-developed habitats including orchards. Forages in woodlands and riparian areas. Nests in riparian habitat but also eucalyptus groves.	Foraging Only	May Occur

Table 2
Special-Status Species for the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 Minute Quadrangle Maps[1]

Common Name/ Scientific Name	Status (Fed/State/ CNPS)[2]	Blooming or Survey Period	Habitats of Occurrence	Potential on Site	Status on Site**
Ferruginous Hawk (*Buteo regalis*)	-/CP/-	Late Fall – Winter	Open country such as semiarid grasslands with few trees, rocky outcrops, and open valleys. Also along streams or in agricultural areas during migration.	Foraging Only	May Occur
Swainson's Hawk (*Buteo swainsoni*)	-/T/-	February – October	Nests in riparian areas and in oak savannah near foraging areas. Forages in alfalfa and grain fields with rodent populations.	Foraging Only	May Occur
Northern Harrier (*Circus cyaneus*)	-/-/SC	February – August	Nests in grasslands and marshlands, ground nesting bird. (Nesting) Coastal salt and freshwater marsh. Nest and forage in grasslands, from salt grass in desert sink to mountain cienagas. Nests on ground in shrubby vegetation, usually at marsh edge; nest built of a large mound of sticks in wet areas.	Foraging Only	Not Likely to Occur
Snowy Egret (*Egretta thula*) ROOKERIES	-/-/-	February – August	(Rookery) Colonial nester, with nest sites situated in protected beds of dense tules. Rookery sites situated close to foraging areas: marshes, tidal-flats, streams, wet meadows, and borders of lakes.	Foraging Only	May Occur
White-Tailed Kite (*Elanus leucurus*)	SOC/CP/FP	February – August	Various grassland habitats, urban land, oak woodlands with grassland for foraging.	Foraging Only	**Present**
California Horned Lark (*Eremophila alpestris actia*)	-/-/SC	February – August	Short-grass prairie, bald hills, mountain meadows, open coastal plains, fallow grain fields, and alkali flats. Prefer open terrain where they construct nests on the ground, often in sparsely vegetated areas.	Moderate	Not Likely to Occur
Prairie Falcon (*Falco mexicanus*)	-/CP/SC	February – August	Nests on cliffs in dry open terrain. Forages in marshlands and ocean shores.	Foraging Only	May Occur
American Peregrine Falcon (*Falco peregrinus anatum*)	D/E/FP	February – August	Nests near wetlands, lakes, rivers, or other water. On cliffs, banks, dunes, mounds, and human-made structures.	Foraging Only	Not Likely to Occur

Table 2
Special-Status Species for the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 Minute Quadrangle Maps[1]

Common Name/ Scientific Name	Status (Fed/State/ CNPS)[2]	Blooming or Survey Period	Habitats of Occurrence	Potential on Site	Status on Site**
American Kestrel (*Falco sparverius*)	-/CP/-	February – August	Various grassland habitats, urban land, oak woodlands with grassland for foraging.	High	May Occur
Bald Eagle (*Haliaeetus leucocephalus*)	D /E/-	February – August	Ocean shore, lake margins, and rivers for both nesting and wintering. Most nests within one mile of water. Nests in large, old-growth, or dominant live tree with open branches, especially ponderosa pine. Roosts communally in winter.	No	Presumed Absent
Loggerhead Shrike (*Lanius ludovicianus*)	SOC/-/SC	February – August	Open grassland habitats, grazed grasslands. Uses shrubs for nesting.	High	May Occur
MAMMALS					
Pallid Bat (*Antrozous pallidus*)	-/-/SC	N/A	Forages in grasslands, shrublands, deserts, forests, and woodlands. Most common in open, dry habitats. Roosts in rock crevices, caves, tree hollows, and buildings. Roosts must protect bats from high temperatures; very sensitive to disturbance of roosting sites.	Low	Not Likely to Occur
Townsend's Big-Eared Bat (*Corynorhinus townsendii*)	-/-/SC	Resident	Throughout California in a wide variety of habitats; roosts in the open, hanging from walls and ceilings. Needs sites free from human disturbance. Most common in mesic sites.	Low	Not Likely to Occur
Berkeley Kangaroo Rat (*Dipodomys heermanni berkeleyensis*)	-/-/-	Resident	Open grassy hilltops and open spaces in chaparral and blue oak/digger pine woodlands; needs fine, deep, well-drained soil for burrowing.	No	Presumed Absent
Hoary Bat (*Lasiurus cinereus*)	-/-/-	Resident	Prefers open habitats or habitat mosaics with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees near water. Feeds mainly on moths.	Low	Presumed Absent

Table 2
Special-Status Species for the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 Minute Quadrangle Maps[1]

Common Name/ Scientific Name	Status (Fed/State/ CNPS)[2]	Blooming or Survey Period	Habitats of Occurrence	Potential on Site	Status on Site**
San Francisco Dusky-Footed Woodrat (*Neotoma fuscipes annectens*)	-/-/SC	Resident	Forest habitats of moderate canopy and moderate to dense understory, may prefer chaparral and redwood habitats. Nests constructed of grass, leaves, sticks, feathers, etc. Population may be limited by availability of nest materials.	No	Presumed Absent
San Joaquin Pocket Mouse (*Perognathus inornatus inornatus*)	SOC/-/-	Resident	Grasslands within blue oak savanna with friable soil.	No	Presumed Absent
American Badger (*Taxidea taxus*)	-/-/SC	Resident	Shrub, forest, and herbaceous habitats with friable soils to dig burrows. Need open, uncultivated ground. Prey on fossorial mammals.	Moderate	May Occur
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	E/T/-	Resident	Annual grasslands or grassy stages with scattered shrubby vegetation. Needs loose soils for burrowing.	Low	May Occur

1. Special-status plants and animals as reported by the California Natural Diversity Data Base, California Native Plant Society, and other background research February 2011.
2. Order of Codes for Plants - Fed/State/CNPS
   Order of Codes for Animals - Fed/State/CDFG
   Codes:
   SOC - Federal Species of Concern
   SC - California Species of Special Concern
   E - Federally/State Listed as an Endangered Species
   T - Federally/State Listed as a Threatened Species
   C - Species listed as a Candidate for Federal Threatened or Endangered Status
   R - Rare
   D - Delisted
   CP- California protected
   FP - State Fully Protected
   DFG: SC California Special Concern species
   1B - California Native Plant Society considers the plant Rare, Threatened, or Endangered in California and elsewhere.
   1A - CNPS Plants presumed extinct in California.
   2 - CNPS Plants Rare, Threatened or Endangered in California, but more common elsewhere.
   3 - CNPS Plants on a review list to find more information about a particular species.
   4 - CNPS Plants of limited distribution - a watch list.
   CNPS Threat Code Extension
   1. Species seriously endangered in California
   2. Species fairly endangered in California
   3. Species not very endangered in California

ATTACHMENT 3
SITE PHOTOGRAPHS

Photo 1. View of the "panhandle" in the eastern portion of the Property facing east. Photo displays the seasonal swale within this portion of the Property.

Photo 2. View of a seasonal wetland in the western portion of the Property. This feature appears to be an old borrow pit.

Photo 3. View of the Property facing south from the hilltop ridgeline towards the proposed bridge overcrossing at Hawk Street, between school campus and residential developments.

Photo 4. View of the proposed bridge overcrossing at the end of Hawk Street, facing west. Note the pushed fill material to build up the south bank, constraining the Altamont Creek channel. A recreation path can be seen on the left.

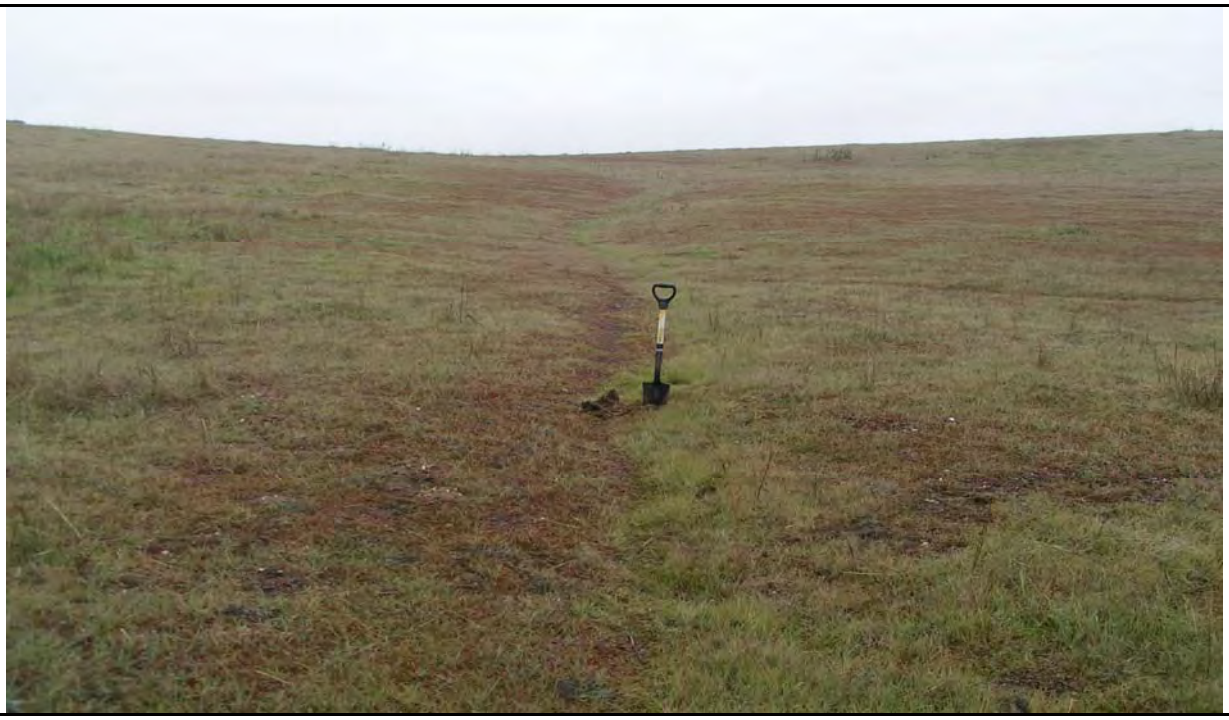


Photo 5. View of on-site grassland habitat and a medium-gradient swale facing north towards center of the Property. While this feature intercepts and conveys sheetflow runoff during the rainy season, vegetation was dominated by upland species.

Photo 6. Clusters of ultramafic rock outcroppings such as these were observed along the ridgeline and hillslopes in the center and western portions of the Property.

U.S. ARMY CORPS OF ENGINEERS JURISDICTIONAL DELINEATION

FOR THE

GARAVENTA HILLS ESTATES PROPERTY

ALAMEDA COUNTY, CALIFORNIA

Prepared for:

RL Communities
5000 Executive Parkway, Suite 530
San Ramon, California 94583

Prepared by:

OLBERDING ENVIRONMENTAL, INC.
Wetland Regulatory Consultants
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583

Phone: (925) 866-2111 ~ FAX (925) 866-2126
Contact: Jeff Olberding

FEBRUARY 2011

TABLE OF CONTENTS

1.0 INTRODUCTION....1

1.1 Scope....1
1.2 Location....1
1.3 Property Description....1

2.0 METHODOLOGY....2

2.1 Overview....2
2.2 Corps Definition of Wetlands/Waters....3
2.3 Data Collection for Potential Jurisdictional Wetlands/Waters....4

3.0 TECHNICAL FINDINGS....5

3.1 Vegetation Conditions....5
3.1.1 Degraded Grassland Habitat....7
3.1.2 Riparian Habitat (Altamont Creek)....8
3.1.3 Seasonal Wetland Habitat....8
3.1.4 Seasonal Swale Habitat....8
3.1.5 Vernal Pool Habitat....8
3.2 Hydrology Conditions....9
3.3 Soils Conditions....10
3.3.1 Soil Analysis at Property....12

4.0 AREAS POTENTIALLY SUBJECT TO REGULATION BY THE CORPS OF ENGINEERS....14

4.1 Potential Wetlands....15
4.2 Potential Other Waters....15
4.3 Section 10 Navigable Waters....16

5.0 AREAS POTENTIALLY EXCLUDED FROM REGULATION UNDER SECTION 404....16

5.1 Discretionary Exemptions....16
5.2 Application of Discretionary Exemptions....17
5.3 Isolated Waters....17
5.4 Application of Isolated Waters Exemptions....17
5.5 Significant Nexus....17
5.6 Application of Significant Nexus....18

6.0 CONCLUSIONS....18

7.0 REFERENCES....19

TABLES

Table 1 Wetland Plant Indicator Status Categories 7
Table 2 Hydrology Indicators 9
Table 3 Arid West Region – Hydrology Indicators 10
Table 4 Potentially Jurisdictional Wetlands 15
Table 5 Potentially Jurisdictional "Other Waters of the U.S." 16

ATTACHMENTS

ATTACHMENT 1 FIGURES

Figure 1	Regional Map
Figure 2	Vicinity Map
Figure 3	USGS Quadrangle Map for Altamont
Figure 4	Aerial Map
Figure 5	Corps Delineation Map
Figure 6	Soils Map

ATTACHMENT 2 PLANT LIST

ATTACHMENT 3 WETLAND DELINEATION DATA FORMS

ATTACHMENT 4 SITE PHOTOGRAPHS

This report should be cited as: Olberding Environmental, Inc. February 2011. *U.S. Army Corps of Engineers Jurisdictional Delineation for the Garaventa Hills Estates Property, Alameda County, California*. Prepared for RL Communities, San Ramon, California.

1.0 INTRODUCTION

1.1 Scope

Olberding Environmental, Inc. (Olberding Environmental) has conducted an investigation of the geographic extent of areas potentially subject to US Army Corps of Engineers (Corps) jurisdiction under Section 404 of the Clean Water Act (wetlands and other waters) within the identified surveyed boundaries of the 31.7 acre Garaventa Hills Estates and 9.7 acre Hom & Lai Propoerties. For the purpose of this report, both properties will be collectively referred to as "the Property". The placement of fill material in areas identified as jurisdictional waters is subject to the permit requirements of the Corps, under Section 404 of the Clean Water Act (1972).

On January 13 and February 9, 2011 a field survey was conducted for the purpose of identifying the extent of Corps jurisdiction withi the identified Survey Area. Visual observations as to the presence or absence of indicators of wetland soil, vegetation and hydrological conditions were made during the investigation. The boundaries of all potential wetland/water features observed were further defined in accordance with the Corps regulations and the required methodology described in the 1987 Corps Wetlands Delineation Manual (1987 Manual) and Arid West Supplement to the 1987 Manual (Arid West Supplement).

1.2 Location

The Property is located north of Interstate-580 and east of Vasco Road and west of Laughlin Road in the city of Livermore, Alameda County, California. The site is located within the USGS Altamont 7.5 minute quadrangle; Sections 25, 26, and 35, Township 2 South, and Range 2 East. Attachment 1, Figure 1 depicts the regional location of the Property in Alameda County and Figure 2 identifies the vicinity location in in Livermore. Figure 3 is a topographic map on the USGS 7.5 Quadrangle Map for Altamont. An aerial photograph of the Property is provided in Figure 4.

Access to the Property is attained by taking the Vasco Road exit from Interstate-580 (either approaching from the East or West). Go north on Vasco Road to the intersection of Northfront Road. Turn right (east) onto Northfront Road and continue for approximately 0.8-mile. Turn north onto Laughlin Road and proceed for 0.56-mile to Bear Creek Drive. Turn left (west) onto Bear Creek Drive. The Property is located at the terminus of this street.

1.3 Property Description

The Property consists of an undeveloped parcel consisting predominantly of non-native grassland habitat, which, until recently, was grazed by cattle and is bounded along the majority of the perimeter by various types of fencing (i.e., chain-link, barbed wire, and wooden). The far eastern portion of the Property is in the shape of a "panhandle" and was previously disced for weed abatement as it occurs between two existing residential developments. The undulating topography is moderate to moderately steep sloping, with a constrained and somewhat channelized intermittent stream feature (i.e., Altamont Creek) forming a portion of the southern boundary of the Property. The elevation ranges from approximately 600 feet in the center of the

Property, to approximately 536 feet in the extreme southwestern corner along Altamont Creek. The highest point lies along a ridgeline in the center of the Property; this ridgeline forms a natural watershed divide, with runoff draining either towards the north or south. The Property is surrounded by open space (i.e., grazed rangeland) along the entire western boundary and with the exception of some interface with residential developments, most of the northern, eastern, and southern boundaries. Clusters of ultramafic rock outcroppings were observed along the ridgeline and hillslopes in the center and western portions of the Property. A low terrace flanks Altamont Creek along the north bank and appears to have been graded in the past. Plants observed during the field delineation can be viewed in Attachment 2.

2.0 METHODOLOGY

2.1 Overview

Olberding Environmental completed an initial field delineation of the Property on January 13, 2011. A second vield inspection was performed on February 9, 2011 to obtain additional information on Altamont Creek and to observe the previousely identified wetland features. The existing landforms as well as associated vegetation, hydrology, and soil conditions were studied to identify areas that would likely contain wetland/waters and or aquatic habitats at the site. Potential jurisdictional areas were identified on field maps and compared to available aerial photography and topographical maps.

Prior to completing site surveys for this report, the previously prepared site surveys, site maps, topographic maps and aerial photographs of the Property were obtained from several sources and reviewed. This information was used in association with detailed delineation surveys to determine the extent and boundaries of wetland features. Resource materials used for the site analysis were as follows:

- U. S. Geological Survey Quadrangle Map for Altamont, California;
- Soil map information contained in the Soil Survey; Alameda Area, California (SCS 1966)

The extent or boundary of wetland habitats was further defined using the 1987 "Corps Wetlands Delineation Manual" (1987 Manual)[1], the "Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region" (Arid West Supplement)[2], routine on-site wetland determination protocol currently in use by the Corps, published Corps of Engineers regulatory guidance letters, and San Francisco District regulatory policy.

[1] Environmental Laboratory. 1987. "Corps of Engineers Wetlands Delineation Manual." U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi. 100 pp. plus appendices.

[2] Environmental Laboratory. 2006. "Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region." U.S. Army Engineer Research and Development Center. Vicksburg, Mississippi. 123 pp.

2.2 Corps Definition of Wetlands/Waters

Pursuant to the 1987 Manual, key criteria for determining the presence of wetlands are:

(a) the presence of inundated or saturated soil conditions resulting from permanent or periodic inundation by ground water or surface water; and

(b) a prevalence of vegetation typically adapted for life in saturated soil conditions (hydrophytic vegetation).

Explicit in the definition is the consideration of three environmental parameters: hydrology, soil, and vegetation. Positive wetland indicators of all three parameters are normally present in wetlands. The assessment of all three parameters enhances the technical accuracy, consistency, and credibility of wetland determination and is required per the1987 Corps Manual.

Aquatic habitats, other than wetlands, that are considered to be waters of the United States were also investigated as part of this study. Their landward extent was defined following the definitions provided in the Corps of Engineers regulations [33 CFR §328.4(a)(b) and (c)]:

(a) *Territorial Seas*. The limit of jurisdiction in the territorial seas is measured from the baseline in a seaward direction a distance of three nautical miles.

(b) *Tidal Waters of the United States*. The landward limits of jurisdiction in tidal waters:

(1) Extends to the high tide line, or
(2) When adjacent non-tidal waters of the United States are present, the jurisdiction extends to the limits identified in (c) below.

(c) *Non-Tidal Waters of the United States*. The limits of jurisdiction in non-tidal waters:

(1) In the absence of adjacent wetlands, the jurisdiction extends to the ordinary high water mark, or
(2) When adjacent wetlands are present, the jurisdiction extends beyond the ordinary high water mark to the limit of the adjacent wetlands.
(3) When the water of the United States consists only of wetlands, the jurisdiction extends to the limit of the wetlands.

Tributary waters and their impoundments are under the regulatory jurisdiction of the Corps and extend to the OHW mark on opposing channel banks. Tributary waters include rivers, streams and seasonal drainage channels. The OHW mark is typically indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in character of soil, destruction of vegetation, exposed roots on the bank, deposition of leaf litter and other debris materials or lower limit of moss growth on channel banks.

Areas meeting the regulatory definition of "Waters of the United States" (jurisdictional waters) are subject to the jurisdiction of the Corps. The Corps under provisions of Section 404 of the

Clean Water Act (1972) has jurisdiction over "Waters of the U.S." These waters may include all waters used or potentially used for interstate commerce. This includes all waters subject to the ebb and flow of the tide, all interstate waters, all other waters (intrastate lakes, rivers, streams, mudflats, sandflats, playa lakes, natural ponds, etc.), all impoundments of waters otherwise defined as "Waters of the U. S.," tributaries of waters otherwise defined as "Waters of the U. S.," the territorial seas, and wetlands adjacent to "Waters of the U.S." (33 CFR, Part 328, Section 328.3).

Areas not considered to be jurisdictional waters include non-tidal drainage and irrigation ditches excavated on dry land, artificially-irrigated areas, artificial lakes or ponds used for irrigation or stock watering, small artificial water bodies such as swimming pools, and water-filled depressions with no outlet for drainage (33 CFR, Part 328).

The Property was also reviewed to assess the potential for qualifying for Section 10 jurisdiction as a navigable water of the United States. Navigable waters of the U.S. are those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce (33 CFR 329, Section 329.4). Section 10 jurisdiction extends to the lateral extent of the ordinary high water marks on opposing channel banks. Ultimately, the determination of navigability is made by the division engineer (33 CFR, Part 329, Section 329.14).

2.3 Data Collection for Potential Jurisdictional Wetlands/Waters

Data was collected for the determination of wetlands/waters during both the January and February 2011 site visits as outlined in the methods section. Specific data point information on vegetation, soils and hydrology was gathered by wetland scientist Mr. Christopher Bronny and Mr. Jeff Olberding. The purpose of this investigation was to identify and delineate potential jurisdictional waters, including wetlands. Surveys were conducted within and adjacent to the specified survey boundaries. The Property was examined for topographic features, drainages, alterations to site hydrology and areas of recent disturbance in the refined survey area. All vascular plant species that were identifiable at the time of the survey were recorded and identified using keys and descriptions in Hickman (1993) (see Attachment 2).

The habitat types occurring in the Property were characterized according to pre-established categories. In classifying the habitat types on the site, the generalized plant community classification schemes of *A Manual of California Vegetation* (Sawyer, Keeler-Wolf and Evens 2009) were consulted. The final classification and characterization of the habitat types of the Property were based on field observations.

Data was collected on vegetation, soils, and hydrology using wetland determination protocol as described in the 1987 Manual. Both upland and wetland data were collected to distinguish wetland boundaries from the adjacent upland; single data points were taken in swales that intercepted and conveyed sheetflow runoff from surrounding hillslopes (i.e., exhibited drainage patterns), but did not meet all three criteria (i.e., lack of dominance exhibited by hydrophytic vegetation and/or absence of hydric soil indicators) to be considered jurisdictional by the Corps. On paired transects, a sample point was sited in an area exhibiting wetland characteristics, while

a second sample point was sited up slope of the first point in an upland position that defined the transitional break between wetland and upland. No soil test pits were taken within potential aquatic features that were confined to channels, thus conforming to the definition of "other waters" of the U.S. (i.e., exhibits a distinct bed and bank, with an ordinary high water mark (OHWM). GPS coordinates of each sample location were recorded in the field using a Trimble GEO XT.

A total of three single and sixteen paired transect data points were established on six transect lines within the boundaries of the Survey Area. With the exception of Transects 1 and 2 (which have four data point locations), all upland positions are distinguished by "A" and the wetland positions "B."

The approximate location and extent of jurisdictional wetlands/waters as well as other relevant data, were transferred on to a 1"= 100' scale topographical map of the survey area in the field. Information obtained at the sample point locations was recorded on modified Corps data sheets included in this report (Attachment 3). Photographs were also taken for selected sample points that represented the Property (Attachment 4).

3.0 TECHNICAL FINDINGS

The following discussion reports the vegetation, hydrology, and soil conditions observed at the Property during the course of the investigation.

3.1 Vegetation Conditions

The 1987 Manual states that the diagnostic environmental characteristics indicating wetland vegetation conditions are met when the prevalent vegetation (more than 50%) consists of macrophytes that are typically adapted to areas having hydrologic and soil conditions described above. In addition, hydrophytic species, due to morphological, physiological, and/or reproductive adaptation(s), have the ability to grow, effectively compete, reproduce, and/or persist in anaerobic soil conditions. Indicators of vegetation associated with wetlands include:

1. more than 50% of the dominant species are rated as Obligate ("OBL"), Facultative Wet ("FACW") or Facultative ("FAC") on lists of plant species that occur in wetlands;[3]

2. visual observations of plant species growing in areas of prolonged inundation or soil saturation; and

3. reports in the technical literature indicating the prevalent vegetation is commonly found in saturated soils" (1987 Manual).

[3] Reed, P.B. 1988. National List of Plant Species That Occur in Wetlands: California (Region 0). Biological Report 88(26.10) May 1988. National Ecology Research Center, National Wetlands Inventory, U.S. Fish and Wildlife Service, St. Petersburg, FL.

In addition, hydrophytic indicators are applied to plant communities using the Arid West Supplement (December, 2006) in the following sequence:

1. Apply the dominance test – more than 50% of the dominant species are rated as OBL, FACW, or FAC on lists of plant species that occur in wetlands.
    a. If the plant community passes the dominance test, then the vegetation is hydrophytic and no further vegetation analysis is required.
    b. If the plant community fails the dominance test, but indicators of hydric soil and wetland hydrology are both present, proceed to step 2.

2. Apply the prevalence index – a weighted average wetland indicator status of all plant species (OBL=1, FACW=2, FAC=3, FACU=4, UPL=5). Weighting is by abundance (percent cover). A hydrophytic plant community will result in a prevalence index of 3.0 or less.
    a. If the plant community satisfies the prevalence index, then the vegetation is hydrophytic. No further vegetation analysis is required.
    b. If plant community fails prevalence index, proceed to step 3.

3. Apply morphological adaptations – morphological features which help plants survive prolonged inundation or saturation in the root zone, must occur on more than 50% of the FACU species living in an area where indicators of hydric soil and wetland hydrology are present.

Table 1 contains the wetland plant indicator status categories used to determine if a particular plant species qualifies as a macrophyte which has adapted to areas having hydrologic and soil conditions.

It is important to note that, although there is a high probability that one would expect to find obligate, facultative wet and facultative plants growing in wetlands, there is also a significant possibility that the obligate, facultative wet, and facultative species will occur in areas that do not exhibit wetland soil and/or wetland hydrology conditions.

Table 1 Wetland Plant Indicator Status Categories		
Indicator Category	**Symbol**	**Frequency of Occurrence**
OBLIGATE	OBL	greater than 99%
FACULTATIVE WETLAND	FACW	67 - 99%
FACULTATIVE	FAC	34 - 66%
FACULTATIVE UPLAND	FACU	1 - 33%
UPLAND	UPL	less than 1%
***** Based upon information contained in Corps of Engineers Wetland Delineation Manual (Environmental Laboratory 1987).		

The Property is located along the eastern edge of the *San Francisco Bay Area Subdivision* of the California Floristic Province (Hickman 1993). In classifying the habitat types found in the Property, generalized plant community classification schemes were used (Sawyer, Keeler-Wolf, and Evens 2009). The final classification and characterization of the habitat types of the Property were based on field observations.

The Property supports five habitat types that consist of degraded grassland, riparian, seasonal wetland, seasonal swale, and a single vernal pool feature. Each habitat is described in further detail below. A description of the plant species present within each habitat type is provided below. Dominant plant species are noted.

3.1.1 Degraded Grassland Habitat

The vegetation observed in the annual grassland habitat consists of species typical to grazed grassland communities. The dominant grasses observed on the open hillslopes and upland flats of the Property consist of non-native species including soft chess (*Bromus hordeaceous*), rip-gut brome (*Bromus diandrus*), hare barley (*Hordeum murinum* ssp. *leporinum*), wild oat (*Avena fatua*), and Italian rye grass (*Lolium multiflorum*). Forb (i.e., wildflower) species found intermixed with the grasses consist of non-native annual and biennial weeds such as prickly lettuce (*Lactuca serriola*), dove geranium (*Geranium molle*), red-stem filaree (*Erodium cicutarium*), Italian thistle (*Carduus pycnocephalus*), yellow-star thistle (*Centaurea solstitialis*), and black mustard (*Brassica nigra*). Although native species were largely absent in the groundlayer at the time of the January 2011 field delineation, species such as needlegrass (*Nasella* sp.), poppy (*Eschscholzia* sp.), fiddleneck (*Amsinckia* sp.), soap plant (*Chlorogalum* sp.), red maids (*Calandrinia ciliata*), dove weed (*Croton setigerus*), vinegarweed (*Trichostema lanceolatum*), pitgland tarweed (*Holocarpha virgata*), and tarweed (*Centromadia* sp. – likely *C. pungens pungens*), were observed; it is anticipated that despite livestock grazing, a modest cryptic flora of geophytes (e.g., *Brodiaea, Triteleia, Calochortus*) and other native early-spring blooming species likely persist in the sod.

3.1.2 Riparian Habitat (Altamont Creek)

Altamont Creek contains herbaceous riparian (i.e., "streamside") habitat within a fairly confined channel. There is no shrub or tree layer associated with this feature, and the herbaceous groundlayer along the banks consists largely of graminoids (i.e., grasses and grass-like plants) including California tule (*Schoenoplectus californicus*), Baltic rush (*Juncus balticus*), iris-leaved rush (*Juncus xiphioides*), tall flatsedge (*Cyperus eragrostis*) foxtail (*Setaria* sp.), creeping wild rye (*Leymus triticoides*), and sparse patches of salt grass (*Distichlis spicata*). Forbs observed included hedge-nettle (*Stachys* sp.), milkweed (likely *A. fasicularis*), and dock (*Rumex crispus* and *R. conglomeratus*).

A low terrace flanks the northern bank of Altamont Creek. This areas is slightly elevated and likely receives overflows during high precipitation events. Vegetation observed included a mix of upland and hydrophytic species including rip-gut brome, soft chess, Mediterranean barley (*Hordeum marinum* var. *gussoneanum*), bird's-foot trefoil (*Lotus corniculatus*), Mediterranean lineseed (*Bellardia trixago*), annual fireweed (*Epilobium brachycarpum*), bull thistle (*Cirsium vulgare*), English plantain (*Plantago lanceolatum*), rose clover (*Trifolium hirtum*), and stinkweed (*Dittrichia graveolens*).

3.1.3 Seasonal Wetland Habitat

A single seasonal wetland was mapped in the western portion of the Property. This feature was located at the toe of a slope below rock outcroppings, and appears to have been an old borrow pit. Hydrophytes observed along the edges of this feature included Mediterranean barley, Italian rye grass, curly dock (*Rumex crispus*), and seedlings of popcornflower (*Plagiobothrys* sp.).

3.1.4 Seasonal Swale Habitat

A fairly extensive drainageway occurs in the far eastern portion of the Property. This low-gradient feature conveys sheetflow runoff and wetland overflows from outside the southern boundary, and conveys this runoff into a series of shallow alkali depressions and wetlands to the north. Dominant species observed within the mapped portion included extensive patches of tarweed, Italian rye grass, rabbit's-foot grass (*Polypogon monspeliensis*), and seedlings of fiddle dock (*Rumex pulcher*).

3.1.5 Vernal Pool Habitat

A single vernal pool was mapped in the eastern portion of the Property and is embedded in the mapped seasonal swale (see above) along the southern boundary. Vernal pools are depressional features of varying size, and are characterized as having a layer of claypan or hardpan below the surface that inhibits percolation of precipitation during the rainy season. This results in prolonged inundation and saturation regimes that allow a unique assemblage of native plants and animals (many of them restricted to this habitat type) to complete their life cycles before the vernal pools dry out completely at the beginning of the dry season. There are a number of annual herbs and grasses that are considered either "indicator species" or strongly allied with this habitat type; some of the plants detected during the January 2011 field delineation fall within these

categories and include seedlings of popcornflower, water starwort (*Callitriche marginata*), and annual hairgrass (*Deschampsia danthanioides*).

3.2 Hydrology Conditions

The 1987 Manual states that the diagnostic environmental characteristics indicative of wetland hydrology conditions are: "the area is inundated either permanently or periodically at mean water depths less than or equal to 6.6 feet, or the soil is saturated to the surface at some time during the growing season of the prevalent vegetation" (1987 Manual, p. 14). According to the Manual, indicators of hydrologic conditions that occur in wetlands may include features in Table 2.

Table 2
Hydrology Indicators

Primary Indicators	Secondary Indicators
Inundation, Saturation	Oxidized Rhizospheres Associated with Living Roots
Watermarks	Water-Stained Leaves
Drift Lines	FAC-Neutral Test
Water-Borne Sediment Deposits	Local Soil Survey Data
Drainage Patterns Within Wetlands (With Caution)	

Department of the Army, U.S. Army Corps of Engineers, Washington, D.C., *Memorandum - Subject: Clarification and Interpretation of the 1987 Manual*, dated June 8, 1992 provides further clarification that:

> "Areas which are seasonally inundated and/or saturated to the surface for a consecutive number of days for more than 12.5 percent of the growing season are wetlands, provided the soil and vegetation parameters are met. Areas wet between 5 percent and 12.5 percent of the growing season in most years (see Table 5, page 36 of the 1987 Manual) may or may not be wetlands. Areas saturated to the surface for less than 5 percent of the growing season are non-wetlands. Wetland hydrology exists if field indicators are present as described herein and in the enclosed data sheet."

The presence of wetland hydrology using the Arid West Supplement (December, 2006) is dependent on the presence of any one primary indicator or two or more secondary indicators included in Table 3.

Table 3 Arid West Region - Hydrology Indicators	
Primary Indicators	**Secondary Indicators**
Surface Water	Water Marks (riverine)
High Water Table	Sediment Deposits (riverine)
Saturation	Drift Deposits (riverine)
Water Marks (nonriverine)	Drainage Patterns
Sediment Deposits (nonriverine)	Dry-Season Water Table
Drift Deposits (nonriverine)	Thin Muck Surface
Surface Soil Cracks	Crayfish Burrows
Inundation Visible on Aerial Imagery	Saturation Visible on Aerial Imagery
Water-Stained Leaves	Shallow Aquitard
Salt Crust	FAC-Neutral Test
Biotic Crust	
Aquatic Invertebrates	
Hydrogen Sulfide Odor	
Oxidized Rhizospheres along Living Roots	
Presence of Reduced Iron	
Recent Iron Reduction in Plowed Soils	

The wetland locations investigated on the Property exhibited hydrologic indicators such as biotic crusting, saturated soils, and surface water; surface water was also present in the stream channel. Oxidized rhizospheres were observed in the soil profile in some mapped wetlands and drainageways. Hydrologic inputs included direct precipitation, sheetflow runoff from surrounding uplands (on-site and off-site), and inputs from upstream sources.

Weather conditions observed during the primary site investigation performed on January 13, 2011 were mostly cloudy with intermittent rain showers around mid-morning; temperatures were in the 50’s. Precipitation amounts thus far for the 2010-2011 rainy season were above-average.

3.3 Soils Conditions

The Corps' 1987 Manual states that the diagnostic environmental characteristics indicative of wetland soil conditions are met where "soils are present and have been classified as hydric, or they possess characteristics that are associated with reducing soil conditions" (1987 Manual, p. 14). According to the Manual, indicators of soils developed under reducing conditions may include:

1. Organic soils (Histosols);
2. Histic epipedons;
3. Sulfidic material;
4. Aquic or peraquic moisture regime;
5. Reducing soil conditions;
6. Soil colors (chroma of 2 or less);
7. Soil appearing on hydric soils list; and
8. Iron and manganese concretions.

According to the most recent version of the National Technical Committee for Hydric Soils, the criteria to be used by the Corps for what constitutes current hydric soil/wetland soil conditions for the soils found at the site are:

1. Minimum Saturation at 12" to the surface: 14 consecutive days during the growing season.

2. Minimum Inundation (Flooded or Ponded): Soils that are frequently "ponded" for long duration (~ 15 to 30 consecutive days) or very long duration (> 30 consecutive days) during the growing season, or soils that are frequently "flooded" for long duration or very long duration during the growing season.

According to the Arid West Supplement (December, 2006), indicators for hydric soils are presented in three groups. Indicators for “all soils” (A) are used in any soil regardless of texture. Indicators for “sandy soils” (S) are used in soil layers with USDA textures of loamy fine sand or coarser. Indicators for “loamy or clayey soils” (F) are used with soil layers of loamy very fine sand and finer (2006 Arid West Supplement, p.32). Hydric soils can be identified by the following indicators:

1. Histosol (A)
2. Histic Epipedon (A)
3. Black Histic (A)
4. Hydrogen Sulfide (A)
5. Stratified Layers (A)
6. 1 cm Muck (A)
7. Depleted Below Dark Surface (A)
8. Thick Dark Surface (A)
9. Sandy Mucky Mineral (S)
10. Sandy Gleyed Matrix (S)
11. Sandy Redox (S)
12. Stripped Matrix (S)
13. Loamy Mucky Mineral (F)
14. Loamy Gleyed Matrix (F)
15. Depleted Matrix (F)
16. Redox Dark Surface (F)
17. Depleted Dark Surface (F)
18. Redox Depressions (F)
19. Vernal Pools (F)

Where possible, the top 12 inches of the soil profile is examined for hydric characteristics. Such characteristics include the presence of organic soils (Histisols), histic epipedons, aquic or peraquic moisture regime, presence of soil on hydric soil list, mottling indicated by the presence of gleyed or bright spots of color within the soil horizons observed. Mottling of soils usually indicates poor aeration and lack of good drainage. A Munsell soil color charts (Kollmorgen Instr. Corp. 1990) were reviewed to obtain the soil color matrix for each soil sample. The last digit of the Munsell Soil Notation refers to the chroma of the sample. This notation consists of numbers

beginning with zero (0) for neutral grays and increasing at equal intervals to a maximum of about 20. Chroma values of the soil matrix which are one (1) or less, or of two (2) or less when mottling is present, are typical of soils which have developed under anaerobic conditions.

In sandy soils, such as alluvial deposits in the bottom of drainage channels, hydric soil indicators include high organic matter content in the surface horizon and streaking of subsurface horizons by organic matter.

3.3.1 Soil Analysis at Property

The USDA Natural Resources Conservation Service (formerly the Soil Conservation Service) mapped three soil types within the Property: Positas gravelly loam, San Ysidro loam, and Solano fine sandy loam (NRCS 2010). San Ysidro loam occurs along within the eastern "panhandle" and along the floodplain of Altamont Creek, while the majority of the Property consists of the Positas gravelly loam soil series along the hilltops and hillslopes throughout the central portion.

San Ysidro loam and Solano fine sandy loam occurring on the Property contain inclusions that are listed as hydric soils in Alamada County, California (NRCS). Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anoxic conditions in the upper part.

A detailed map of these soils for the Property can be found in Attachment 5. The numbers in parentheses next to the soil types represent the percentage amount on the Property. The soils mapped included the following types:

- **PoC2: Positas gravelly loam, 2 to 30 percent slopes, erodeds (59.4%) –** The Positas series consists of well drained to excessively drained, shallow to moderately deep gravelly loam soils on nearly level to very steep high terraces south of the Livermore Valley. These soils formed in poorly sorted clay, sand, and gravel that are weakly consolidated in places.

  The surface soil in this series is brown, medium acid gravelly loam and is massive and hard when dry. It is abruptly underlain by reddish-brown, medium acid to mildly alkaline clay subsoil. The subsoil has prismatic structure and is very plastic when wet and extremely hard when dry. The lower part of the subsoil is brownish, blocky heavy loam.

  Most of this soil is in large bodies on smooth, gently sloping to strongly sloping high terraces. In places the texture of the surface soil is gravelly sandy loam, gravelly loam, or loam. Some areas have coarse pebbles or cobbles throughout the profile. Although typically brown, this layer is reddish brown in places. In areas transitional to the Perkins soils, the subsoil is light clay. In some places the underlying material is weakly consolidated, yellowish calcareous silt.

  This well drained soil has a very slowly permeable subsoil. Before the surface soil is saturated, the soil absorbs water readily. Runoff is slow to medium, and the available

water holding capacity is low. The erosion hazard is slight to moderate on cultivated areas.

- **Sa: San Ysidro loam (39.8%) –** This single soil series consists of moderately well drained, shallow soils developed on nearly level old valley fill northeast of Livermore. These soils formed in alluvium from sedimentary rock. The San Ysidro soils are in the same general area as the Rincon and Solano soils in valleys and the Altamont soils in uplands.

  The surface soils is pale-brown loam that is massive. It is hard when dry and is medium acid. The upper part of the subsoil is brown clay that has strong columnar structure; it is extremely hard when dry and is neutral but becomes moderately alkaline with depth. The lower part is yellowish-brown, blocky, moderately alkaline silty clay.

  San Ysidro loam occurs mostly in large bodies in nearly level valleys. The texture of the surface soil ranges from silt loam to fine sandy loam. The color ranges from pale brown or brown to grayish brown. In some areas, the subsoil is reddish brown. The lower part of the subsoil is clay, silty clay, or silty clay loam, and, in a few places, gravelly clay loam. In areas transitional to the Pescadero soils, the surface soil is dark gray.

  This soil is moderately well drained and has a very slowly permeable subsoil. Runoff is slow and the available water capacity is low; the erosion hazard is slight when the soil is cultivated. Hydric soils include Pescadero inclusions (occurring on basin floors) and unnamed inclusions (occurring in depressions).

- **Sf: Solano fine sandy loam (0.8%) –** This single soil series consists of imperfectly drained, shallow, slightly to strongly saline-alkli, very pale brown soils. These soils have hog-wallowed microrelief and occur on nearly level stream terraces and basin rims north and east of Livermore and in the northeast part of the Area. They formed in alluvium from sandstone and shale. The Solano soils occur in the same general area as the San Ysidro, Rincon, and Pescadero soils in valleys, and the Altamont and Linne soils in uplands.

  The surface soil is very pale brown, medium acid fine sandy loam. It is underlain by a thin layer of light-gray, medium acid fine sandy loam that has weak platy structure. The subsoil is pale-brown, neutral clay loam. Whe dry, this layer breaks to weak columnar structure. The substratum consists of a yellowish brown, massive, mildly alkaline clay loam or light clay loam. This layer becomes strongly alkaline with depth.

  Most of this soil type occurs in small, nearly level areas having hog-wallow microrelief. The thickness of the surface soil ranges from 0 on the barren alkali spots to 18 inches on the mounds. The texture ranges from sandy loam or fine sandy loam to loam. In some places, the subsoil is dark grayish brown, is clayey, and has strong columnar structure. The effects from salts and alkali range from slight to strong.

  This soil is imperfectly drained. Permeability of the subsoil is moderately slow to slow. Runoff is slow, and the available water capcity is low. The erosion hazard is slight. Hydric soils include Pescadero inclusions (occurring on rims).

A total of nineteen soil pits were dug by shovel to a maximum depth of 18 inches at locations representative of various hydrogeomorphic surface conditions within the Property (Attachment 1, Figure 5). Soils found along the six transect lines were classified as having or not having indicators of wetland soil conditions using the methodology in the Corps' 1987 Manual.

Soils found in the upland positions exhibited the following moist soil matrix colors: 5YR3/1, 7.5YR2.5/2, 7.5YR2.5/3, 7.5YR3/3, 10YR2/2, 10YR 3/1, 10YR3/3, 10YR3/4, 10YR4/6, and 10YR5/8, generally with silty clay and clayey loam textures; in some soil pits, redoximorphic (redox) conditions (e.g., mottles) were present.

Soils found in the mapped wetland positions exhibited the following moist soil matrix colors: 5YR3/1, 7.5YR4/3, 10YR 3/1, and 10YR3/2, generally with high clay content and loam textures. Mottling was observed in some wetland locations and included the following moist colors: 5YR4/4 and 5YR5/8.

4.0 AREAS POTENTIALLY SUBJECT TO REGULATION BY THE CORPS OF ENGINEERS

The EPA and Corps regulations define wetlands as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (40 C.F.R. §230.3(t); 33 C.F.R. §328.3(b)).

The term "waters of the United States" are defined in 40 C.F.R. §328.3(a) as:

(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters including interstate wetlands;

(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:

(i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
(ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
(iii) Which are used or could be used for industrial purpose by industries in interstate commerce.

(4) All impoundments of waters otherwise defined as waters of the United States under the definition;
(5) Tributaries of waters identified in paragraphs [1-4] of this section;
(6) The territorial sea; and
(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs [1-6] of this section (40 CFR §230.3(s); 33 CFR §328.3(a)).

Based on information obtained during the field delineation, it was determined that a total of 0.513-acre of jurisdictional wetlands and 0.36-acre of "other waters" exist within the boundaries of the Property (see Attachment 1, Figure 5).

4.1 Potential Wetlands

The single mapped seasonal wetland, vernal pool, and seasonal swale features would be considered potentially jurisdictional wetlands. While some upland species were present within the sample areas, the absolute percent cover favored dominance by hydrophytes. Soil samples from the test pits taken inside the mapped boundary of the wetland features contained low chroma colors from the parent material, often with evidence of reducing conditions (e.g., oxidized rhizospheres and mottles) in the soil profile. Primary and secondary hydrologic indicators included the presence of surface water, saturated soils, oxidized rhizospheres, and drainage patterns (swale).

Table 4
Potentially Jurisdictional Wetlands

Type of Feature	Acreage
Seasonal Wetland	0.004
Seasonal Swale	0.484
Vernal Pool	0.025
TOTAL	**0.513**

4.2 Potential Other Waters

Altamont Creek is part of the greater Arroyo Las Positas watershed (Hydrologic Unit Code #1805000402). The portion of Altamont Creek that runs along the southern boundary of the Property is a moderately incised and partially confined stream feature with an average OHWM of approximately 8 feet along the entire reach. While stream overflows can spill onto the low terrace along the northern bank of the creek during high volume discharges, the southern bank has been elevated by construction fill material pushed along the edges to create a recreational path between the school campus and residential developments. At the time of the January 2011 field delineation, it was observed that heavy discharges had eroded large sections of the southern bank, resulting in bank cave-ins and sloughing.

Table 5 Potentially Jurisdictional "Other Waters of the U.S."	
Type of Feature	**Acreage**
Stream (Altamont Creek)	0.36
TOTAL	**0.36**

4.3 Section 10 Navigable Waters

No portions of the Property were determined to meet the parameters to be delineated as navigable water.

5.0 AREAS POTENTIALLY EXCLUDED FROM REGULATION UNDER SECTION 404

5.1 Discretionary Exemptions

A number of exemptions from Section 404 Clean Water Act regulations exist for waters of the United States. These exemptions fall into two basic categories: (1) discretionary and (2) non-discretionary.

According to the preamble discussion of the Corps regulations in the November 19, 1986 *Federal Register*, certain areas which may meet the technical definition of a wetland are generally not regulated. Such areas include:

(a) Non-tidal drainage and irrigation ditches excavated on dryland.

(b) Artificially irrigated areas which would revert to upland if the irrigation ceased.

(c) Artificial lakes or ponds created by excavating and/or diking dryland to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing.

(d) Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating and/or diking dryland to retain water for primarily aesthetic reasons.

(e) Water filled depressions created in dryland incidental to construction activity and pits excavated in dryland for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States (see 33 CFR 328.3(a)).

5.2 Application of Discretionary Exemptions

No portions of the Property were determined to meet the parameters of discretionary exemptions.

5.3 Isolated Waters

The U.S. Supreme Court has ruled that isolated, non-navigable wetlands and other waters are not subject to federal regulation even if they provide habitat for migratory birds and endangered species. Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers (hereinafter SWANCC) (No. 99-1178). The Corps has attempted to define isolated as "not having hydrological connectivity to other jurisdictional features." Based on this determination, the Court has eliminated the need to secure fill permits from the Corps under Section 404 of the Clean Water Act when isolated wetlands are encountered. Nevertheless, the decision is by no means a blanket repeal of Section 404. Every landowner's on-the-ground situation is unique, and must be analyzed individually. In the aftermath of this decision, each landowner must still carefully assess its situation to determine whether its survey area contains features which qualify as "waters of the U.S." It is therefore recommended that a jurisdictional delineation be verified by the Corps rather than making an assumption regarding the potential regulation of a specific wetland/water feature.

The RWQCB has indicated that they intend to continue regulation of isolated wetlands under the Porter-Cologne Act (Water Code Section 13260). Their interpretation of the Court ruling indicates that the SWANCC decision has no bearing on the RWQCB's regulation of "waters of the state" and as such they will continue to issue waste discharge requirements (WDRs) in lieu of a Section 401 Certification which is required when the Corps issues a Section 404 permit.

5.4 Application of Isolated Waters Exemptions

No isolated wetlands occur within the Property.

5.5 Significant Nexus

The geographic extent of jurisdiction under the Clean Water Act was further refined based on the U.S. Supreme Court's interpretation of the Act in Rapanos v. United States, 126 S. Ct. 2208 (2006) (Rapanos Case). In the EPA and Corps joint guidance of the Rapanos Case, issued in December of 2008, it was determined that the Corps generally will not assert jurisdiction over (1) swales or erosional features (e.g. gullies, small washes characterized by low volume, infrequent, or short duration flow) and (2) ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water. Non-navigable tributaries that are not relatively permanent and wetlands adjacent to such tributaries will be assessed on a case-by-case basis to determine whether they have a "significant nexus" to a traditional navigable water. A "significant-nexus" will be determined through assessment of the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of downstream traditional navigable waters.

According to the guidance, the Corps will continue to assert jurisdiction over traditional navigable waters; wetlands adjacent to traditional navigable waters; non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months); and wetlands that directly abut such tributaries.

5.6 Application of Significant Nexus

Sheetflow runoff and upstream hydrologic inputs are intercepted and conveyed by Altamont Creek, which is an intermittent blue line feature on the Altamont USGS topo quad and is a tributary of the Arroyo Las Positas watershed. Because Arroyo Las Positas is a traditional navigable water, a significant nexus applies.

However, the medium-gradient swales in the southcentral (DP9) and northcentral (DP8) portions of the Property are not likely jurisdictional, as they do not carry a relatively permanent flow of water, and do not exhibit characteristics consistent with the Corps criteria to be determined a wetland.

6.0 CONCLUSIONS

Results of the field delineation conducted by Olberding Environmental in January and February 2011 identified the presence of regulated waters of the U.S. within the Property. Altamont Creek traverses the Property along an east to west direction and is an intermittent "blue line" water feature on the USGS topographic map for Altamont. A single seasonal wetland, seasonal swale, and vernal pool occur as wetland features within the Property. The total Corps jurisdictional acreage on the North Livermore Property is **0.873**-acres.

7.0 REFERENCES

Code of Federal Regulation. Title 33 Part 328 "Navigation and Navigable Waters." U.S. Government Printing Office, Washington, D.C.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service, Office of Biological Services. Washington, D.C. Publ. No. FWS/OBS-79/31. 107 pp.

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. U. S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi. 100 pp. plus appendices.

Environmental Laboratory. 2006. Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. Technical Report 06-16. U.S. Army Engineers Research and Development Center, Vicksburg, Mississippi. 123 pp.

Hickman, James C., Ed. 1993. The Jepson Manual, Higher Plants of California. University of California Press. Berkeley, CA. 1400 pp.

Holland, R. F., 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. California Department of Fish and Game, Sacramento, CA. 156 pp.

Kollmorgen Instruments Corporation. 1975. Munsell soil color charts, revised edition (1990). Macbeth Division of Kollmorgan Instruments Corporation, Baltimore, Maryland.National Technical Committee for Hydric Soils [NTCHS]. 1991. Hydric Soils of the United States, USDA, Soil Conservation Service Misc. Publ. 1491.

Reed, P.B. 1988. National List of Plant Species that Occur in Wetlands: California (Region O). Biological Report 88(26.10) May 1988. National Ecology Research Center, National Wetlands Inventory, U.S. Fish and Wildlife Service, St. Petersburg, Fl.

Sawyer, J.O., T. Keeler-Wolf, and J. Evens. 2009. A manual of California vegetation. 2nd Ed. California Native Plant Society, Sacramento, Ca.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS), Web Soil Survey: 1966. Soil Survey Alameda Area, California. Accessed November 8, 2010. Available on-line at http://websoilsurvey.nrcs.usda.gov.

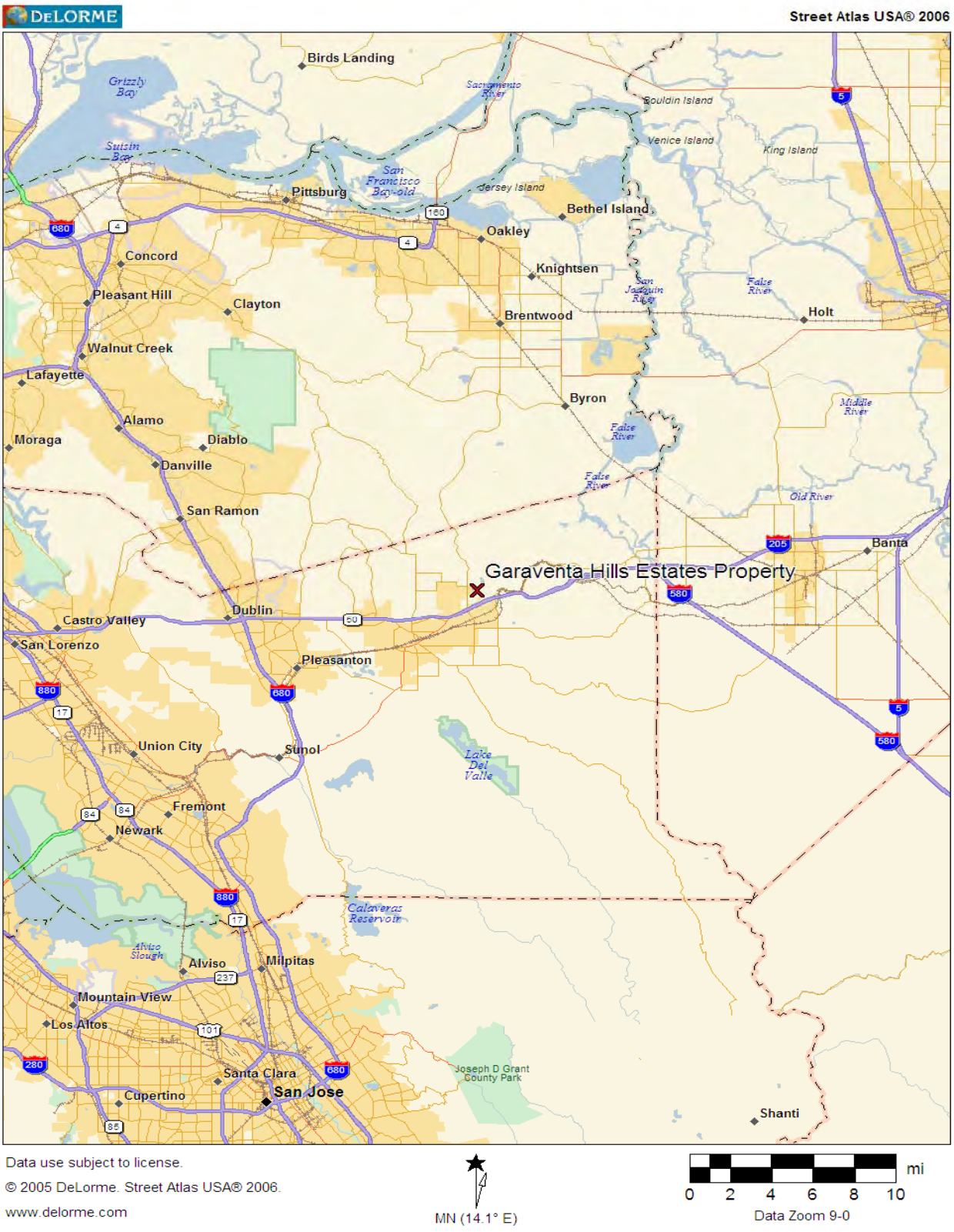
U.S. Department of Agriculture, Natural Resources Conservation Service; California Hydric Soils List, Alameda County electronic document: http://soils.usda.gov/use/hydric/lists/state.html.

ATTACHMENTS

ATTACHMENT 1
FIGURES

Figure 1 **Regional Map**
Figure 2 **Vicinity Map**
Figure 3 **USGS Quadrangle Map for Altamont**
Figure 4 **Aerial Photograph**
Figure 5 **Corps Delineation Map**
Figure 6 **Soils Map**

Figure 1
Regional Map

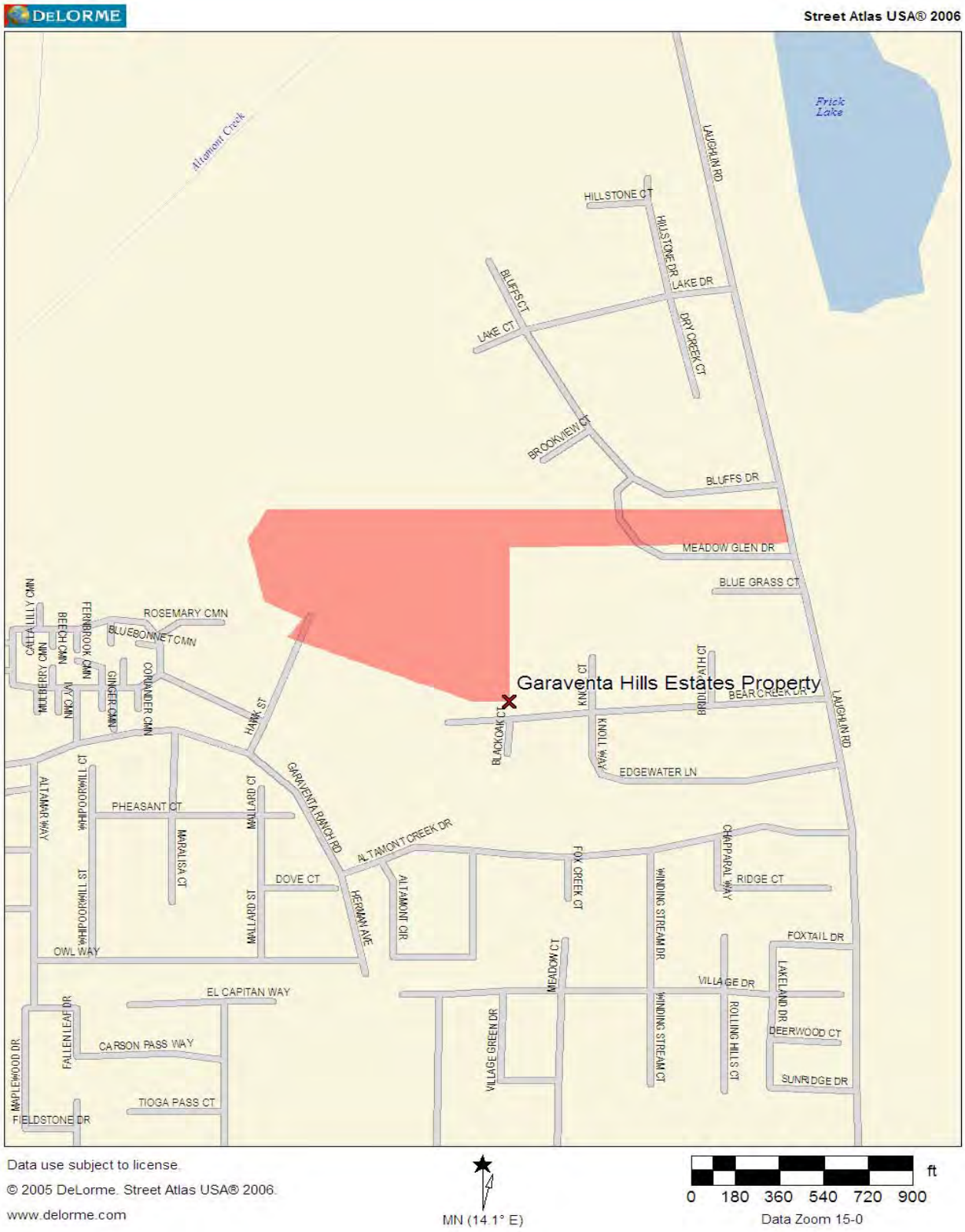


Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583
Phone: (925) 866-2111

This document is not intended for detail design work.

Figure 1
Regional Map of the Garaventa Hills Estates Property
Alameda County, California

Figure 2
Vicinity Map

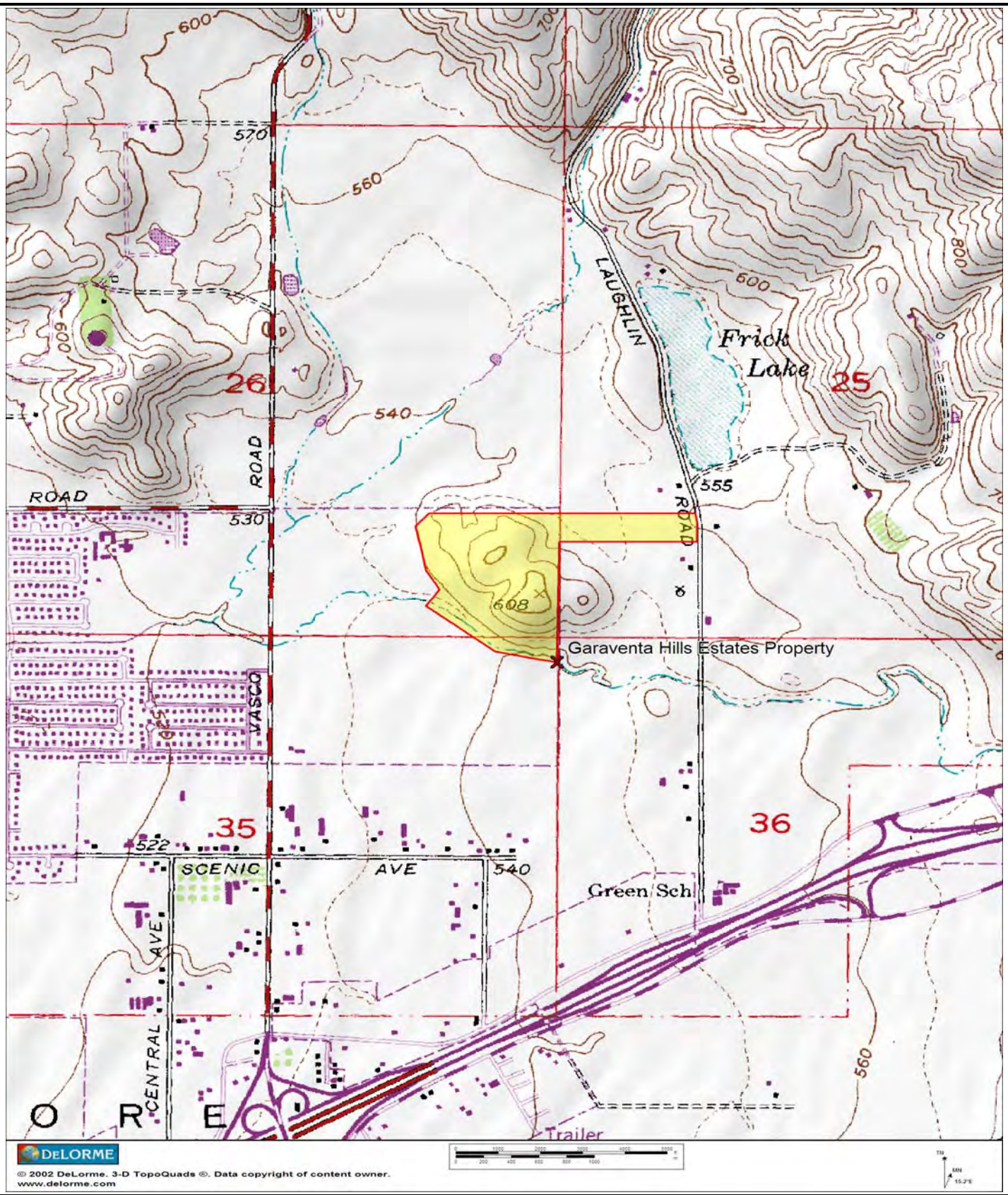


Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583
Phone: (925) 866-2111

This document is not intended for detail design work.

Figure 2
Vicinity Map of the Garaventa Hills Estates Property
Alameda County, California

Figure 3
USGS Quadrangle Map for
Altamont



Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583
Phone: (925) 866-2111

This document is not intended for detail design work.

Figure 3
USGS Quadrangle Map of the Garaventa Hills Estates Property
Altamont Quadrangle
Alameda County, California

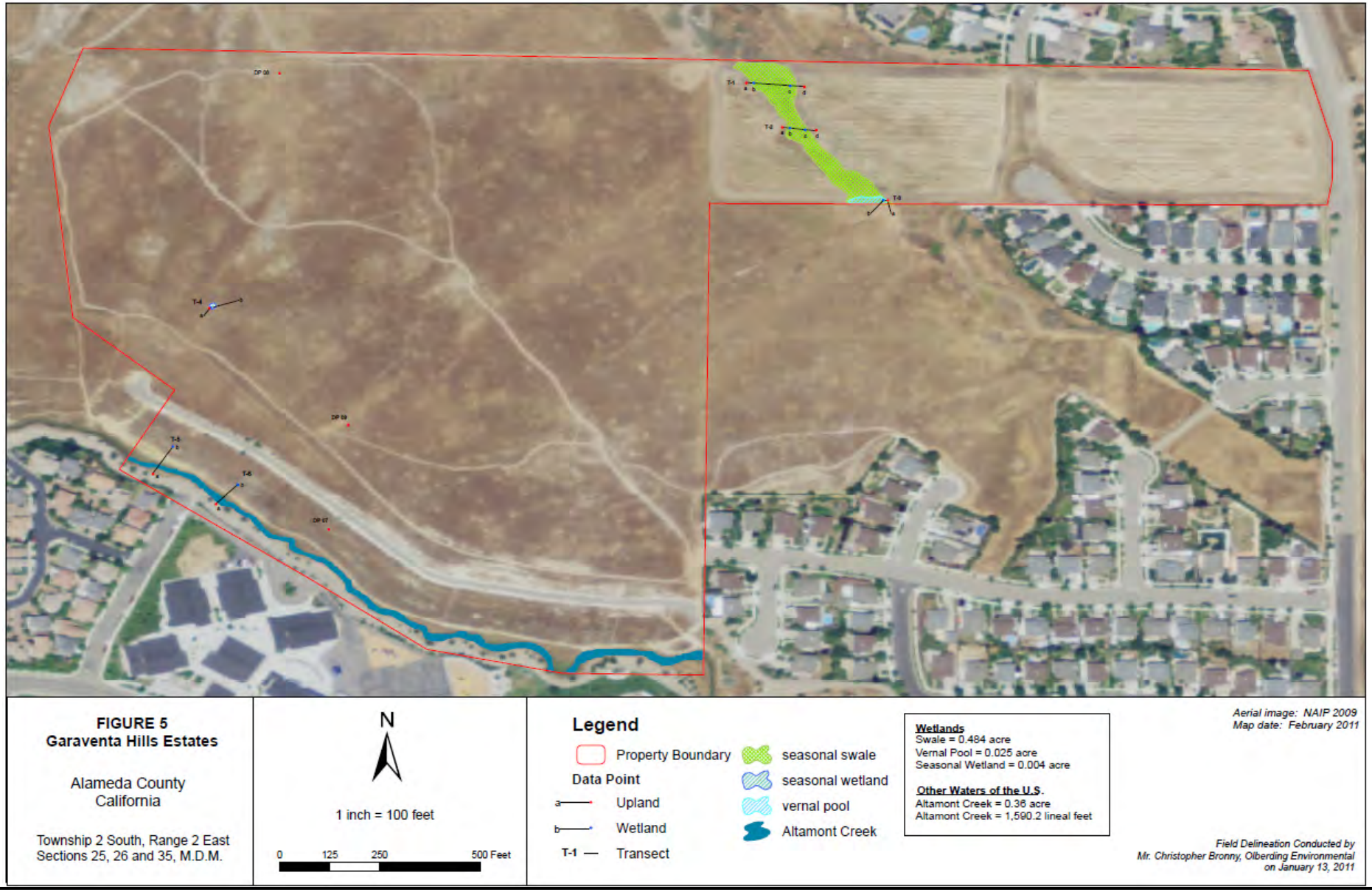
Figure 4
Aerial Photograph

Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583
Phone: (925) 866-2111

This document is not intended for detail design work.

Figure 4
Aerial Photo of the Garaventa Hills Estates Property
Alameda County, California

Figure 5
Corps Delineation Map



Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583
Phone: (925) 866-2111

This document is not intended for detail design work.

Figure 5
Corps Delineation Map of the Garaventa Hills Estates Property
Alameda County, California

Figure 6
Soils Map

Alameda County, California		
Map Unit Symbol	**Percentage within Property**	**Map Unit Name**
PoC2	59.4 %	Positas gravelly loam, 2 to 20 percent slopes, eroded
Sa	39.8 %	San Ysidro loam
Sf	0.8 %	Solano fine sandy loam

Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583
Phone: (925) 866-2111

This document is not intended for detail design work.

Figure 6
Soils Map of the Garaventa Hills Estates Property
Alameda County, California

ATTACHMENT 2
PLANT LIST

Table 1
Plant Species Observed Within/Adjacent to the Survey Area

*denotes non-native species

Scientific Name	Common Name
Plant Species Observed	
Amsinckia sp.	Fiddleneck
Asclepias fascicularis	Narrow-leaved milkweed
Atriplex argentea	Silverscale saltbush
*Avena fatua**	Wild oat
Baccharis pilularis	Coyote brush
*Bellardia trixago**	Mediterranean lineseed
*Brassica nigra**	Black mustard
*Bromus diandrus**	Ripgut brome
*Bromus hordeaceous**	Soft chess
Calandrinia ciliata	Red maids
Callitriche marginata	Water starwort
*Carduus pychnocephalus**	Italian thistle
*Centaurea solstitialis**	Yellow star-thistle
Centromadia sp. (likely *C. pungens*)	Common tarweed
Chlorogalum sp. (likely *C. pomeridianum*)	Soap plant
*Cirsium vulgare**	Bull thistle
*Cortaderia selloana**	Pampas grass
Croton setigerus	Dove weed
Cyperus eragrostis	Tall flatsedge
Deschampsia danthonioides	Annual hair grass
Distichlis spicata	Salt grass
*Dittrichia graveolens**	Stinkweed
Epilobium brachycarpum	Annual fireweed
Epilobium ciliatum	Willow-herb
*Erodium cicutarium**	Red-stemmed filaree
Eschscholzia sp.	California poppy
Frankenia salina	Alkali heath
*Geranium molle**	Dove geranium
Holocarpha virgata	Pitgland tarweed
Hordeum marinum ssp. *gussoneanum**	Mediterranean barley
Hordeum murinum ssp. *leporinum**	Hare barley
*Hypochaeris glabra**	Smooth cat's-ear
Juncus balticus	Baltic rush
Juncus xiphioides	Iris-leaved rush
*Lactuca serriola**	Prickly lettuce
Lepidium nitidum	Little pepper weed
Leymus triticoides	Creeping wild rye
*Lolium multiflorum**	Italian rye grass

ATTACHMENT 3
WETLAND DELINEATION DATA FORMS

ATTACHMENT 4
SITE PHOTOGRAPHS

Photo 1. "Panhandle" in eastern portion of Property facing east, showing seasonal swale and approximate locations of Transects 1, 2, and 3.

Photo 2. Location of Transect 4 and mapped seasonal wetland in western portion of the Property. Feature appears to be old borrow pit.

Photo 3. Property facing south from hilltop ridgeline towards proposed bridge overcrossing at Hawk Street, between school campus and residential developments. Red lines show the approximate locations of Transects 5 and 6, crossing Altamont Creek.

Photo 4. Proposed bridge overcrossing at end of Hawk Street, facing north towards hilltop ridgeline (see previous photo). Altamont Creek channel is below embankment where shovel is located. Most of the south bank is graded fill material higher than the historic floodplain terrace on the opposite bank.

Photo 5. Proposed bridge overcrossing at end of Hawk Street, facing west. Note pushed fill material to build up south bank, constraining Altamont Creek channel. Recreation path can be seen on the left, along with approximate locations of T-5a and T-5b.

Photo 6. Location of single soil pit (DP7) along low terrace north of Altamont Creek channel. Feature appears to be old tractor rut. While this feature had hydrophytic vegetation and hydrologic indicators, there was no evidence of hydric soil indicators in the soil profile.

Photo 7. Location of single soil pit (DP8) in medium-gradient swale facing south towards ridgeline in the center of the Property. Hydrologic indicators were present; dominant vegetation was a mix of pitgland tarweed (UPL) and curly dock (FACW). There was no evidence of reducing conditions in the soil profile. Feature appears to have been recently dug by local youths for an obstacle course.

Photo 8. Location of single soil pit (DP9) in medium-gradient swale facing north towards center of the Property. While this feature intercepts and conveys sheetflow runoff during the rainy season, vegetation was dominated by upland species, and there was no evidence of hydric soil indicators.

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET, 16TH FLOOR
SAN FRANCISCO, CALIFORNIA 94103-1398

REPLY TO
ATTENTION OF

RECEIVED
MAR 0 2 2011
BY:

Regulatory Division

MAR - 1 2012

SUBJECT: File Number 2011-00094S

Mr. Jeff Olberding
Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583

Dear Mr. Olberding:

This correspondence is in reference to your submittal of March 6, 2011, and revised submittal of January 9, 2012, on behalf of RL Communities, requesting an approved jurisdictional determination of the extent of waters of the United States occurring on the Garaventa Hills Estates property. This property is located at the western terminus of Bear Creek Drive, in the City of Livermore, Alameda County, California (APN 99B-5300-10, 99B-5303-2, 99B-5302-5, and eastern portion of 99B-5302-4).

All proposed discharges of dredged or fill material occurring below the plane of ordinary high water in non-tidal waters of the United States; or below the high tide line in tidal waters of the United States; and within the lateral extent of wetlands adjacent to these waters, typically require Department of the Army authorization and the issuance of a permit under Section 404 of the Clean Water Act of 1972, as amended (33 U.S.C. § 1344 *et seq.*). Waters of the United States generally include the territorial seas; all traditional navigable waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including waters subject to the ebb and flow of the tide; wetlands adjacent to traditional navigable waters; non-navigable tributaries of traditional navigable waters that are relatively permanent, where the tributaries typically flow year-round or have continuous flow at least seasonally; and wetlands directly abutting such tributaries. Where a case-specific analysis determines the existence of a "significant nexus" effect with a traditional navigable water, waters of the United States may also include non-navigable tributaries that are not relatively permanent; wetlands adjacent to non-navigable tributaries that are not relatively permanent; wetlands adjacent to but not directly abutting a relatively permanent non-navigable tributary; and certain ephemeral streams in the arid West.

All proposed structures and work, including excavation, dredging, and discharges of dredged or fill material, occurring below the plane of mean high water in tidal waters of the United States; in former diked baylands currently below mean high water; outside the limits of mean high water but affecting the navigable capacity of tidal waters; or below the plane of ordinary high water in non-tidal waters designated as navigable waters of the United States, typically require Department of the Army authorization and the issuance of a permit under Section 10 of the Rivers and Harbors Act of 1899, as amended (33 U.S.C. § 403 *et seq.*).

Navigable waters of the United States generally include all waters subject to the ebb and flow of the tide; and/or all waters presently used, or have been used in the past, or may be susceptible for future use to transport interstate or foreign commerce.

The enclosed delineation map entitled, "SPN File Number 2011-00094S, Approved Jurisdictional Determination, Garaventa Hills Estates, Livermore, Alameda County, California," in one sheet and date certified January 20, 2012, accurately depicts the extent and location of wetlands and other waters of the United States within the boundary area of the site that are subject to U.S. Army Corps of Engineers' regulatory authority under Section 404 of the Clean Water Act. This approved jurisdictional determination is based on the current conditions of the site, as verified during a field investigation of April 11, 2011, and a review of other data included in your submittal. This approved jurisdictional determination will expire five (5) years from the date of this letter, unless new information or a change in field conditions warrants a revision to the delineation map prior to the expiration date. The basis for this approved jurisdictional determination is explained in the enclosed *Approved Jurisdictional Determination Form.* This approved jurisdictional determination is presumed to be consistent with the official interagency guidance of June 5, 2007, interpreting the Supreme Court decision, *Rapanos v. United States*, 126 S. Ct. 2208 (2006).

You are advised that the approved jurisdictional determination may be appealed through the U.S. Army Corps of Engineers' *Administrative Appeal Process*, as described in 33 C.F.R. Part 331 (65 Fed. Reg. 16,486; Mar. 28, 2000), and outlined in the enclosed flowchart and *Notification of Administrative Appeal Options, Process, and Request for Appeal* (NAO-RFA) Form. If you do not intend to accept the approved jurisdictional determination, you may elect to provide new information to this office for reconsideration of this decision. If you do not provide new information to this office, you may elect to submit a completed NAO-RFA Form to the Division Engineer to initiate the appeal process; the completed NAO-RFA Form must be submitted directly to the Appeal Review Officer at the address specified on the NAO-RFA Form. You will relinquish all rights to a review or an appeal, unless this office or the Division Engineer receives new information or a completed NAO-RFA Form within 60 days of the date on the NAO-RFA Form. If you intend to accept the approved jurisdictional determination, you do not need to take any further action associated with the Administrative Appeal Process.

You may refer any questions on this matter to Katerina Galacatos of my Regulatory staff by telephone at 415-503-6778 or by e-mail at Katerina.Galacatos@usace.army.mil. All correspondence should be addressed to the Regulatory Division, South Branch, referencing the file number at the head of this letter.

The San Francisco District is committed to improving service to our customers. My Regulatory staff seeks to achieve the goals of the Regulatory Program in an efficient and cooperative manner, while preserving and protecting our nation's aquatic resources. If you

would like to provide comments on our Regulatory Program, please complete the Customer Service Survey Form available on our website: http://www.spn.usace.army.mil/regulatory/.

Sincerely,

Jane M. Hicks
Chief, Regulatory Division

Enclosures

Copy Furnished (w/ encls):
RL Communities, San Ramon, CA (Attn Scott Roylance)

Copy Furnished (w/ encl 1 only):
CA RWQCB, Oakland, CA

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): January 5, 2012

B. DISTRICT OFFICE: San Francisco District **FILE NUMBER:** 2011-00094S
File Name: Garaventa Hills Project
Waterbody Name: Altamont Creek

C. PROJECT LOCATION AND BACKGROUND INFORMATION:
State: California County/parish/borough: Alameda Co. City: Livermore
(lat/long (in degree decimal format): Lat: 37.717612 N Long: -121.717612 W
Pick List (lat/long (in degree decimal format): Lat: Pick Long: Pick
Pick List (lat/long (in degree decimal format): Lat: Pick Long: Pick
Universal Transverse Mercator: UTM Zone 10
Name of nearest waterbody: Altamont Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Alameda Creek
Name of watershed or Hydrologic Unit Code (HUC): San Francisco Bay, 18050004
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☐ Office (Desk) Determination. Date:
☒ Field Determination. Date(s): April 11, 2012

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There Pick List "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*].
☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. ***Explain:***

B. CWA SECTION 404 DETERMINATION OF JURISDICTION

There are "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. Waters of the U.S:

a. Indicate presence of waters of U.S. in review area (check all that apply): [1]

☐ TNWs, including territorial seas
☐ Wetlands adjacent to TNWs
☒ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
☐ Non-RPWs that flow directly or indirectly into TNWs
☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
☒ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
☐ Impoundments of jurisdictional waters
☐ Isolated (interstate or intrastate) waters, including isolated wetlands

b. Identify (estimate) size of waters of the U.S. in the review area
Non-wetland waters: 1,590 linear feet: width (ft) and/or 0.36 acres. (other comments:)
Wetlands: 0.004 acres. (other comments:)

c. Limits (boundaries) of jurisdiction based on: Pick List
Elevation of established OHWM (if known): 8 ft.

2. Non-regulated waters/wetlands (check if applicable):[3]
☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. ***Explain:***

---
[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. **TNW**
   Identify TNW:
   Summarize rationale supporting determination that waterbody is a TNW:
2. **Wetland adjacent to TNW**
   Summarize rationale supporting conclusion that wetland is "adjacent":

B CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. **Characteristics of non-TNWs that flow directly or indirectly into TNW**

   (i) General Area Conditions:
   Watershed size: 40 acres
   Drainage area: 40 acres
   Average annual rainfall: 15 inches
   Average annual snowfall: inches

   (ii) Physical Characteristics:

   a. **Relationship with TNW:**
   ☐ Tributary flows directly into TNW
   ☒ Tributary flows through 3 tributaries before entering TNW

   Project waters are 30 (or more) river miles from TNW.
   Project waters are 2-5 river miles from RPW.
   Project waters are 20-25 aerial (straight) miles from TWN.
   Project waters are 1 (or less) aerial (straight) miles from RPW.
   Project waters cross or serve as a state boundary. ***Explain:***

   Identify flow route to TNW[5]:
   Tributary stream order, if known:

   b. **General Tributary Characteristics (check all that apply):**

   Tributary is:
   ☐ Natural: (comment if needed)
   ☐ Artificial (man-made): ***Explain:***
   ☒ Manipulated (man-altered): ***Explain:*** Creek has been channelized and flood plain reduced.

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

Tributary properties with respect to top of bank (*estimate*):

Average width: feet (measured from top of bank to top of bank)
Average depth: feet. (measured from OHWM to top of bank)
Average side slopes: Pick List

Primary tributary substrate composition (*check all that apply*):

- ☒ Silt:
- ☒ Sand:
- ☐ Clay:
- ☐ Cobbles:
- ☐ Gravel:
- ☐ Muck:
- ☐ Bedrock:
- ☐ Concrete:
- ☐ Vegetation (Type / % cover):
- ☐ Other (Explain):

Tributary condition/stability [e.g., highly eroding, sloughing banks]. ***Explain***: This section of the stream has incised, eroding/sloughing steep banks..
Presence of run/riffle/pool complexes. ***Explain***: .

Tributary geometry: Relatively Straight .

Tributary gradient (approximate average slope): 2 %

c. FLOW INFORMATION

Tributary provides for: Intermittent but not seasonal flow
Estimate average number of flow events in review area/year: 20 (or greater)
Describe flow regime: Altamont Creek appears to have flow year round due to seasonal rainfall during the winter and urban runoff during the summer and is mapped as a blue line creek on the USGS quad sheet.
Other information on duration and volume: .
Surface flow is: Pick List. Characteristics: .
Subsurface flow: Pick List. ***Explain findings***: .

- ☐ Dye (or other) test performed:. .

Tributary has (check all that apply):

- ☒ Bed and banks
- ☒ OHWM[6] (check all indicators that apply):
  - ☒ clear, natural line impressed on the bank
  - ☐ changes in the character of soil
  - ☐ destruction of terrestrial vegetation
  - ☐ vegetation matted down, bent, or absent
  - ☐ leaf litter disturbed or washed away
  - ☐ multiple observed or predicted flow events
  - ☐ water staining
  - ☐ abrupt change in plant community. ***Explain***:
  - ☐ other (list):
  - ☐ the presence of litter and debris
  - ☐ shelving
  - ☐ the presence of wrack line
  - ☐ sediment sorting
  - ☐ scour
  - ☐ sediment deposition
- ☐ Discontinuous OHWM.[7] ***Explain***:

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (***check all that apply***):

- ☐ High Tide Line indicated by: **OR** ☐ Mean High Water Mark indicated by:
  - ☐ oil or scum line along shore objects
  - ☐ fine shell or debris deposits (foreshore)
  - ☐ physical markings/characteristics
  - ☐ tidal gauges
  - ☐ other (***list***):
  - ☐ survey to available datum
  - ☐ physical markings
  - ☐ vegetation lines/changes in vegetation types

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

(iii) **Chemical Characteristics:**

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.). Explain: .

Identify specific pollutants, if known:

(iv) **Biological Characteristics. Channel supports (*check all that apply*):**

- ☐ Riparian corridor. Characteristics (type, average width):
- ☐ Wetland fringe. Characteristics:
- ☐ Habitat for:
  - ☐ Federally Listed species. ***Explain findings***:
  - ☐ Fish/spawn areas. ***Explain findings***:
  - ☐ Other environmentally-sensitive species. ***Explain findings***:
  - ☐ Aquatic/wildlife diversity. ***Explain findings***:

2. **Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:

Properties

Wetland size: acres

Wetland type. ***Explain***:

Wetland quality. ***Explain***:

Project wetlands cross or serve as state boundaries. ***Explain***:

(b) General Flow Relationship with Non-TNW:

Flow is: Pick List Explain:

Surface flow is: Pick List

Characteristics:

Subsurface flow: Pick List ***Explain findings***:

- ☐ Dye (or other) test performed:

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. ***Explain***:
  - ☐ Ecological connection. ***Explain***:
  - ☐ Separated by berm / barrier. ***Explain***:

(d) Proximity (Relationship) to TNW

Project wetlands are Pick List river miles from TNW.

Project waters are: Pick List aerial (straight) miles from TNW.

Flow is from: Pick List

Estimate approximate location of wetland as within the: Pick List floodplain.

(ii) **Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). ***Explain***:

Identify specific pollutants, if known: ***Explain***:

(iii) **Biological Characteristics. Wetland supports (*check all that apply*):**

- ☐ Riparian buffer. Characteristics (type, average width):
- ☐ Vegetation type/percent cover. ***Explain***:
- ☐ Habitat for:
  - ☐ Federally Listed species. ***Explain findings***:
  - ☐ Fish/spawn areas. ***Explain findings***:
  - ☐ Other environmentally-sensitive species. ***Explain findings***:
  - ☐ Aquatic/wildlife diversity. ***Explain findings***:

3. **Characteristics of all wetlands adjacent to the tributary (if any)**

(i) All wetland(s) being considered in the cumulative analysis: 1

(ii) Approximately (0.004) acres in total are being considered in the cumulative analysis.

(iii) For each wetland associated with the reach or waterbody being analyzed in this form, specify the following:

Number/Name[8]	Directly abuts (Yes/No)	Size
	Pick	acres
	Pick	acres
	Pick	acres
	Pick	acres
	Pick	acres
	Pick	acres

Number/Name	Directly abuts (Yes/No)	Size
	Pick	acres
	Pick	acres
	Pick	acres
	Pick	acres
	Pick	acres
	Pick	acres

(iv) Summarize overall biological, chemical and physical functions being performed: Seasonal wetlands have numerous functions and services. Seasonal wetlands provide short-term water storage that reduces downstream flood peaks and long-term water storage that helps maintain and moderate stream flows. Seasonal wetlands also retain sediments and nutrients therefore limiting downstream sedimentation and nutrient loading. Increased sedimentation and nutrient loading has been shown to decrease the water quality of the aquatic resource, the downstream traditional navigable water that supports the federally listed, endangered fish species chinook (Oncorhynchus tshawytscha), delta smelt (Hypomesus transpacificus) and green sturgeon (Acipenser medirostris).

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** ***Explain*** findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D

[8] In the Number/Name column, add the number and/or name that you have given the wetland being referred to in the table. Example, you are referring to a wetland on your wetland delineation map number 6, that you call wetland No.3 on a reach you refer to as Putah Creek. For this wetland you would add to the table in the Number/Name column, something like the following: (No. 3, Putah Ck., Map # 6).

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** ***Explain*** findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

3 **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** ***Explain*** findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

Surface water from this seasonal wetland feature can easily travel, down slope to Altamont creek, approximately four hundred feet to the south. Seasonal wetlands have numerous functions and services. Seasonal wetlands provide short-term water storage that reduces downstream flood peaks and long-term water storage that helps maintain and moderate stream flows. Seasonal wetlands also retain sediments and nutrients therefore limiting downstream sedimentation and nutrient loading. Increased sedimentation and nutrient loading has been shown to decrease the water quality of the aquatic resource, the downstream traditional navigable water that supports the federally listed, endangered fish species chinook (Oncorhynchus tshawytscha), delta smelt (Hypomesus transpacificus) and green sturgeon (Acipenser medirostris).

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

☐ **1. TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:

- ☐ TNWs: linear feet width (ft), and/or acres.
- ☐ Wetlands adjacent to TNWs: acres.

☒ **2. RPWs that flow directly or indirectly into TNWs.**

- ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
- ☒ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: Altamont Creek appears to have flow year round due to seasonal rainfall during the winter and urban runoff during the summer and is mapped as a blue line creek on the USGS quad sheet.
  Provide estimates for jurisdictional waters in the review area (***check all that apply***)
  - ☒ Tributary waters: 1,590 linear feet30width (ft).
  - ☐ Other non-wetland waters: acres.
    Identify type(s) of waters: .

☐ **3. Non-RPWs[9] that flow directly or indirectly into TNWs.**

- ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.
  Provide estimates for jurisdictional waters within the review area (***check all that apply***):
  - ☐ Tributary waters: linear feet width (ft).
  - ☐ Other non-wetland waters: acres.
    Identify type(s) of waters: .

☐ **4. Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**

- ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
  - ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in **Section III.D.2**, above. Provide rationale indicating that wetland is directly abutting an RPW: .
  - ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in **Section III.B** and rationale in **Section III.D.2**, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

☒ **5. Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**

[9]See Footnote # 3.

☒ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at **Section III.C**.

Provide acreage estimates for jurisdictional wetlands in the review area: 0.004 acres.

☐ **6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**

☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at **Section III.C**.

Provide estimates for jurisdictional wetlands in the review area: acres.

☐ **7. Impoundments of jurisdictional waters.**[10]

As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.

☐ Demonstrate that impoundment was created from "waters of the U.S.," or

☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or

☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (*CHECK ALL THAT APPLY*):[11]

☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.

☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.

☐ which are or could be used for industrial purposes by industries in interstate commerce.

☐ Interstate isolated waters. Explain: .

☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

Provide estimates for jurisdictional waters in the review area (***check all that apply***)

☐ Tributary waters: linear feet width (ft).

☐ Other non-wetland waters: acres.

Identify type(s) of waters: .

☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.

☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.

☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).

☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. ***Explain***: .

☐ Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (***check all that apply***):

☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).

---

[10] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

[11] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

☐ Lakes/ponds: acres.

☐ Other non-wetland waters: acres. List type of aquatic resource: .

☐ Wetlands: acres.

☐

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:Revised delineation submitted on .

☐ Data sheets prepared/submitted by or on behalf of the applicant/consultant.

- ☐ Office concurs with data sheets/delineation report.
- ☐ Office does not concur with data sheets/delineation report.

☒ Data sheets prepared by the Corps:See January 20, 2011 memorandum for record.

☐ Corps navigable waters' study: .

☐ U.S. Geological Survey Hydrologic Atlas: .

- ☐ USGS NHD data.
- ☐ USGS 8 and 12 digit HUC maps.

☐ U.S. Geological Survey map(s). Cite scale & quad name: .

☐ USDA Natural Resources Conservation Service Soil Survey. Citation: .

☐ National wetlands inventory map(s). Cite name: .

☐ State/Local wetland inventory map(s): .

☐ FEMA/FIRM maps: .

☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)

☐ Photographs: ☐ Aerial (Name & Date): .

☐ Other (Name & Date): .

☐ Previous determination(s). File no. and date of response letter: .

☐ Applicable/supporting case law: .

☐ Applicable/supporting scientific literature: .

☐ Other information (please specify): .

☐

B. ADDITIONAL COMMENTS TO SUPPORT JD:

☐

FIGURE 5
Garaventa Hills Estates

Alameda County
California

Township 2 South, Range 2 East
Sections 25, 26 and 35, M.D.M.

N

1 inch = 100 feet

0 125 250 500 Feet

Legend

- Property Boundary
- Data Point
- T-1 — Transect
- seasonal wetland
- Altamont Creek

Wetlands
Seasonal Wetland = 0.004 acre

Other Waters of the U.S.
Altamont Creek = 0.36 acre
Altamont Creek = 1,590.2 lineal feet

Aerial image: NAIP 2009
Map date: Jan. 2012

U.S. Army Corps of Engineers San Francisco District Regulatory Division

SPN File Number 2011-00094S
Approved Jurisdictional Determination
Garaventa Hills Estates
Livermore, Alamada County, California

Project Site Boundary

Wetland Area - Jurisdictional pursuant to Section 404 of the Clean Water Act

Altamont Creek, Other Water jurisdictional pursuant to Section 404 of the Clean Water Act

Map in one sheet

Date: January 20, 2012

Field Delineation Verified by
The Corps and Olberding Environmental
on April 11, 2011

SPECIAL-STATUS PLANT SURVEY REPORT

FOR THE

GARAVENTA HILLS ESTATES PROPERTY

LIVERMORE, CALIFORNIA

Prepared for:

RL COMMUNITIES
5000 Executive Parkway, Suite 530
San Ramon, California 94583

Prepared by:

OLBERDING ENVIRONMENTAL, INC.
Wetland Regulatory Consultants
1390 Willow Pass Road, Suite 370
Concord, CA 94520

Phone: (925) 825-2111 – FAX (925) 825-2112
Contact: Jeff Olberding

AUGUST 2011

TABLE OF CONTENTS

TABLE OF CONTENTS i
LIST OF ATTACHMENTS ii
1.0 SUMMARY 1
2.0 LOCATION 1
3.0 DESCRIPTION OF PROPOSED PROJECT AND PROJECT SITE 1
4.0 PLANT REGULATIONS 2
4.1 Federal Regulatory Setting 2
4.2 State Regulatory Setting 2
5.0 FLORISTIC INVENTORY AND HABITAT CHARACTERIZATION 3
5.1 Degraded Grassland 4
5.2 Riparian (Altamont Creek) 4
5.3 Seasonal Wetland 5
6.0 SURVEY METHODOLOGY 5
7.0 SURVEY RESULTS 6
8.0 CONCLUSIONS 8
9.0 REFERENCES 9

LIST OF ATTACHMENTS

ATTACHMENT 1 FIGURES

Figure 1	Regional Map
Figure 2	Vicinity Map
Figure 3	USGS Quadrangle Map
Figure 4	Aerial Photograph
Figure 5	CNDDB Locations of Special-Status Plants

ATTACHMENT 2 TABLES

Table 1	Special-Status Species Occurring in the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 Minute Quadrangle Maps
Table 2	Plant Species Observed

ATTACHMENT 3 SITE PHOTOGRAPHS

1.0 SUMMARY

Olberding Environmental, Inc. has performed focused botanical surveys for special-status (those species identified as rare, threatened, or endangered) plants on the Garaventa Hills Estates property (Property) located in the city limit of Livermore, Alameda County, California. Four special-status plant species were identified by the California Natural Diversity Data Base (CNDDB) and California Native Plant Society's (CNPS) *Online Inventory of Rare and Endangered Plants* as having the potential to occur on the Property based on appropriate habitat types present: Large-flowered fiddleneck (*Amsinckia grandiflora*), bent-flowered fiddleneck (*Amsinckia lunaris*), Congdon's tarplant (*Centromadia parryi ssp. congdonii*), and diamond-petaled California poppy (*Eschscholzia rhombipetala*). The following discussion provides a description of the Property's plant communities, our survey methods and the results of surveys performed during the identified blooming period for all species recognized as having the potential to occur within habitats present on the Property.

2.0 LOCATION

The Property is located north of Interstate-580 and east of Vasco Road in the city of Livermore, Alameda County, California. The site is located north of Interstate-580 and east of Vasco Road (USGS Altamont 7.5 minute quadrangle; Sections 25, 26, and 35, Township 2 South, and Range 2 East). Attachment 1, Figure 1 depicts the regional location of the Property in Alameda County and Figure 2 identifies the vicinity location. Figure 3 is a topographic map on the USGS 7.5 Quadrangle Map for Altamont. An aerial photograph of the Property is provided in Figure 4.

Access to the Property is attained by taking the Vasco Road exit from Interstate-580 (either approaching from the East or West). Go north on Vasco Road to the intersection of Vasco Road and Garaventa Ranch Road. Turn right (east) onto Garaventa for approximately 0.25-mile towards the Livermore Valley Joint Unified School District campus. Just before the school, turn left (north) onto Hawk Street and proceed until it dead-ends just south of the Altamont Creek channel. Limited parking is available along the street.

3.0 DESCRIPTION OF PROPOSED PROJECT AND PROJECT SITE

The Property consists of an approximately 31.7-acre parcel consisting predominantly of open non-native grassland habitat, which, until recently, was grazed by cattle and is bounded along the majority of the perimeter by various types of fencing (i.e., chain-link, barbed wire, and wooden). The undulating topography is moderate to moderately steep sloping, with a constrained and somewhat channelized intermittent stream feature (i.e., Altamont Creek) forming a portion of the

southern boundary of the Property. The elevation ranges from approximately 600 feet in the center of the Property, to approximately 536 feet in the extreme southwestern corner along Altamont Creek. The highest point lies along a ridgeline in the center of the Property; this ridgeline forms a natural watershed divide, with runoff draining either towards the north or south. The Property is surrounded by open space (i.e., grazed rangeland) on nearly all sides, with the exception of some interface with residential developments and the school campus along the southern boundary. Clusters of ultramafic rock outcroppings were observed along the ridgeline and hillslopes in the center and western portions of the Property. A low terrace flanks Altamont Creek along the north bank and appears to have been graded in the past.

While native herbaceous species are present, the majority of vegetative assemblages consists of naturalized species that persist in highly disturbed habitats. Plant species observed during the spring 2011 surveys can be viewed in Attachment 2 Table 2.

4.0 PLANT REGULATIONS

4.1 Federal Regulatory Setting

The Federal Endangered Species Act (ESA) of 1973 (16 USC 1531 et seq., as amended) prohibits federal agencies from authorizing, permitting, or funding any action that would result in biological jeopardy to a plant or animal species listed as Threatened or Endangered under the Act. Listed species are taxa for which proposed and final rules have been published in the Federal Register (U.S. Fish and Wildlife Service [USFWS], 2006a and 2006b). If a proposed project may jeopardize listed species, Section 7 of the ESA requires consideration of those species through formal consultations with the USFWS. Federal Proposed species (USFWS, 2006c) are species for which a proposed listing as Threatened or Endangered under ESA has been published in the Federal Register. If a proposed project may jeopardize proposed species, Section 7 of the ESA affords consideration of those species through informal conferences with USFWS. The USFWS defines federal Candidate species as “those taxa for which we have on file sufficient information on biological vulnerability and threats to support issuance of a proposed rule to list, but issuance of the proposed rule is precluded by other higher priority listing actions.” (USFWS, 2007c). Federal Candidate species are not afforded formal protection, although USFWS encourages other federal agencies to give consideration to Candidate species in environmental planning.

4.2 State Regulatory Setting

Project permitting and approval requires compliance with California Environmental Quality Act (CEQA), the 1984 California Endangered Species Act (CESA), and the 1977 Native Plant

Protection Act (NPPA). The CESA and NPPA authorize the California Fish and Game Commission to designate Endangered, Threatened and Rare species and to regulate the taking of these species (§§2050-2098, Fish & Game Code). The California Code of Regulations (Title 14, §670.5) lists animal species considered Endangered or Threatened by the State.

The Natural Heritage Division of the California Department of Fish and Game (CDFG) administers the state rare species program. The CDFG maintains lists of designated Endangered, Threatened, and Rare plant and animal species (CDFG, 2008a and 2008b). Listed species either were designated under the NPPA or designated by the Fish and Game Commission. In addition to recognizing three levels of endangerment, the CDFG can afford interim protection to candidate species while they are being reviewed by the Fish and Game Commission.

Under provisions of §15380(d) of the CEQA Guidelines, the project lead agency and CDFG, in making a determination of significance, must treat non-listed plant and animal species as equivalent to listed species if such species satisfy the minimum biological criteria for listing. In general, the CDFG considers plant species on List 1A (Plants Presumed Extinct in California), List 1B (Plants Rare, Threatened, or Endangered in California and elsewhere), or List 2 (Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere) of the California Native Plant Society's (CNPS) *Inventory of Rare and Endangered Vascular Plants of California* (Skinner and Pavlik 1994) as qualifying for legal protection under §15380(d). Species on CNPS List 3 or 4 may, but generally do not, qualify for protection under this provision.

Sensitive habitats include riparian corridors, wetlands, habitats for legally protected species and CDFG Species of Special Concern, areas of high biological diversity, areas providing important wildlife habitat, and unusual or regionally restricted habitat types. Habitat types considered sensitive include those listed on the California Natural Diversity Data Base's (CNDDB) working list of "high priority" habitats (i.e., those habitats that are rare or endangered within the borders of California) (Holland 1986).

5.0 FLORISTIC INVENTORY AND HABITAT CHARACTERIZATION

The Property is located along the eastern edge of the *San Francisco Bay Area Subdivision* of the California Floristic Province (Hickman 1993). In classifying the habitat types found in the Property, generalized plant community classification schemes were used (Sawyer, Keeler-Wolf, and Evens 2009). The final classification and characterization of the habitat types of the Property were based on field observations.

The Property supports three habitat types that consist of degraded grassland, riparian, and seasonal wetland. Each habitat is described in further detail below. A description of the plant species present within each habitat type is provided below. Dominant plant species are noted.

5.1 Degraded Grassland

The vegetation observed in the degraded grassland habitat consists of species typically encountered in highly grazed rangeland. The dominant grasses observed on the open hillslopes and upland flats of the Property consist of non-native species including soft chess (*Bromus hordeaceous*), rip-gut brome (*Bromus diandrus*), hare barley (*Hordeum murinum* ssp. *leporinum*), wild oat (*Avena fatua*), and perennial rye grass (*Festuca* [*Lolium multiflorum*] *perennis*). Forb (i.e., wildflower) species found intermixed with the grasses consist of non-native annual and biennial weeds such as prickly lettuce (*Lactuca serriola*), dove geranium (*Geranium molle*), Italian thistle (*Carduus pycnocephalus*), yellow-star thistle (*Centaurea solstitialis*), and black mustard (*Brassica nigra*); the presence of bedrock close to the surface overlain by a shallow lens of soil on many of the ridgelines and hillslopes supported nearly pure stands of shortfruit stork's bill (*Erodium brachycarpum*) and smooth cat's-ear (*Hypochaeris glabra*).

Although the frequency, density, and distribution of native species is generally low on the Property, small remnant stands of purple needlegrass (*Stipa* [*Nasella*] *pulchra*) were detected in some areas. Native forbs observed included California poppy (*Eschscholzia californica*), fiddleneck (*Amsinckia intermedia* and *A. menziesii*), soap plant (*Chlorogalum pomeridianum*), dove weed (*Croton setigerus*), vinegarweed (*Trichostema lanceolatum*), pitgland tarweed (*Holocarpha virgata* spp. *virgata*), and common tarweed (*Centromadia pungens* ssp. *pungens*).

5.2 Riparian (Altamont Creek)

Altamont Creek contains herbaceous riparian (i.e., "streamside") habitat within a fairly confined channel. There is no shrub or tree layer associated with this feature, and the herbaceous groundlayer along the banks consists largely of graminoids (i.e., grasses and grass-like plants) including California tule (*Schoenoplectus californicus*), Baltic rush (*Juncus balticus*), iris-leaved rush (*Juncus xiphioides*), tall flatsedge (*Cyperus eragrostis*) foxtail (*Setaria* sp.), creeping wild rye (*Elymus* [*Leymus*] *triticoides*), and sparse patches of salt grass (*Distichlis spicata*). Forbs observed included hedge-nettle (*Stachys* sp.), narrow-leaved milkweed (*Asclepias fasicularis*), seep monkeyflower (*Mimulus guttatus*), bull thistle (*Cirsium vulgare*), and dock (*Rumex crispus* and *R. conglomeratus*). A hiking/biking recreational path lies along the southern boundary above the channel and supports landscape plantings of native oaks (*Quercus agrifolia* and *Q. lobata*).

A low graded terrace flanks the northern bank of Altamont Creek. Vegetation observed included a mix of upland and hydrophytic species including rip-gut brome, soft chess, Mediterranean barley (*Hordeum marinum* var. *gussoneanum*), bird's-foot trefoil (*Lotus corniculatus*), Mediterranean lineseed (*Bellardia trixago*), annual fireweed (*Epilobium brachycarpum*), English plantain (*Plantago lanceolatum*), silverscale saltbush (*Atriplex argentea*), sticky sand-spurrey (*Spergularia macrotheca* var. *longistyla*), owl's clover (*Castilleja densiflora*), Johnny-tuck (*Triphysaria eriantha*), alkali heath (*Frankenia salina*), rose clover (*Trifolium hirtum*), sour clover (*Melilotus indicus*), and stinkweed (*Dittrichia graveolens*).

5.3 Seasonal Wetland

A single seasonal wetland was mapped in the western portion of the Property. This feature is located at the toeslope below rock outcroppings, and appears to have been an old borrow pit. Hydrophytes observed along the edges of this feature included Mediterranean barley, Italian rye grass, curly dock, and stalked popcornflower (*Plagiobothrys stipitatus* var. *micranthus*).

6.0 SURVEY METHODOLOGY

Olberding Environmental queried a literature review and special-status species databases in order to identify special-status plant species and sensitive habitat types with potential to occur in the study area. Sources reviewed include: California Natural Diversity Data Base (CNDDB) occurrence records (CNDDB 2011) and the California Native Plant Society (CNPS) *Inventory* (Skinner and Pavlik 1994) for the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain USGS 7.5 quadrangles; and standard flora (Hickman 1993). From the above sources, a list of special-status plant species with potential to occur in the project vicinity was developed (Attachment 2, Table 1).

Special-status plant surveys were conducted by Olberding Environmental botanist Christopher Bronny on March 12, April 28, May 25, June 25, and August 15, 2011. The surveys followed the California Department of Fish and Game (CDFG) (2000) and CNPS (2001) published survey guidelines. These guidelines state that special-status surveys should be conducted at the proper time of year when special-status and locally significant plants are both evident and identifiable. These guidelines also state that the surveys be floristic in nature with every plant observed identified to the species, subspecies, or variety as necessary to determine their rarity status. Finally, these surveys must be conducted in a manner that is consistent with conservation ethics and accepted plant collection and documentation techniques. Following these guidelines, surveys were conducted during the time period when special-status plant species from the region were known to be evident and flowering. Surveys were intuitively-controlled and consisted of walking meandering transects through upland and wetland areas of the Property were potentially

suitable habitat for special-status species could occur; emphasis was placed on assessing the rock outcroppings and other areas supporting the highest percentage of native taxa in terms of their overall frequency, density, and distribution throughout the Property.

A list of all vascular plant taxa encountered within the Property was recorded in the field (see Attachment 2, Table 2). Nearly all species observed within the Property were identified to species; all were identified to the level needed to determine whether they qualify as special-status plants. Final determinations for collected plant material were made by keying using *The Jepson Manual* and other sources.

7.0 SURVEY RESULTS

Attachment 2, Table 1 includes a list of special-status plants with the potential to occur within or in the immediate vicinity of the Property based on a review of the USGS 7.5 minute quadrangles for Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain. The special-status plant species identified by the CNDDB as potentially occurring in the Property are known to grow from general habitat types similar to those encountered on the subject Property. Many of the specific habitats, soil substrates, or "micro-climate" necessary for the plant species to occur were absent within the boundaries of the subject Property. The habitats necessary to support the CNDDB reported plant species consist of a variety of habitats including valley and foothill grassland, cismontane woodland, chaparral, vernal pool, and chenopod scrub. While several of the special-status plants identified in Table 1 have the potential to occur on the Property as a result of the specific habitats identified within the Property boundaries (e.g., valley and foothill grassland), many are considered extirpated (i.e., locally extinct) and are unlikely to occur, absence of suitable soil substrates (e.g., friable clay soils), or no longer persist due to continuous grazing regimes of special-status species generated by the CNDDB and CNPS queries. Based on existing habitats, the following is a list of special-status plant species having the greatest potential to occur on the Property.

Large-Flowered Fiddleneck (*Amsinckia grandiflora*). Federal and State Endangered; CNPS List 1B.1

Large-flowered fiddleneck is an annual of the family *Boraginaceae*. The inflorescence is spike-like and coiled at the tip with multiple large reddish-orange flowers. It is distributed throughout the inner north coast ranges of California, in the west Central Valley, and the San Francisco Bay Area. Habitat consists of cismontane woodland and valley and foothill grassland in various soils. The blooming period is between April and May.

While the degraded grasslands on the Property provide potentially suitable habitat to support this species, it is considered extirpated from the area. This species was not observed during the spring/summer 2011 surveys and is presumed absent from the Property.

Bent-Flowered Fiddleneck (*Amsinckia lunaris*). CNPS List 1B.2

Bent-flowered fiddleneck is an annual of the family *Boraginaceae*. The inflorescence is spike-like and coiled at the tip with multiple small orange flowers. It is distributed throughout the inner north coast ranges of California, in the west Central Valley, and the San Francisco Bay Area. Habitat consists of coastal bluff scrub, cisomontane woodlands, and valley and foothill grasslands. The blooming period is between March and June.

While the degraded grasslands on the Property provide potentially suitable habitat to support this species, it is considered extirpated from the area. This species was not observed during the spring/summer 2011 surveys and is presumed absent from the Property.

Congdon's Tarplant (*Centromadia parryi* ssp. *congdonii*). CNPS List 1B.2

Congdon's tarplant is a member of the sunflower family (*Asteraceae*). It is one of four subspecies of Parry's tarplant (*Centromadia parryi*). Congdon's tarplant is a prostrate to erect, annual herb with rigidly spine-tipped leaves and yellow ray- and disk-flowers (head). It occurs in valley and foothill grasslands in moist alkaline soils and blooms between June and November. Historically, Congdon's tarplant was distributed from Solano County south to San Luis Obispo County.

While the degraded grasslands on the Property provide potentially suitable habitat to support this species, this species was not observed during the spring/summer 2011 surveys and is presumed absent from the Property.

Diamond-Petaled California Poppy (*Eschscholzia rhombipetala*). CNPS List 1B.1

Diamond-petaled California poppy is a member of the poppy family (*Papaveraceae*). This erect annual herb grows from 5-30 cm in height with yellow petals 3-15mm in length. After pollination, a barrel-shaped receptacle is formed. It occurs in valley and foothill grasslands in alkaline and clay soil substrates on slopes and flats.

While the degraded grasslands on the Property provide potentially suitable habitat to support this species, it is considered extirpated from the area. This species was not observed during the spring/summer 2011 surveys and is presumed absent from the Property.

8.0 CONCLUSIONS

During the Spring/Summer 2011 special-status plant surveys, a total of 90 vascular plants were detected and identified within the boundaries of the Property. The relative percent cover of native species within the Property is extremely low. Of these 90 species, slightly less than half – 44 species - are native to California; the remaining 46 species are naturalized, and introduced to California from other countries.

Four special-status plant species were identified as having the potential to occur on the Property based on general habitat descriptions (valley and foothill grassland). The special-status plants that were identified on the Property occurred due to the presence of potentially suitable habitat. However, existing habitat quality is low, and no special-status species were detected during the surveys performed during the appropriate blooming periods for each plant. No special-status plant species were observed during the five focused botanical surveys.

Under provisions of §15380(d) of the CEQA Guidelines, the project lead agency and CDFG, in making a determination of significance, must treat non-listed plant species as equivalent to listed species if such species satisfy the minimum biological criteria for listing. In general, the CDFG considers plant species on List 1A (Plants Presumed Extinct in California), List 1B (Plants Rare, Threatened, or Endangered in California and elsewhere), or List 2 (Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere) of the CNPS as qualifying for legal protection under §15380(d).

9.0 REFERENCES

Barbour, M.G., T. Keeler-Wolf, and A.A. Schoenherr. 2007. Terrestrial vegetation of California. University of California Press.

Beidleman, L. H. and E. N. Kozloff. 2003. Plants of the San Francisco Bay region. University of California Press, Berkeley and Los Angeles, California.

California Department of Fish and Game Natural Diversity Data Base, computer listings and map locations of historic and current recorded occurrences of special-status species and natural communities of special concern for USGS 7.5 minute quadrangle maps: (*Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain). (February 2011).*

California Department of Fish and Game. 2007. State and federally listed Endangered, Threatened, and Rare plants of California. http://www.dfg.ca.gov/endangered/t_eplnt.pdf.

_____. 2000. Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened, and Endangered Plants and Natural Communities.

California Native Plant Society (CNPS). 2011. Inventory of Rare and Endangered Plants (online edition, v6-04d1). California Native Plant Society. Sacramento, CA. Accessed on February 2011 from http://www.cnps.org/inventory.

_____. 2001. CNPS Botanical Survey Guidelines.

DiTomaso, J.M. and E.A. Healy. 2007. Weeds of California and other western states. Vol. 1 and 2. University of California; Agriculture and Natural Resources Publication 3488. Oakland, CA.

Ertter, B. 1997. Annotated checklist of the East Bay flora. Special Publication #3; California Native Plant Society, East Bay Chapter.

Hickman, J. C. (ed.). 1993. The Jepson manual: higher plants of California. University of California Press, Berkeley, CA. 1400 pp.

Holland, R.F. 1986. Preliminary Description of the Natural Communities of California. CDFG.

Sawyer, J.O., T. Keeler-Wolf, and J. Evens. 2009. A manual of California vegetation. 2nd Ed. California Native Plant Society, Sacramento, Ca.

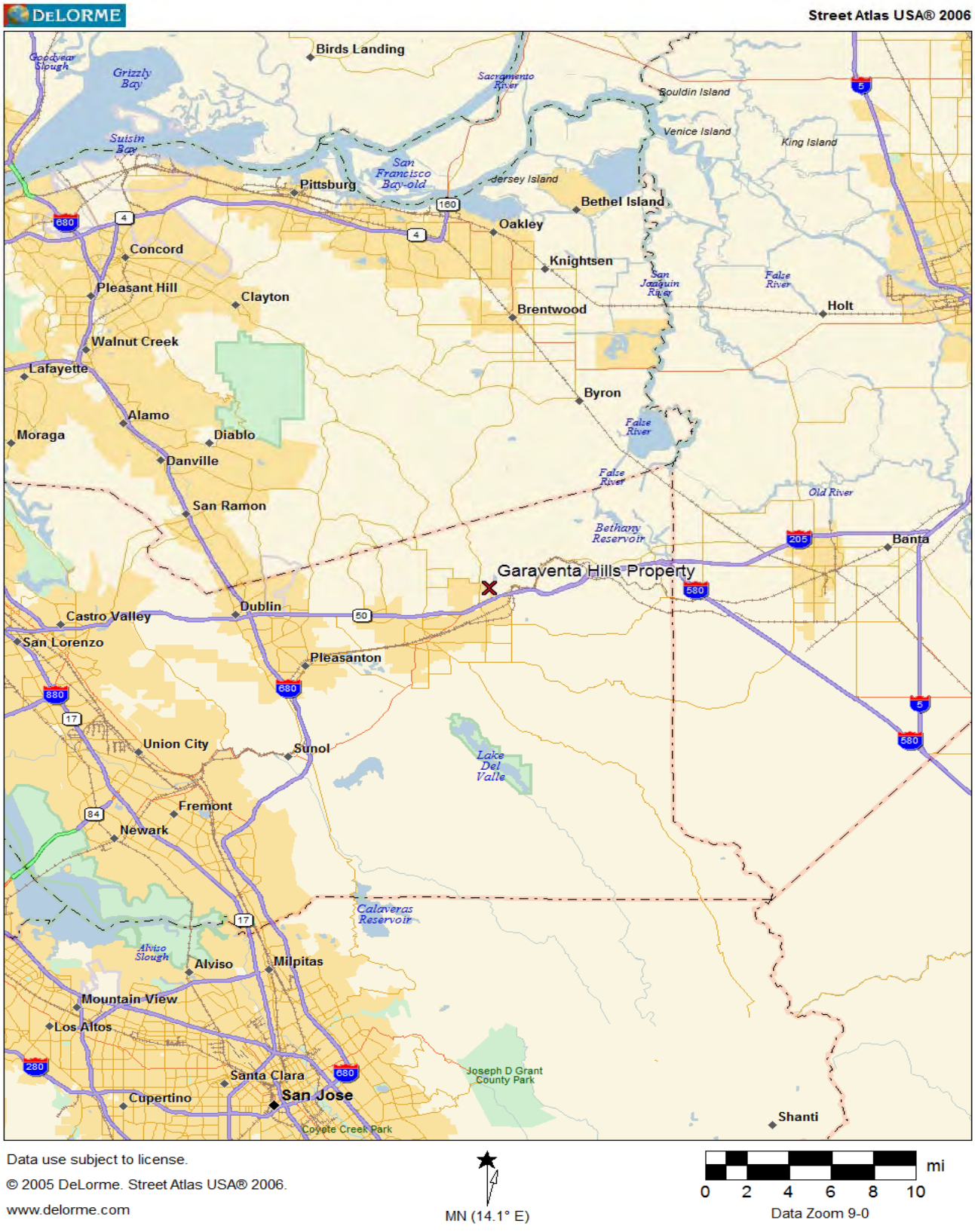
Skinner, M. W. and B. M. Pavlik (eds.). 1994. Inventory of rare and endangered vascular plants of California. California Native Plant Society Special Publication No. 1 (5th edition). California Native Plant Society, Sacramento, CA. 338 pp.

ATTACHMENTS

ATTACHMENT 1
FIGURES

Figure 1 **Regional Map**
Figure 2 **Vicinity Map**
Figure 3 **USGS Quadrangle Map for Altamont**
Figure 4 **Aerial Photograph**
Figure 5 **Map of CNDDB Reports of Special-Status Plants**

Figure 1
Regional Map



Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583
Phone: (925) 866-2111

This document is not intended for detail design work.

Figure 1
Regional Map of the Garaventa Hills Estates Property
Alameda County, California

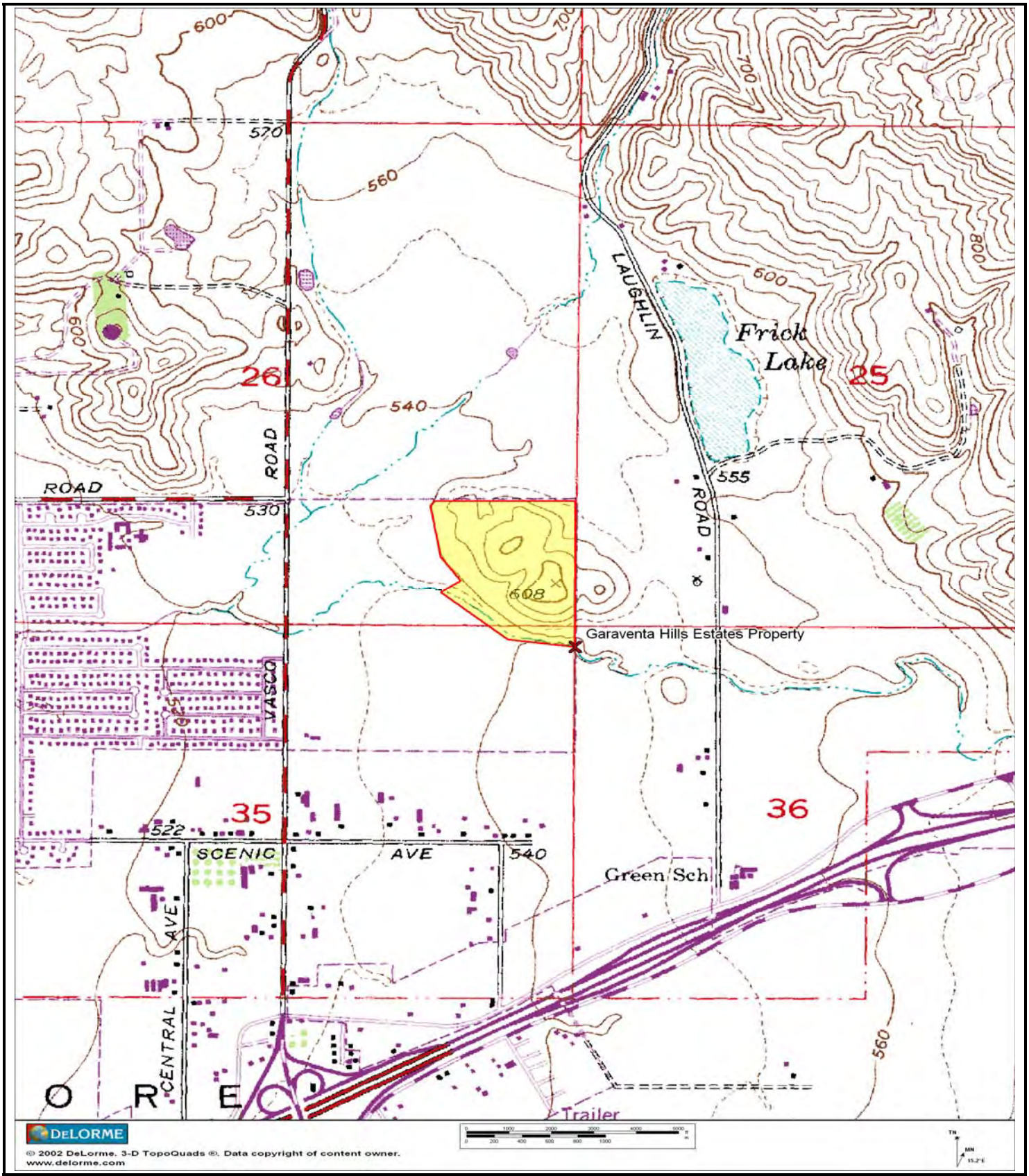
Figure 2
Vicinity Map

Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583
Phone: (925) 866-2111

This document is not intended for detail design work.

Figure 2
Vicinity Map of the Garaventa Hills Estates Property
Alameda County, California

Figure 3
USGS Quadrangle Map for
Altamont



Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583
Phone: (925) 866-2111

This document is not intended for detail design work.

Figure 3
USGS Quadrangle Map of the Garaventa Hills Estates Property
Altamont Quadrangle
Alameda County, California

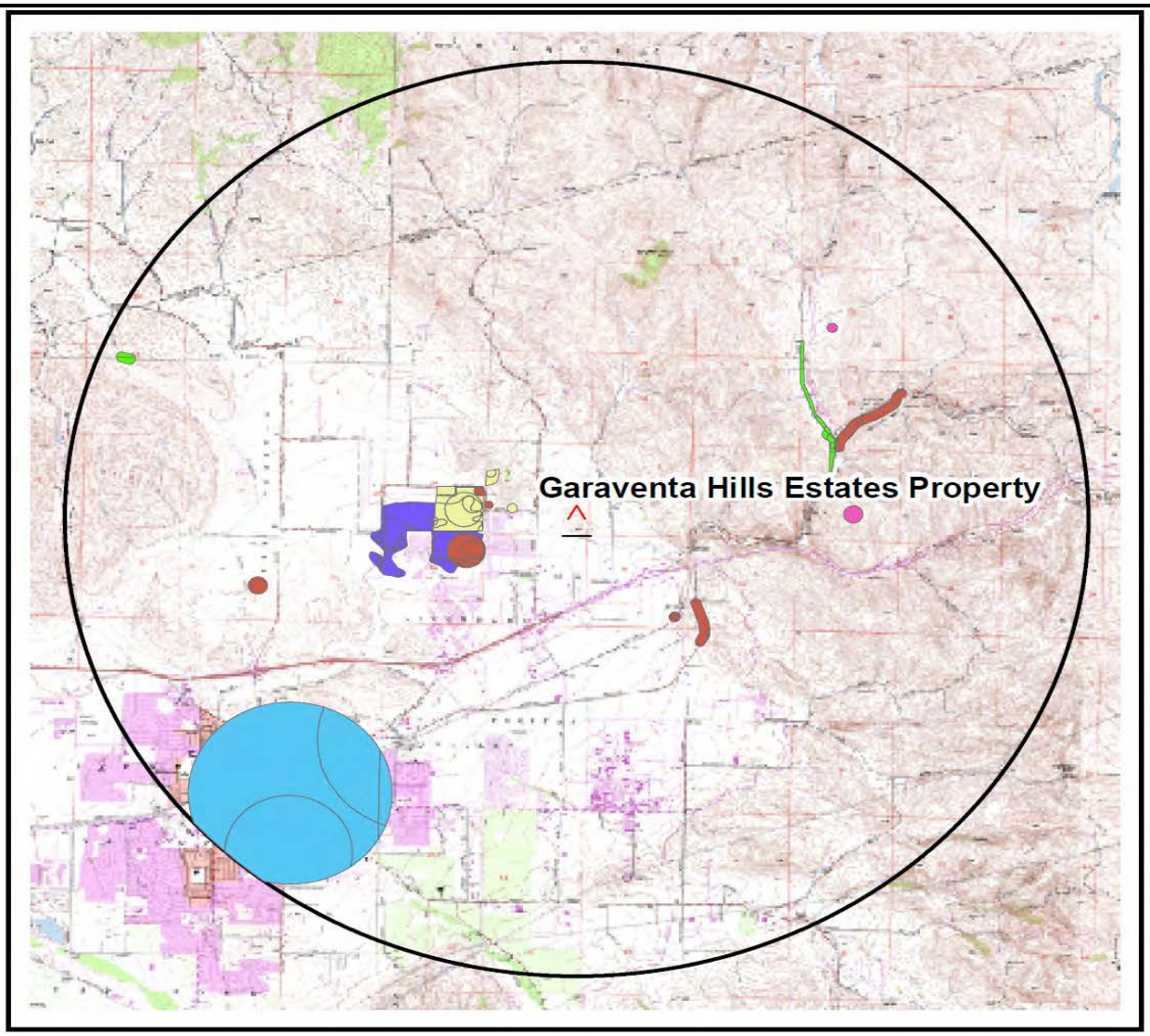
Figure 4
Aerial Photograph

Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583
Phone: (925) 866-2111

This document is not intended for detail design work.

Figure 4
Aerial Photograph of the Garaventa Hills Estates Property
Alameda County, California

Figure 5
Map of CNDDB Reports of Special-Status Plants



Olberding Environmental, Inc.
3170 Crow Canyon Place, Suite 260
San Ramon, California 94583
Phone: (925) 866-2111

This document is not intended for detail design work.

Figure 5
CNDDB Map of Special-Status Plants Near the Garaventa Hills Estates Property Within a 5-Mile Radius and Within the Last 10 Years
Alameda County, California

ATTACHMENT 2
TABLES

Table 1

Special-Status Species Occurring in the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 Minute Quadrangle Maps

Table 1
Special-Status Species for the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 Minute Quadrangle Maps[1]

Common Name/ Scientific Name	Status (Fed/State/ CNPS)[2]	Blooming or Survey Period	Habitats of Occurrence	Potential on Site	Status on Site**
PLANTS					
Sharsmith's Onion (*Allium sharsmithiae*)	-/-/1B.3	March – May	Cismontane woodland, chaparral; rocky, serpentine slopes.	No	Presumed Absent
Large-Flowered Fiddleneck (*Amsinckia grandiflora*)	E/E/1B.1	April – May	Cismontane woodland and valley and foothill grassland in various soils.	Low	Possibly Extirpated
Bent-Flowered Fiddleneck (*Amsinckia lunaris*)	-/-/1B.2	March – June	Cismontane woodland, valley and foothill grassland, and coastal bluff scrub.	Low	Possibly Extirpated
Slender Silver Moss (*Anomobryum julaceum*)	-/-/2.2	N/A	Broadleafed upland forest; lower montane coniferous forest; North Coast coniferous forest/damp rock and soil on outcrops, usually on roadcuts.	No	Presumed Absent
Mount Diablo Manzanita (*Arctostaphylos auriculata*)	-/-/1B.3	January – March	Chaparral, in canyons and on slopes, on sandstone.	No	Presumed Absent
Contra Costa Manzanita (*Arctostaphylos manzanita* ssp. *laevigata*)	-/-/1B.2	January – February	Chaparral, rocky slopes.	No	Presumed Absent
Alkali Milk-Vetch (*Astragalus tener* var. *tener*)	-/-/1B.2	March – June	Playas, valley and foothill grasslands in adobe clay soils, and vernal pools in alkaline soils.	No	Possibly Extirpated
Heartscale (*Atriplex cordulata*)	-/-/1B.2	April – October	Chenopod scrub, valley and foothill grassland on alkaline flats and scalds, sandy soils.	No	Presumed Absent
Brittlescale (*Atriplex depressa*)	-/-/1B.2	May – October	Chenopod scrub, meadows and sinks, playas, valley and foothill grasslands, and alkaline vernal pools with clay substrate.	No	Presumed Absent
San Joaquin Spearscale (*Atriplex joaquiniana*)	-/-/1B.2	April – October	Chenopod scrub, meadows and seeps, playas, valley and foothill grassland in alkaline soils.	No	Presumed Absent
Big-Scale Balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*)	-/-/1B.2	March – June	Chaparral, cismontane woodland, and valley and foothills grasslands, sometimes in serpentinite outcrops.	No	Presumed Absent

Table 1
Special-Status Species for the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 Minute Quadrangle Maps[1]

Common Name/ Scientific Name	Status (Fed/State/ CNPS)[2]	Blooming or Survey Period	Habitats of Occurrence	Potential on Site	Status on Site**
Big Tarplant (*Blepharizonia plumosa*)	-/-/1B.1	July – October	Valley and foothill grassland, dry hills and plains in annual grassland, clay to clay-loam soils; usually on slopes and often in burned areas.	No	Presumed Absent
Round-Leaved Filaree (*California macrophylla*)	-/-/1B.1	March – May	Cismontane woodland and valley and foothill grassland in clay soils.	No	Presumed Absent
Mount Diablo Fairy-Lantern (*Calochortus pulchellus*)	-/-/1B.2	April – June	Chaparral, cismontane woodland, riparian woodland, and valley and foothill grassland; on wooded and brushy slopes.	No	Presumed Absent
Chaparral Harebell (*Campanula exigua*)	-/-/1B.2	May – June	Chaparral, in rocky, usually serpentine soils.	No	Presumed Absent
Lemmon's Jewelflower (*Caulanthus lemmonii*)	-/-/1B.2	March – May	Pinyon and juniper woodland and valley and foothill grassland.	No	Presumed Absent
Congdon's Tarplant (*Centromadia parryi* ssp. *congdonii*)	-/-/1B.2	June – November	Valley and foothill grasslands in alkaline soils.	Low	May Occur
Mount Hamilton Fountain Thistle (*Cirsium fontinale* var. *campylon*)	-/-/1B.2	(February) April – October Months in parentheses are uncommon	Cismontane woodland, chaparral, valley and foothill grassland; in seasonal and perennial drainages on serpentine seeps.	No	Presumed Absent
Santa Clara Red Ribbons (*Clarkia concinna* ssp. a*utomixa*)	-/-/4.3	May – June	Cismontane woodland, chaparral, on slopes and near drainages.	No	Presumed Absent
Hispid Bird's-Beak (*Cordylanthus mollis* ssp. *hispidus*)	-/-/1B.1	June – September	Meadows and seeps, playas, valley and foothill grasslands in alkaline soils.	No	Presumed Absent
Palmate-Bracted Bird's-Beak (*Cordylanthus palmatus*)	E/E/1B.1	May – October	Chenopod scrub, valley and foothill grassland; usually on Pescadero silty clay which is alkaline, with *Distichlis*, *Frankenia*, etc.	No	Presumed Absent
Livermore Tarplant (*Deinandra bacigalupii*)	-/-/1B.2	June – October	Alkaline meadows and seeps.	No	Presumed Absent

Table 1
Special-Status Species for the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 Minute Quadrangle Maps[1]

Common Name/ Scientific Name	Status (Fed/State/ CNPS)[2]	Blooming or Survey Period	Habitats of Occurrence	Potential on Site	Status on Site**
Hospital Canyon Larkspur (*Delphinium californicum* ssp. *interius*)	-/-/1B.2	April – June	Cismontane woodland, chaparral; in wet, boggy meadows, openings in chaparral and in canyons, mesic.	No	Presumed Absent
Recurved Larkspur (*Delphinium recurvatum*)	-/-/1B.2	March – May	Chenopod scrub, cismontane woodland, and valley and foothill grasslands in alkaline soils.	No	Presumed Absent
Diamond-Petaled California Poppy (*Eschscholzia rhombipetala*)	-/-/1B.1	March – April	Valley and foothill grassland, alkaline, clay slopes and flats.	Low	Rediscovered at Lawrence Livermore Laboratory Site 300 in 1997; Possibly Extirpated
Stinkbells (*Fritillaria agrestis*)	-/-/4.2	February – April	Cismontane woodland, chaparral, valley and foothill grassland; sometimes on serpentine, mostly found on non-native grassland or in grassy openings in clay soil.	No	Presumed Absent
Talus Fritillary (*Fritillaria falcata*)	-/-/1B.2	March – May	Chaparral, cismontane woodland, lower montane coniferous forest; on shale, granite, or serpentine talus.	No	Presumed Absent
Diablo Helianthella (*Helianthella castanea*)	-/-/1B.2	March – June	Broadleafed upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland. Usually in chaparral/oak woodland interface in rocky, azonal soils, often in partial shade.	No	Presumed Absent
Brewer's Western Flax (*Hesperolinon breweri*)	-/-/1B.2	May – July	Chaparral, cismontane woodland, valley and foothill grassland. Often in rocky serpentine soils.	No	Presumed Absent
Napa Western Flax (*Hesperolinon serpentinum*)	-/-/1B.1	May – July	Chaparral in serpentine soils.	No	Presumed Absent

Table 1
Special-Status Species for the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 Minute Quadrangle Maps[1]

Common Name/ Scientific Name	Status (Fed/State/ CNPS)[2]	Blooming or Survey Period	Habitats of Occurrence	Potential on Site	Status on Site**
Woolly Rose-Mallow (*Hibiscus lasiocarpus*)	-/-/2.2	June – September	Freshwater marshes and swamps; moist, freshwater-soaked river banks and low peat islands in sloughs; in California, known from the Delta watershed.	No	Presumed Absent
Loma Prieta Hoita (*Hoita strobilina*)	-/-/1B.1	May – October	Chaparral, cismontane woodland, riparian woodland, usually in mesic, serpentine soils.	No	Presumed Absent
Legenere (*Legenere limosa*)	-/-/1B.1	April – June	Vernal pools.	No	Presumed Absent
Mount Hamilton Coreopsis (*Leptosyne hamiltonii*)	-/-/1B.2	March – May	Cismontane woodland, on steep shale talus with open southwestern exposure.	No	Presumed Absent
Mason's Lilaeopsis (*Lilaeopsis masonii*)	-/R/1B.1	April – November	Brackish or freshwater marshes and swamps.	No	Presumed Absent
Delta Mudwort (*Limosella subulata*)	-/-/2.1	May – August	Riparian scrub, freshwater marsh, brackish marsh, swamps; usually on mud banks of the Delta in marshy or scrubby riparian associations, often with *Lilaeopsis masonii*. Probably the rarest of the suite of Delta rare plants.	No	Presumed Absent
Showy Golden Madia (*Madia radiata*)	-/-/1B.1	March – May	Valley and foothill grassland, cismontane woodland, chenopod scrub, mostly on adobe clay in grassland or among shrubs.	No	Presumed Absent
Hairless Popcorn-Flower (*Plagiobothrys glaber*)	-/-/1A	March – May	Meadows and seeps, marshes and swamps, coastal salt marshes and alkaline meadows.	No	Considered Extinct
Rayless or Chaparral Ragwort (*Senecio aphanactis*)	-/-/2.2	January – April	Cismontane woodland, coastal scrub, drying alkaline flats, chaparral.	No	Presumed Absent
Most Beautiful Jewel-Flower (*Streptanthus albidus* ssp. *peramoenus*)	-/-/1B.2	April – June	Chaparral, cismontane woodland, and valley and foothill grasslands in serpentine soils on ridges and slopes.	No	Presumed Absent
Saline Clover (*Trifolium hydrophilum*)	-/-/1B.2	April – June	Marshes and swamps, valley and foothill grasslands with mesic, alkaline soils, and vernal pools.	No	Presumed Absent

Table 1
Special-Status Species for the Altamont, Byron Hot Springs, Clifton Court Forebay, Livermore, La Costa Valley, Tassajara, Midway, Mendenhall Springs, and Cedar Mountain 7.5 Minute Quadrangle Maps[1]

Common Name/ Scientific Name	Status (Fed/State/ CNPS)[2]	Blooming or Survey Period	Habitats of Occurrence	Potential on Site	Status on Site**
Caper-Fruited Tropidocarpum (*Tropidocarpum capparideum*)	-/-/1B.1	March – April	Valley and foothill grasslands on alkaline hills.	No	Possibly Extirpated
Oval-Leaved Viburnum (*Viburnum ellipticum*)	-/-/2.3	May – June	Chaparral, cismontane woodlands, and lower montane coniferous forest.	No	Presumed Absent

1. Special-status plants as reported by the California Natural Diversity Data Base, California Native Plant Society, and other background research June 2011.
2. Order of Codes for Plants - Fed/State/CNPS
   Codes:
   E - Federally/State Listed as an Endangered Species
   R - Rare
   1B - California Native Plant Society considers the plant Rare, Threatened, or Endangered in California and elsewhere.
   1A - CNPS Plants presumed extinct in California.
   2 - CNPS Plants Rare, Threatened or Endangered in California, but more common elsewhere.
   3 - CNPS Plants on a review list to find more information about a particular species.
   4 - CNPS Plants of limited distribution - a watch list.
   CNPS Threat Code Extension
   1. Species seriously endangered in California
   2. Species fairly endangered in California
   3. Species not very endangered in California

Table 2
Plant Species Observed

Project: Garaventa Property, Alameda Co., California
Dates: 3/12/2011; 8/15/2011
Botanist: Christopher Bronny
*denotes naturalized species
[ ] denotes recent taxonomic name changes (TJM2)

Family	Scientific Name	Common Name	
Section - Eudicots			
Apiaceae	*Sanicula bipinnatifida*	Purple sanicle	
Apocynaceae	*Asclepias fascicularis*	Narrow-leaved milkweed	
Asteraceae	*Baccharis pilularis*	Coyote brush	
	*Carduus pycnocephalus**	Italian thistle	
	*Centaurea solstitialis**	Yellow star-thistle	
	Centromadia pungens ssp. *pungens*	Common tarweed	
	*Cirsium vulgare**	Bull thistle	
	*Dittrichia graveolens**	Stinkweed	
	*Filago gallica**	Narrowleaf cottonrose	
	Holocarpha virgata spp. *virgata*	Pitgland tarweed	
	*Hypochaeris glabra**	Smooth cat's-ear	
	*Hypochaeris radicata**	Rough cat's-ear	
	*Lactuca serriola**	Prickly lettuce	
	*Picris echioides**	Bristly ox-tongue	
	*Senecio vulgaris**	Common groundsel	
	*Silybum marianum**	Milk thistle	
	*Tragopogon porrifolius**	Salsify	
Boraginaceae	*Amsinckia intermedia*	Common fiddleneck	
	Amsinckia menziesii	Small-flowered fiddleneck	
	Plagiobothrys stipitatus var. *micranthus*	Stalked popcornflower	
Brassicaceae	*Brassica nigra**	Black mustard	
	Cardamine oligosperma	Bitter-cress	
	*Raphanus sativus**	Wild radish	
Caryophyllaceae	*Cerastium glomeratum**	Mouse-ear chickweed	
	Spergularia macrotheca var. *longistyla*	Sticky sand-spurrey	
Chenopodiaceae	*Atriplex argentea*	Silverscale saltbush	
Convolvulaceae	*Convolvulus arvensis**	Field bindweed	
Crassulaceae	*Crassula conata*	Sand pygmyweed	
Euphorbiaceae	*Croton setigerus*	Dove weed	

Fabaceae	*Lotus corniculatus**	Bird's-foot trefoil
	Lotus humistratus	Hill lotus
	*Lupinus*sp.	Lupine
	*Medicago polymorpha**	California bur-clover
	*Melilotus albus**	White sweet clover
	*Melilotus indicus**	Sour clover
	*Trifolium hirtum**	Rose clover
	Trifolium microcephalum	Small-head clover
	Trifolium willdenovii	Tomcat clover
	Vicia sativa spp. *sativa**	Spring vetch
Fagaceae	*Quercus agrifolia*	Coast live oak
	Quercus lobata	Valley oak
Frankeniaceae	*Frankenia salina*	Alkali heath
Geraniaceae	*Erodium botrys**	Filaree
	*Erodium brachycarpum**	Shortfruit stork's bill
	*Erodium cicutarium**	Red-stem filaree
	*Geranium molle**	Dove geranium
Lamiaceae	*Lamium amplexicaule**	Dead nettle
	Stachys sp.	Hedge-nettle
	Trichostema lanceolatum	Vinegarweed
Lythraceae	*Lythrum hyssopifolia**	Hyssop loosestrife
Montiaceae	*Calandrinia ciliata*	Red maids
	Claytonia perfoliata	Miner's lettuce
Mrysinaceae	*Anagallis arvensis**	Scarlet pimpernel
Onagraceae	*Clarkia purpurea* ssp. *quadrivulnera*	Clarkia
	Epilobium brachycarpum	Annual fireweed
	Epilobium ciliatum	Willow-herb
Orobanchaceae	*Bellardia trixago**	Mediterranean lineseed
	Castilleja densiflora	Owl's clover
	Triphysaria eriantha	Johnny-tuck
Papaveraceae	*Eschscholzia californica*	California poppy
	Platystemon californicus	Cream cups
Phrymaceae	*Mimulus guttatus*	Seep monkeyflower
Plantaginaceae	*Plantago lanceolata**	English plantain
Polygonaceae	*Rumex conglomeratus**	Clustered dock
	*Rumex crispus**	Curly dock
	*Rumex pulcher**	Fiddle dock
Salicaceae	*Populus fremontii*	Fremont's cottonwood
Section - Monocots		
Agavaceae	*Chlorogalum pomeridianum*	Soap plant
Cyperaceae	*Cyperus eragrostis*	Tall flatsedge

	Schoenoplectus californicus	California tule
Juncaceae	*Juncus balticus*	Baltic rush
	Juncus bufonius	Toad rush
	Juncus xiphioides	Iris-leaved rush
Poaceae	*Avena barbata**	Slender wild oat
	*Avena fatua**	Wild oat
	*Bromus diandrus**	Rip-gut brome
	*Bromus hordeaceus**	Soft chess
	Bromus madritensis ssp. *rubens**	Red brome
	*Cortaderia selloana**	Pampas grass
	Distichlis spicata	Salt grass
	Elymus [*Leymus*] *triticoides*	Creeping wild-rye
	Festuca [*Lolium*] *perennis**	Perennial rye grass
	Festuca **[***Vulpia*] *myuros**	Rat-tail fescue
	Hordeum marinum ssp. *gussoneanum**	Mediterranean barley
	Hordeum murinum ssp. *leporinum**	Hare barley
	*Poa annua**	Annual bluegrass
	*Polypogon monspeliensis**	Rabbit's-foot grass
	Setaria sp.	Foxtail
	Stipa [*Nasella*] *pulchra*	Purple needlegrass
Typhaceae	*Typha angustifolia*	Narrow-leaved cattail

ATTACHMENT 3
PHOTOGRAPHS

Photo 1. Rock outcropping supporting soap plant along ridgeline in central portion of property, facing southeast. Photo taken during March 2011 survey.

Photo 2. Purple needlegrass remnant on hillslope. Bedrock occurs a few inches below the surface; low cover surrounding remnant grass consists of shortfruit stork's bill and smooth cat's-ear. Photo taken during March 2011 survey.

Photo 3. Altamont Creek channel. Photograph was taken in January 2011 during preliminary jurisdictional delineation of wetlands and other waters of the U.S. on the Property.

Photo 4. Seasonal wetland in southern portion of Property. Photograph taken in January 2011 during preliminary jurisdictional delineation of wetlands and other waters of the U.S. on the Property.

OLBERDING ENVIRONMENTAL, INC.
Wetland Regulation and Permitting

January 18, 2012

Mr. Scott Roylance
RL Communities
5000 Executive Parkway, Suite 530
San Ramon, California 94583

Subject: Garaventa Hills Estates – Mitigation Proposal

Dear Mr. Roylance:

This letter is intended to provide information related to our mitigation proposal for the Garaventa Hills Estates Residential Development Project (Project) located in City of Livermore, Alameda County, California. The Project involves the permanent fill of U.S. Army Corps of Engineers (Corps) jurisdictional wetlands/waters for the purpose of filling and relocating a segment of Altamont Creek, facilitating the construction of a bridge crossing which allows access to the residential development project.

The proposed activity will permanently impact approximately 0.004 acre of seasonal wetland habitat and 0.053 acre (290 linear feet) of intermittent drainage channel habitat (Altamont Creek). Altamont Creek is regulated by the Corps, the Regional Water Quality Control Board (RWQCB) and California Department of Fish and Game (CDFG). Field verification of the extent of Corps jurisdiction took place on April 11, 2011. Jurisdictional impacts will include the placement of approximately 350 cubic yards (cy) of clean earthen fill into jurisdictional waters in association with the proposed channel relocation activity. Relocation of the channel several feet to the north of its current location would allow for the construction of a pier supported bridge structure required to access the proposed residential development site. In addition to the channel relocation activity a small (0.004 acre) seasonal wetland would be graded in association with the construction of 76 single family residential units and associated infrastructure on the 31.7-acre parcel.

Mitigation for permanent development impacts to 0.004 acre of seasonal wetland and 0.053 acre of intermittent channel habitat (290 linear feet) will be satisfied through the creation of a new channel located several feet to the north of the existing channel alignment. The new channel segment would extend 310 linear feet and contain an average width of 8-10 feet mimicking the channel dimensions of the impacted segment of Altamont Creek. The total jurisdictional area provided by the new channel is approximately 0.071 acres. Enhancement measures such as riparian planting would also take place if approved by Zone 7.

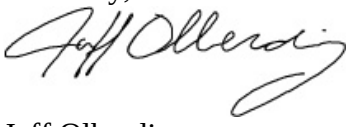
Three federally listed species have been identified as having the potential to occur on the property based on the results of a California Natural Diversity Data Bases (CNDDB) search and field surveys and assessments performed in 2010 and 2011. While not observed on site the federally endangered San Joaquin kit fox (*Vulpes macrotis mutica*) and federally threatened

3170 Crow Canyon Place, Suite 260 · San Ramon, CA 94583 · Office: (925) 866-2111 · Fax: (925) 866-2126
Emailjeff@olberdingenv.com

California tiger salamander (*Ambystoma californiense*) and California red-legged frog (*Rana draytonii*) could potentially occur on or utilize habitats found within or immediately surrounding the property. Project related actions associated with channel relocation, bridge construction, flood control access road construction and site grading and development would permanently impact 31.783 acres of habitat potentially utilized by the federally listed species. This includes the entire 31.7 acre development property and an additional 0.083 acres located within a Zone 7 Water Agency right-of way surrounding Altamont Creek. In addition to the permanent loss of habitat, 1.184 acres of temporary habitat impacts would occur within the Zone 7 right-of-way in association with construction activities. Mitigation for federally listed species permanent habitat impacts would include the off-site preservation of habitat provided at a 2.5:1 to 3:1 ratio, based on the assessed functions and values of an agency approved mitigation site. Temporary impacts would be mitigated at a 1.5:1 ratio at the same mitigation site.

If you have any questions, please feel free to contact me at (925) 825-2111.

Sincerely,



Jeff Olberding
Regulatory Scientist

Appendix D:

Historic Resources Evaluation

CULTURAL RESOURCES ASSESSMENT REPORT

Garaventa Hills Project

Livermore, Alameda County, California

PREPARED FOR:

LAMPHIER-GREGORY
1944 Embarcadero
Oakland, CA 94606

PREPARED BY:

WILLIAM SELF ASSOCIATES, Inc.
PO Box 2192
Orinda, CA 94563

WSA

January 2012

CULTURAL RESOURCES ASSESSMENT REPORT

Garaventa Hills Project

Livermore, Alameda County, California

PREPARED BY:

Matthew A. Russell, Ph.D., RPA and Aimee Arrigoni, M.A.

SUBMITTED BY:

James M. Allan, Ph.D., RPA, Principal Investigator

WSA PROJECT NO. 2011-63
WSA REPORT NO. 2012-02

January 2012

Cover Photo: Overview of Garaventa Hills, view to the northwest.

Table of Contents

1.0 Introduction 1
1.1 Project Location 1
1.2 Project Description 5
2.0 Regulatory Context 5
2.1 Federal Regulations (Section 106) 5
2.2 State Regulations 6
3.0 Project Setting 7
3.1 Environmental Setting 7
3.2 Paleoenvironment 8
3.3 Cultural Setting 9
4.0 Results of the Literature and Records Search 24
4.2 Previous Cultural Resource Studies 24
4.3 Previously Recorded Archaeological Resources 25
5.0 Native American Consultation 25
6.0 Results of the Archaeological Survey 25
7.0 Results of Paleontological Resources Assessment 28
8.0 Evaluation Under NHPA and CEQA 28
8.1 NRHP Evaluation Criteria 28
8.2 CEQA Evaluation Criteria 30
9.0 Impacts and Mitigation 31
9.1 Previously Undiscovered Archaeological Resources 31
9.2 Previously Undiscovered Paleontological Resources 32
9.3 Previously Undiscovered Human Remains 32
10.0 References 34

List of Figures

Figure 1 Project Vicinity Map……....2
Figure 2 Project Area Map……..……....3
Figure 3 Project Location Map…….……..…….....4
Figure 4 Project Location on. 1878 Alameda County Farm Map...…….….21
Figure 5 Project Location on 1907 Tesla USGS 15’ Topo
Quad...……..….2**Error! Bookmark not defined.**3
Figure 6 Plywood Aerial Mapping Target...…….……...…….26
Figure 7 Barb Wire Fence……..……27
Figure 8 Debris Scatter Located in the Bottom of a Dry Pit……..27

List of Tables

Table 1 Previous Cultural Resource Studies 24

Appendix A Native American Heritage Commission Consultation

Management Summary

William Self Associates, Inc. (WSA) has been contracted by Lamphier-Gregory on behalf of the City of Livermore to perform a cultural resource assessment of the proposed Garaventa Hills Project (Project). The Project will develop a 76-unit residential subdivision on a 31.7-acre site of vacant grazing land in the northern part of the City of Livermore, Alameda County, California. As the Project will involve a realignment of Altamont Creek, which would affect waters of the United States, the Project proponent must meet requirements of Section 404 of the Clean Water Act, and therefore, is seeking a permit from the U.S. Army Corps of Engineers (ACOE), Sacramento District. Under the jurisdiction of the ACOE, the project must comply with Section 106 of the National Historic Preservation Act (NHPA), in addition to the cultural and paleontological resources provisions of the California Environmental Quality Act (CEQA). This report was prepared pursuant to those requirements.

WSA implemented a records search, conducted by the Northwest Information Center (NWIC) at Sonoma State University in Rohnert Park, California, of a ¼-mile radius surrounding the proposed Project area. Results indicate that no archaeological sites have been previously recorded within ¼-mile of the Project area, no historic buildings have been recorded within ¼-mile of the Project area, and no buildings located within ¼-mile of the Project area are listed in the Office of Historic Preservation (OHP) Historic Properties Directory. WSA archaeologists Matthew Russell and David Buckley conducted a pedestrian field survey of the Project area on December 19, 2011. No historic properties, historical resources, or unique archaeological resources were observed. WSA also conducted a paleontological resources assessment to address potential Project impacts to paleontological resources, and found that there is a high potential for significant fossils to be present within the Project area.

This Cultural Resources Assessment Report (CRAR) defines the Project area, presents the results of the records search and Native American consultation, describes the field survey of the Project area and presents the results, assesses the significance of the findings, and proposes mitigation measures for cultural and paleontological resources. The proposed Project will not have a substantial adverse change in the significance of any historic properties, historical resources, or unique archaeological resources. Should any previously unknown cultural resources be discovered during construction, their significance would have to be determined in relation to the criteria for eligibility for the National Register of Historic Places (NRHP) and the California Register of Historic Places (CRHP).

1.0 Introduction

William Self Associates, Inc. (WSA) has been contracted by Lamphier-Gregory to perform a cultural resource assessment of the proposed Garaventa Hills Project (Project). The Project will develop a 76-unit residential subdivision on a 31.7-acre parcel of vacant grazing land in north Livermore, Alameda County, California.

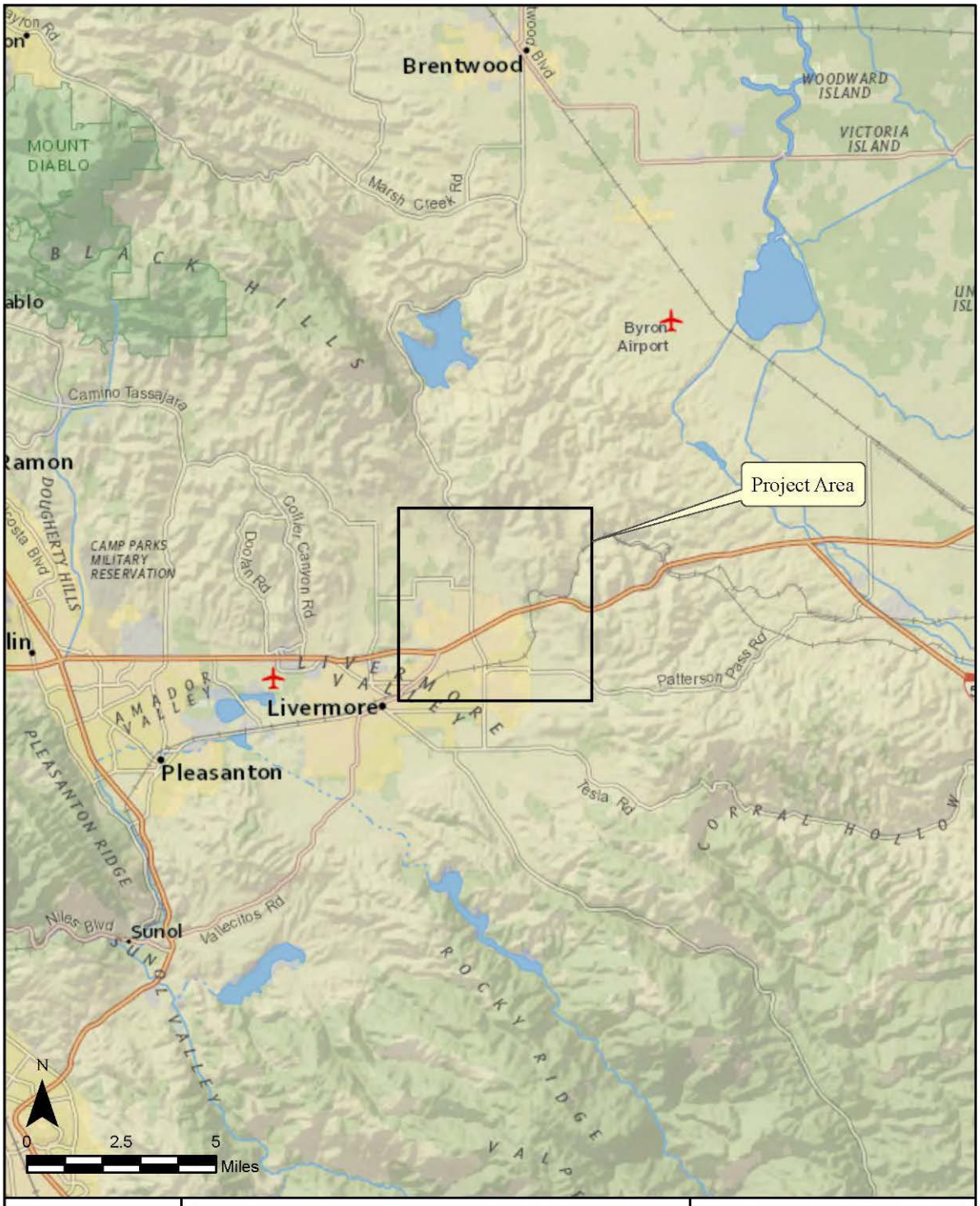
WSA implemented a records search, conducted by the Northwest Information Center (NWIC) at Sonoma State University in Rohnert Park, California, of a ¼-mile radius surrounding the proposed Project area. Results indicate that no archaeological sites have been previously recorded within ¼-mile of the Project area, no historic buildings have been recorded within ¼-mile of the Project area, and no buildings located within ¼-mile of the Project area are listed in the Office of Historic Preservation (OHP) Historic Properties Directory. WSA archaeologists Matthew Russell and David Buckley conducted a pedestrian field survey of the Project area on December 19, 2011. No historic properties, historical resources, or unique archaeological resources were observed. WSA also conducted a paleontological resources assessment to address potential Project impacts to paleontological resources, and found that there is a high potential for significant fossils to be present within the Project area.

This Cultural Resources Assessment Report (CRAR) presents the results of research conducted to identify and evaluate potential cultural and paleontological resources within the Project area. The report defines the Project area, presents the results of the records search and Native American consultation, describes the field survey of the Project area and presents the results, assesses the significance of the findings, and proposes mitigation measures for cultural and paleontological resources. As the Project will involve a realignment of Altamont Creek, which would affect waters of the United States, the Project proponent must meet requirements of Section 404 of the Clean Water Act, and therefore, is seeking a permit from the U.S. Army Corps of Engineers (ACOE), Sacramento District. Under the jurisdiction of the ACOE, the project must comply with Section 106 of the National Historic Preservation Act (NHPA), in addition to the cultural and paleontological resources provisions of the California Environmental Quality Act (CEQA). The City of Livermore is the lead agency for the Project.

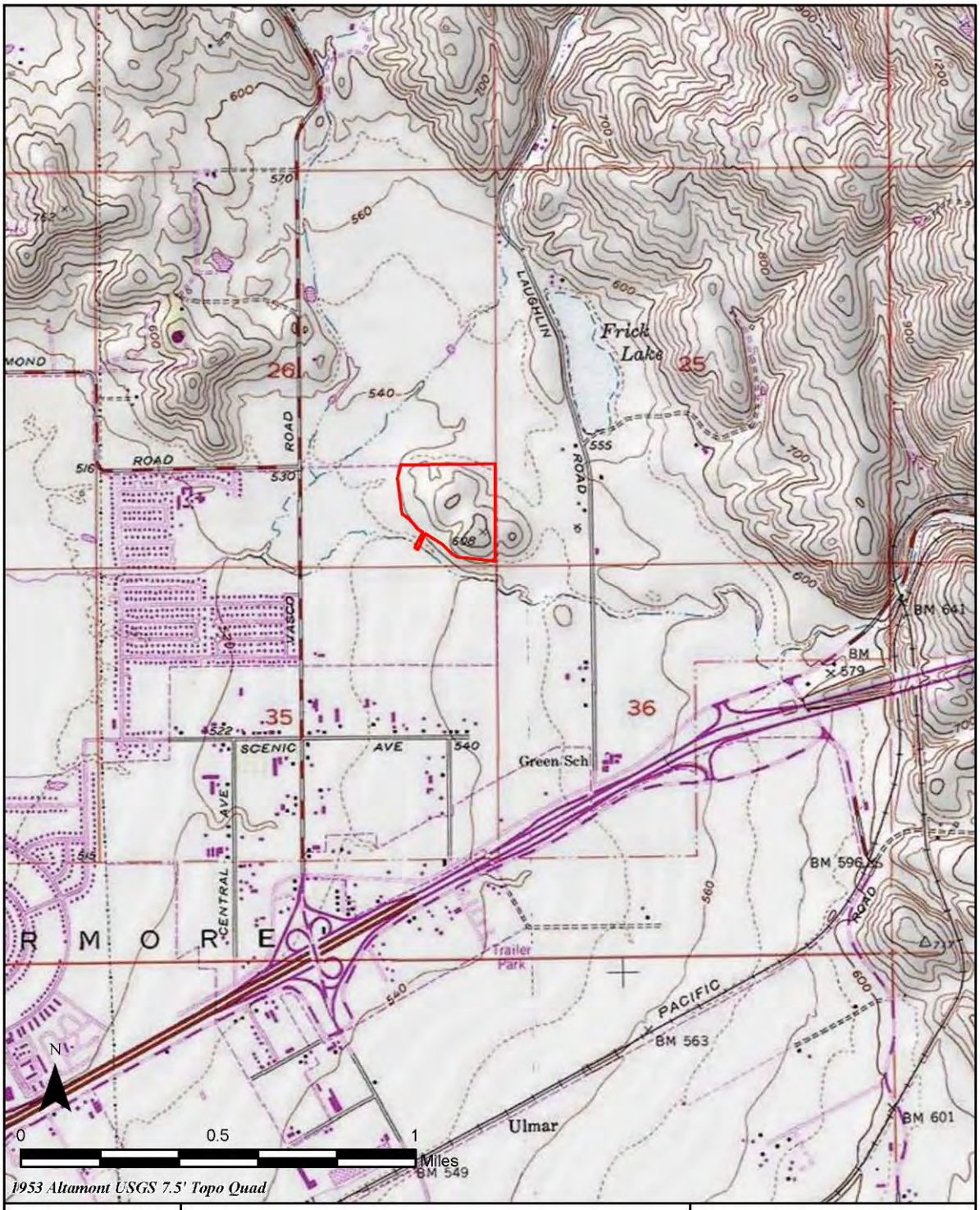
1.1 Project Location

The proposed Project is located on a 31.7-acre parcel north of Interstate-580, east of Vasco Road, and west of Laughlin Road in the City of Livermore, Alameda County. The Project area is an undeveloped parcel consisting predominantly of non-native grassland habitat. It falls within Township 2 South, Range 2 East, Section 26, as depicted on the 1953 (Revised 1981) Altamont U.S. Geological Survey 7.5 minute topographic quadrangle (Figures 1-3)

WSA	Project Vicinity Map	Figure 1 Lamphier-Gregory Garaventa Hills Project Livermore, CA



WSA	Project Area Map	Figure 2 Lamphier-Gregory Garaventa Hills Project Livermore, CA



WSA

Project Location Map

Figure 3
Lamphier-Gregory
Garaventa Hills Project
Livermore, CA

(U.S. Geological Survey [USGS] 1953). The parcel is bordered by open space along the northern, western and immediate eastern boundaries, and is adjacent to existing residential developments to the south and east. The topography of the property is moderately steeply sloping. Altamont Creek, an intermittent stream channel, is located immediately outside the southern boundary of the parcel. A ridgeline in the center of the property forms a natural watershed divide, with runoff draining either towards the north or south. The ridgeline forms a connection between the two prominent knolls that dominate the parcel.

1.2 Project Description

The Project will develop a 76-unit residential subdivision that would be known as Garaventa Hills. The proposed subdivision would consist of an internal looped circulation plan circumscribing the prominent knolls, with a number of smaller cul-de-sacs accessing the corners of the property. The looped roadway system would be connected to the south across Altamont Creek by a new bridge crossing at Hawk Street that would connect to the developed properties to the south, and by the planned extension of Bear Creek Drive, which ultimately connects to Laughlin Road to the east. Construction of the bridge would require modification of the streambed. Ultimate development will include 76 residential lots of approximately 6,500 square feet in size each, and construction of associated roadways and utilities. Each lot will contain one single-family home supported by a shallow foundation system. Lots and roadways will comprise approximately 62% of the site only, with the remaining land reserved for open space slopes at the edges, undeveloped knolls with trails, and a detention basin. The Project includes a planned bridge extending Hawk Street north into the Project parcel, and will re-route the adjacent creek bank on either side of the planned bridge.

2.0 Regulatory Context

This section describes the regulatory setting for cultural and paleontological resources, including federal and state regulations.

2.1 Federal Regulations (Section 106)

Section 106 of the NHPA and its implementing regulations (36 CFR 800, as amended 2004) require federal agencies to consider the effects of their undertakings, or those they fund or permit, on historic properties and cultural resources that are eligible for listing or that are listed in the National Register of Historic Places (NRHP). The 36 CFR Part 60.4 regulations describe the criteria to evaluate cultural resources for inclusion in the NRHP. Such resources are required to retain integrity and must exhibit an association with broad patterns of our history, be associated with an important person, embody a distinctive characteristic, or yield information important to prehistory or history.

In the context of a federal undertaking, the legal significance of cultural resources (i.e., NRHP eligibility) determines whether or not the properties are considered for protection from destruction or impairment (36 CFR 60.2). The Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (48 CFR 44716-44742) outlines the process by which such determinations are made.

2.2 State Regulations

CEQA details appropriate measures for the evaluation and protection of cultural resources in §15064.5 of the CEQA Guidelines. For the purposes of CEQA, "historical resources" are those cultural resources that are: (1) listed in or eligible for listing in the California Register of Historical Resources; (2) listed in a local register of historical resources (as defined in PRC 5020.1(k)); (3) identified as significant in a historical resource survey meeting the requirements of §5024.1(g) of the Public Resources Code; or (4) determined to be a historical resource by a project's lead agency (§15064.5(a)). The subsection further states that "A project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment" (§15064.5(b)).

CEQA applies to effects on archaeological sites (§15064.5(c)). CEQA requires a lead agency to determine if an archaeological cultural resource fits into one of three legal categories (14 CCR §15064.5(c)(1-3)). A lead agency, in this case the City of Livermore, applies a two-step screening process to determine if an archaeological site meets the definition of a historical resource, a unique archaeological resource, or neither. Prior to considering potential impacts, the lead agency must determine whether a cultural resource meets the definition of a historical resource in §15064.5(a). If the cultural resource meets the definition of a historical resource, then it is treated like any other type of historical resource in accordance with §15126.4. If the cultural resource does not meet the definition of a historical resource, then the lead agency applies the second criterion to determine if the resource meets the definition of a unique archaeological resource as defined in §21083.2(g). Should the archaeological site meet the definition of a unique archaeological resource, then it must be treated in accordance with §21083.2. If the archaeological site does not meet the definition of a historical resource or a unique archaeological resource, then effects to the site are not considered significant effects on the environment (§15064.5(c)(4)).

Public Resources Code (PRC) §5097.5 provides for the protection of cultural resources. PRC §5097.5 prohibits the removal, destruction, injury, or defacement of cultural features on any lands under the jurisdiction of State or local authorities.

Paleontological resources are afforded protection under CEQA (Appendix G, Part V of the CEQA Guidelines), which indicates that a project would have a significant impact on

paleontological resources if it will disturb or destroy a unique paleontological resource or site or unique geologic feature. Section 5097.5 of the California Public Resources Code specifies that any unauthorized removal of paleontological remains is a misdemeanor. Further, California Penal Code Section 622.5 sets the penalties for damage or removal of paleontological resources.

3.0 Project Setting

3.1 Environmental Setting

The Garaventa Hills Project area is situated within the eastern part of Livermore Valley, in northeastern Alameda County. The Project area, located in the northern part of the City of Livermore, comprises a series of low, rolling hills that rise in some places to more than 600 ft. above mean sea level (amsl). Altamont Creek, with its source to the east in the Altamont Pass, is aligned southeast-northwest and is located immediately outside the southern boundary of the Project area.

Annual precipitation in the broader region varies from 6 to 29 inches, with precipitation concentrated in the fall, winter and spring months. This climate is much like that found in the Mediterranean: mild, rainy winters, and hot, dry summers. After the first rain at the end of October or early November, the vegetation becomes green and remains green, but not growing, until late February, when the grasses begin to grow rapidly. By early June, the area has usually changed to dry golden-colored grasses, and stays that way until fall. Temperatures in the summer are high, often reaching over 38°C (100°F) (Brown 1985: 87).

Within the Project area, plant communities are dominated by California annual grassland. The most common flora is non-native herbaceous plants and annual grasses, such as ryegrass, wild oats, and soft chess, which are the result of long-term grazing and cultivation in the area. Some native perennial grasses, such as purple needlegrass and creeping wildrye may be present. Saltgrass may be found in the seasonal wetlands bordering Altamont Creek (Brushy Peak Regional Preserve n.d.).

The most likely grassland wildlife species present in the Project area is the ground squirrel, whose burrows may be inhabited by amphibians, reptiles, badgers, burrowing owls, and possibly the San Joaquin kit fox. Altamont Creek and the associated wetlands may provide habitat for federally protected California red-legged frogs and the California tiger salamanders. Other native amphibian species that may be present include the Western toad and Pacific tree frog (Brushy Peak Regional Preserve n.d.).

3.2 Paleoenvironment

3.2.1 Development of the Bay and Delta System

During the last glacial maximum, the San Francisco Bay was a broad inland valley, referred to as the 'Franciscan Valley.' The runoff from the Sacramento and San Joaquin Rivers converged to form the 'California River' that flowed through the Carquinez Straits, into the Franciscan Valley. Runoff from smaller streams and rivers draining this valley merged into the river, and emptied into the Pacific Ocean near the current location of the Farallon Islands. The melting of the ice sheets and concurrent rising of the oceans pushed the California coastline eastwards. Between 11,000 and 8,000 calibrated years before present (cal B.P.), rising sea levels inundated the lower areas of the Franciscan Valley and California River. Sediments carried by the California River were deposited on the floor of the valley. Continued rising of the sea level resulted in the development of freshwater marshes (Praetzellis 2004:9).

Between 7,000 and 6,000 cal B.P. there was a decline in the rate of sea level rise worldwide, and flooding of the Franciscan Valley continued more gradually. This more gradual rise permitted the development of extensive tidal-marsh deposits during the middle Holocene. It was during this period that the extensive saltwater/freshwater tidal marshland of the Sacramento-San Joaquin Delta began to develop. Large alluvial floodplains were also formed at this time as a result of accumulated materials spilling from the lower reaches of streams and river channels onto existing fans and floodplains. As a result of these changes, bay and marsh deposits now covered several previously stable Holocene-age land surfaces. Throughout the late Holocene, the San Francisco Bay grew in size, marshlands expanded, and large tidal mudflats and peat marshes were formed. This promoted the continued deposition of sediment around the Bay margins (Praetzellis 2004:11; Ziesing 2000:29).

Studies within the Bay region confirm that several late Pleistocene and early Holocene land surfaces were covered by alluvium that was generally deposited within the last 6,000 years. These deposits average 2 to 3 m in thickness but can exceed 10 m thick in a few areas. They often exhibit well-developed buried soil profiles (paleosols) that show a marked stratigraphic boundary. Archaeological deposits older than 6,000 years would likely have been inundated by sea level rise and/or buried by sediment deposition (Praetzellis 2004:11).

Although the timing of lowlands development surrounding the Sacramento-San Joaquin Delta is not well dated, it is thought to have followed the same basic pattern as the San Francisco Bay Area. Water, sediment, and marsh plants began to be deposited on the lowlands following a period of non-deposition during the late Pleistocene and early Holocene. This raised the base level of streams and rivers flowing into the Delta during the mid-Holocene, causing active channels to change alignments and depositing a large amount

of sediment onto older land surfaces. These active channels caused the formation of large alluvial fans and levee deposits. These Holocene deposits range in thickness from an estimated 3 m near the Delta and Bay margins to approximately 15 m near the heads of alluvial fans (Meyer and Rosenthal 1997:II.7).

3.3 Cultural Setting

3.3.1 Prehistoric Background

Research into local prehistoric cultures began in the early 1900s with the work of N. C. Nelson of the University of California at Berkeley. Nelson documented 425 shellmounds along the bay shore and adjacent coast when the bay was still ringed by salt marshes three to five miles wide (Nelson 1909:322-331). He maintained that the intensive use of shellfish, a subsistence strategy reflected in both coastal and bay shoreline middens, indicated a general economic unity in the region during prehistoric times, and he introduced the idea of a distinct San Francisco Bay archaeological region (Moratto 1984:227). Three sites, in particular, provided the basis for the first model of cultural succession in Central California, the Emeryville Shellmound (CA-ALA-309), the Ellis Landing Site (CA-CCO-295), and the Fernandez Site (CA-CCO-259) (Moratto 1984:227).

Investigations into the prehistory of California's Central Valley, presaged by early amateur excavations in the 1890s, began in earnest in the 1920s. In the early 20th century, Stockton-area amateur archaeologists J. A. Barr and E. J. Dawson separately excavated a number of sites in the Central Valley and made substantial collections. On the basis of artifact comparisons, Barr identified what he believed were two distinct cultural traditions, an early and a late. Dawson later refined his work and classified the Central Valley sites into three "age-groups" (Schenck and Dawson 1929:402).

Professional or academic-sponsored archaeological investigations in central California began in the 1930s, when J. Lillard and W. Purves of Sacramento Junior College formed a field school and conducted excavations throughout the Sacramento Delta area. By seriating artifacts and mortuary traditions, they identified a three-phase sequence similar to Dawson's, including Early, Intermediate, and Recent cultures (Lillard and Purves 1936). This scheme went through several permutations (see Lillard et al. 1939; Heizer and Fenenga 1939). In 1948 and again in 1954, Richard Beardsley refined this system and extended it to include the region of San Francisco Bay (Beardsley 1948, 1954). The resulting scheme came to be known as the Central California Taxonomic System (CCTS) (Fredrickson 1973; Hughes 1994:1). Subsequently, the CCTS system of Early, Middle, and Late Horizons was applied widely to site dating and taxonomy throughout central California.

As more data were acquired through continued fieldwork, local exceptions to the CCTS were discovered. The accumulation of these exceptions, coupled with the development of radiocarbon dating in the 1950s and obsidian hydration analysis in the 1970s, opened up the possibility of dating deposits more accurately. Much of the subsequent archaeological investigation in central California focused on the creation and refinement of local versions of the CCTS.

In the 1960s and 1970s, archaeologists including Ragir (1972) and Fredrickson (1973) revised existing classificatory schemes and suggested alternative ways of classifying the prehistory of California. Fredrickson (1973:113-114) proposed four "major chronological periods" in prehistoric California: the Early Lithic Period (described as hypothetical), a Paleoindian Period, an Archaic Period, and an Emergent Period. The Archaic and Emergent Periods were further divided into Upper and Lower periods. Subsequently, Fredrickson (1974, 1994) subdivided the Archaic into Lower, Middle, and Upper. Milliken et al. (2007) have recently updated and further refined this scheme.

A series of "patterns," emphasizing culture rather than temporal periods, can be identified throughout California prehistory. Following Ragir, Fredrickson (1973:123) proposed that the nomenclature for each pattern relate to the location at which it was first identified, such as the Windmiller, Berkeley, and Augustine Patterns.

Various modifications of the CCTS (e.g., Bennyhoff and Hughes 1987; Fredrickson 1973, 1974; Milliken and Bennyhoff 1993) sustain and extend the system's usefulness for organizing our understanding of local and regional prehistory in terms of time and space. The cultural patterns identified in the Bay Area that in a general way correspond to the CCTS scheme are the Berkeley and Augustine patterns (for information on the Berkeley and Augustine Patterns see Fredrickson 1973, Milliken et al. 2007, Moratto 1984 and Wiberg 1997). Dating techniques such as obsidian hydration analysis or radiometric measurements can further increase the accuracy of these assignments.

Most recently, Milliken et al. (2007:99-123) developed what they term a "hybrid system" for the San Francisco Bay Area, combining the Early-Middle-Late Period temporal sequence with the pattern-aspect-phase cultural sequence. Dating of the cultural patterns, aspects, and phases was based on Dating Scheme D of the CCTS, developed by Groza (2002). Groza directly dated over 100 Olivella shell beads, obtaining a series of AMS radiocarbon dates representing shell bead horizons. The new chronology he developed has moved several shell bead horizons as much as 200 years forward in time.

Milliken et al.'s (2007) San Francisco Bay Area Cultural Sequence includes:

Early Holocene (Lower Archaic) from 8000 to 3500 B.C.
Early Period (Middle Archaic) from 3500 to 500 B.C.
Lower Middle Period (Initial Upper Archaic) from 500 B.C. to A.D. 430
Upper Middle Period (Late Upper Archaic) from A.D. 430 to 1050
Initial Late Period (Lower Emergent) from A.D. 1050 to 1550
Terminal Late Period, post-A.D. 1550

No archaeological evidence dating to pre-8000 B.C. has been located in the Bay Area. Milliken et al. (2007) posit that this dearth of archaeological material may be related to subsequent environmental changes that submerged sites, buried sites beneath alluvial deposits, or destroyed sites through stream erosion. A brief summary of the sequence presented by Milliken et al. (2007) follows.

A "generalized mobile forager" pattern marked by the use of milling slabs and handstones and the manufacture of large, wide-stemmed and leaf-shaped projectile points emerged around the periphery of the Bay Area during the Early Holocene Period (8000 to 3500 B.C.). Beginning around 3500 B.C., evidence of sedentism, interpreted to signify a regional symbolic integration of peoples, and increased regional trade emerged. This Early Period lasted until ca. 500 B.C. (Milliken et al. 2007:114, 115).

Milliken et al. (2007:115) identify "a major disruption in symbolic integration systems" circa 500 B.C., marking the beginning of the Lower Middle Period (500 B.C. to A.D. 430). Bead Horizon M1, dating from 200 B.C. to A.D. 430, is described by Milliken et al. (2007:115) as marking a 'cultural climax' within the San Francisco Bay Area.

The Upper Middle Period (A.D. 430 to 1050) is marked by the collapse of the Olivella saucer bead trade in central California, abandonment of many Bead Horizon M1 sites, an increase in the occurrence of sea otter bones in those sites that were not abandoned, and the spread of the extended burial mortuary pattern characteristic of the Meganos complex into the interior East Bay. Bead Horizons M2 (A.D. 430 to 600), M3 (A.D. 600 to 800), and M4 (A.D. 800 to 1050) were identified within this period (Milliken et al. 2007:116).

The Initial Late Period, dating from A.D. 1050 to 1550, is characterized by increased manufacture of status objects. In lowland central California during this period, Fredrickson (1973, 1994) noted evidence for increased sedentism, the development of ceremonial integration, and status ascription. The beginning of the Late Period, (ca. A.D. 1000) is marked by the Middle/Late Transition bead horizon. The Terminal Late Period began circa A.D. 1550 and continued until European settlement of the area.

3.3.2 Ethnographic Background

The Project area lies within the region occupied by the Ohlone or Costanoan group of Native Americans at the time of historic contact with Europeans (Kroeber 1970:462-473). This section provides a brief summary of the ethnography of the Project vicinity and is intended to provide a general background only. More extensive reviews of Ohlone ethnography are presented in Bocek (1986), Cambra et al. (1996), Kroeber (1970), Levy (1978), Milliken (1995), and Shoup et al. (1995).

Although the term *Costanoan* is derived from the Spanish word *Costaños*, or "coast people," its application as a means of identifying this population is based in linguistics. The Costanoans spoke a language now considered one of the major subdivisions of the Miwok-Costanoan, which belonged to the Utian family within the Penutian language stock (Shipley 1978:82-84). Costanoan actually designates a family of eight languages.

Tribal groups occupying the area from the Pacific Coast to the Diablo Range and from San Francisco to Point Sur spoke the other seven languages of the Costanoan family. Modern descendants of the Costanoan prefer to be known as Ohlone. The name *Ohlone* is derived from the Oljon group, which occupied the San Gregorio watershed in San Mateo County (Bocek 1986:8). The two terms (*Costanoan* and *Ohlone*) are used interchangeably in much of the ethnographic literature.

On the basis of linguistic evidence, it has been suggested that the ancestors of the Ohlone arrived in the San Francisco Bay area about A.D. 500, having moved south and west from the Sacramento-San Joaquin Delta. The ancestral Ohlone displaced speakers of a Hokan language and were probably the producers of the artifact assemblages that constitute the Augustine Pattern previously described (Levy 1978:486).

Although linguistically linked as a family, the eight Costanoan languages actually comprised a continuum in which neighboring groups could probably understand each other. However, beyond neighborhood boundaries, each group's language was reportedly unrecognizable to the other. Each of the eight language groups was subdivided into smaller village complexes or tribal groups. These groups were independent political entities, each occupying specific territories defined by physiographic features. Each group controlled access to the natural resources of its territory, which also included one or more permanent villages and numerous smaller campsites used as needed during a seasonal round of resource exploitation. Chochenyo or East Bay Costanoan was the language spoken by the estimated 2,000 people who occupied the "east shore of San Francisco Bay between Richmond and Mission San Jose, and probably also in the Livermore Valley" (Levy 1978:485).

Leadership was provided by a chief, who inherited the position patrilineally and could be either a man or woman. The chief and a council of elders served mainly as community advisers. Specific responsibility for feeding visitors, providing for the impoverished and directing ceremonies, hunting, fishing, and gathering fell to the chief. Only during warfare was the chief's role as absolute leader recognized by group members (Levy 1978:487).

Extended families lived in domed, conical structures built of thatched grass (Levy 1978:492). Semi-subterranean men's houses, also using grass and earth cover, were built at the larger village sites (Kroeber 1970:468).

Acorns of the coast live oak, valley oak, tanbark oak, and California black oak were an important staple in the Ohlone diet. Seeds and berries, roots and grasses, and the meat of deer, elk, grizzly, rabbit, and squirrel also contributed to the Ohlone diet. Careful management of the land through controlled burning served to ensure a plentiful, reliable source of all these foods (Levy 1978:491).

The Ohlone usually cremated a corpse immediately upon death but, if there were no relatives to gather wood for the funeral pyre, interment occurred. Mortuary goods comprised most of the personal belongings of the deceased (Levy 1978:490).

The Ssaoam tribe of the Ohlone peoples was probably the most closely linked to the Project area. The Ssaoam lived in the surrounding dry hills and valleys around Brushy Peak and nearby Altamont Pass, which separates the Livermore Valley from the San Joaquin Valley (Milliken 1995:255). Ssaoam populations may have dispersed in the dry summer months, and reconverged at various camps throughout the rest of the year. The triblet reportedly hosted trade feasts in the area, acting as brokers in a regional trade network with the Volvons, a tribelet of the Bay Miwok, and the Tamcans of the Northern Valley Yokuts. The Ssaoam's ability to prosper may have had as much to do with their occupying this strategic trading location as with their ability to use the area's food and limited water resources (Brushy Peak Regional Preserve n.d.).

The arrival of the Spanish explorers in 1772 threatened the cultural and political organization of these native groups. The Franciscan priests were intent upon changing the native people of California into Catholic agriculturists, which led to a rapid and major reduction in native Californian populations. The native peoples living in the Mount Diablo region (including the present-day Project area) suffered a complete Spanish takeover of their lands by the end of the eighteenth century. The Spaniards founded Mission San Francisco de Asis (now called Mission Dolores) in 1776, Mission Santa Clara the following year, and Mission San Jose in 1797. While some natives were drawn to the mission life by their interest in Spanish technology and religion, others were opposed to the Spanish settlement and most were eventually forced to join the missions, retreat into the hinterlands, or were killed (Milliken

1995). Brought into the missions, the surviving Ohlone, along with the Esselen, Yokuts, and Miwok, were transformed from hunters and gatherers into agricultural laborers (Levy 1978; Shoup et al. 1995).

Under Spanish missionization of the San Francisco Bay Area, native populations decreased dramatically in numbers. Seven missions were eventually established in what was once Ohlone territory and those natives who were living and working under the authority of the missions were baptized as Catholics (Levy 1978). Between 1803 and 1807, 108 Ssaoam people, the entirety of the surviving Ssaoam population, were converted at Mission San Jose (Milliken 1995:255). By the autumn of 1806 all members of the Ssaoam tribelets had been removed to the missions or had passed away. Higher mortality rates from introduced diseases, social strain from disrupted trading networks, and environmental pressures resulting from encroachment of livestock on what were formally Native American lands served to largely eradicate aboriginal life ways (Milliken 1997a:88).

By 1832, the Native population had decreased to less than one-fifth of its number at the time of initial contact with the Spanish (Levy 1978). Only 9 of the original Ssaoam neophytes and 11 Ssaoam descendents were living at Mission San Jose at the close of 1836 (Milliken 1997b:137). Many of the surviving "converted" natives worked as vaqueros for the missions and spent much time grazing cattle.

Beginning in the mid-1830s, the missions became secularized resulting in more than 800 patents of land that comprised more than 12 million acres that were issued to individuals by the Mexican government in what is now California (Ziesing 1997). After missionization, Native Americans dispersed and were often lost to historical record keeping. Native Americans had few choices, and limited or no legal rights, once the mission system broke down. Under Spanish, and later Mexican, law, mission lands and stock were to be allocated to the mission Indians following disbandment of the mission. This almost never happened and much of the mission lands, including those areas previously used for cattle-grazing, were quickly divided up among elite Mexican families, leaving the remaining Indian population with nothing. As a result, many native peoples migrated back to their homelands and began working as vaqueros or servants for the new owners of the land. Others did not join the system and lived apart from the ranchers, occasionally stealing livestock, especially horses (Milliken 1997b:137, 138).

Milliken notes that extensive research on the history of Ssaoam descendents into the late 19th and 20th centuries has not yet been conducted. Due to large gaps in record keeping, this is likely to be a very difficult process (Milliken 1997b:144). Beginning in the early 1900s, academic interest in the fast-disappearing cultures of the Californian Native Americans resulted in a number of ethnographic and linguistic studies, primarily by staff and students of the Anthropology Department at the University of California, Berkeley. However, their

research focused on the reconstruction of pre-contact lifeways, rather than on what was happening contemporaneously (Davis, Hitchcock and Mertz 1997:156-157).

In the 1990s, some Ohlone groups (e.g., the Muwekma, Amah, and Esselen further south) submitted petitions for federal recognition (Esselen Nation 2007; Muwekma Ohlone Tribe 2007). Many Ohlone are active in preserving and reviving elements of their traditional culture and are active participants in the monitoring and excavation of archaeological sites.

3.3.3 Historical Background

The history of Northern California, Alameda County, and the Project area, can be divided into several periods of influence. To establish a historic context from which to assess the potential significance of historic sites in the Project area, various periods and local sub-periods, some of which overlap, are defined below. These include:

Spanish Period 1772 - 1822
Mexican Period 1822 - 1848
American Period 1848 - present
Ranching and Farming ca. 1840s – present

SPANISH PERIOD (1772-1822)

The earliest historical accounts of the Livermore Valley come from the Spanish explorers who ventured into the region in the late 18th century. The Spanish period in the Mount Diablo region began with the Fages expedition of 1772. The expedition traveled from Monterey along the eastern shore of San Francisco Bay through what are now Milpitas, San Lorenzo, Oakland, and Berkeley, and finally reached Pinole on March 28, 1772 (Cook 1957:131). From there they traveled through the locations of today's Rodeo and Crockett to Martinez, made a brief foray into the delta region of the Central Valley, and then camped somewhere near Pittsburg or Antioch. On March 31, the Fages party began the return journey to Monterey. They traveled to the vicinity of today's Walnut Creek, turned south, and then made their way to the Danville area, where they spent the night. On April 1st, they passed through today's Livermore Valley, finally arriving back in the area of Milpitas on the following day. In 1775, Captain Juan Manuel Ayala's expedition studied the San Francisco Bay and ventured up the Sacramento and San Joaquin rivers. Other Spanish expeditions in the ensuing years passed near the Project area, including the 1811 expedition of Ramon Abella, the 1813 expedition of Jose Arguello, and the 1817 expedition of Narciso Duran and Luis Arguello (Beck and Haase 1974:21). The most significant impact of the European presence on the local California Indians, however, was not felt until the Spanish missions were established in the region (Cook 1957:132).

The first Spanish mission in the region was established in 1776 with the completion of Mission San Francisco de Asis (Mission Dolores) in San Francisco. Mission Santa Clara followed in 1777, and the founding of Mission San Jose in 1797 marked the start of European influence in the Livermore Valley (Praetzellis et al. 1997:15). Settlements were established inland for maintenance of the Mission system's expanding grazing lands, and these settlements extended into the Livermore Valley. At that time, the control of the Missions was focused around the more accessible San Francisco Bay. It was not until after Mexico's secession from Spain in 1821 that land was granted to private citizens, a practice that increased significantly after the 1833 act of the Mexican legislature that established the secularization of the missions.

The Mission era lasted approximately 60 years and proved to be detrimental to the native inhabitants of the region, who were brought to the missions to be assimilated into a new culture as well as to provide labor for the missionaries. Diseases introduced by the early explorers and missionaries, and the contagions associated with the forced communal life at the missions, killed a large number of local peoples, while changes in land use made traditional hunting and gathering practices increasingly difficult. Cook (1976) estimates that by 1832, the Costanoan population had been reduced from a high of over 10,000 in 1770 to less than 2,000.

MEXICAN PERIOD (1822-1848)

The Mexican War of Independence, from 1810 to 1821, resulted in Mexico separating from Spain. During the Mexican Period, rapid secularization of the Spanish mission system occurred. Between 1835 and 1836 the Mexican government began offering grants of Mission grazing land primarily to *Californios* (both Spanish speaking descendants of European settlers, and Mestizo and Europeanized Natives) and Mexican colonists. In 1836, Mission San Jose shut down, freeing the Indian neophytes to return to their villages, or take up work on the newly granted ranches. The secularization of the Missions was intended to be the final step of the process to make the Indians Spanish (Rawls and Bean 1998:26-27), after which the neophytes living in the communities surrounding Mission San Jose were to be granted half of the Mission land (Rawls and Bean 1998:59). However, this policy was never properly implemented and many neophytes were reduced to raiding horses from the local ranches, which resulted in violence and Mexican reprisals against them, as well as a general opposition to them settling near the San Joaquin Valley (Stewart 1994:57-59).

By 1845, the last of the mission land holdings had been relinquished, opening the way for the large ranchos common to California in the mid-1800s. The dominant land-use of the ranchos was livestock grazing and some farming.

It was not until 1839 that the Project area was granted as part of a rancho (Willard 1988:18-19). Rancho Las Positas was granted to Don Salvio Pacheco in April that year, who in turn transferred his interest to Robert Livermore and Jose Noriega (Baker 1914:44). The Rancho consisted of an area of approximately 2 leagues (8,857 acres), and was bounded by property owned by Francisco Alviso, Antonino Higuera, and Manuel Miranda (Cañada de Los Vaqueros) to the north, and Antonio Maria Pico, Agustín Bernal, Juan Pablo Bernal, and María Dolores Bernal de Suñol (Valle de San Jose) to the west (Beck and Haase 1974:30). The land grant was intended to be a place for the owners to graze their herds while they resided further to the west in more populated regions (Ziesing 1997:27).

The Englishman Robert Livermore, originally a merchant marine by trade, was known amongst the landed families of the area with whom he had associated since his arrival in Monterey in 1829 (Praetzellis et al. 1997:25). He had married Josepha Higuera-Molina (daughter of a Santa Clara County ranchero), and Livermore had known Jose Noriega since his early days in the area; the two had met at Mission San Jose in 1830. In 1835 they agreed to establish their own rancho, and in 1839 received the land grant for what would become Las Positas (Praetzellis et al. 1997:25). Livermore moved to the valley that would later bear his name in 1839, and there he raised cattle for hides and tallow, as well as horses, and sheep. In 1844, Livermore planted a vineyard and orchard, the first outside Mission San Jose (Baker 1914:45;Willard 1988:18-19). He also grew wheat, the first produced in the valley (Baker 1914:45). Livermore and Noriega filed a claim for Las Positas in February of 1852, and in February of 1854 the Board of Land Commissioners confirmed their claim to the rancho (Baker 1914:37).

Deterioration of relations between the United States and Mexico resulted in the Mexican War, which ended with Mexico relinquishing California to the United States under the Treaty of Guadalupe Hidalgo of 1848. With the formation of the new State of California, and the onset of the American Period, rapid changes were in store for the region.

AMERICAN PERIOD (1848-present)

The discovery of gold in the Sierra Nevada in 1848 produced a major population increase in the northern half of California as gold miners poured into the region. The population explosion led to land use changes as livestock grazed native grasses to extinction, woodlands were cut for lumber, railroad ties and mining timbers, and vast parcels of arable land were tilled for agricultural development. Following the U.S. takeover of Alta California from Mexico in 1848, rancho lands began to be divided up and generally overrun by Anglo immigration to the area that was coincident with the land boom following the Gold Rush of 1849. Rancho Las Positas suffered the fate of most Mexican land grants in northern California, with squatters taking quasi-legal title to lands, and the courts denying title to the original grantees (Hendry and Bowman 1940).

During the Mexican Period, ranching and stock raising were the primary concerns, with farming undertaken on a small-scale to provide subsistence for the ranchos. With the advent of the American Period, farming on a large-scale was introduced. In general, Alameda County passed through three stages of development: (1) a predominant cattle raising industry, primarily for hides and tallow, from the Spanish Period until 1862; (2) a period where cattle-raising gave way to large-scale production of grain, from approximately 1862 to 1882; and (3) an era where fruit, primarily grapes in the Livermore Valley, were the most important crops, from approximately 1882 into the 20th century (Baker 1914:177).

Alameda County was formed in 1853 from portions of Santa Clara and Contra Costa Counties, and six townships were established. Eastern Alameda County, including the Livermore Valley, was part of the Murray Township. Within the Murray Township, the town of Livermore had its beginnings in 1855 when Alphonso Ladd built a hotel near Robert Livermore's home, and called the new community Laddville. In 1869, William Mendenhall, a long-time friend of Livermore, donated 20 acres west of Laddville for a railroad depot, and surveyed the surrounding lands for a community that he called Livermore, in honor of his friend. The town of Livermore was founded in 1869 when the Central Pacific Railway reached the area, and Livermore was officially incorporated in 1876 with a population of 830 (Baker 1914:441; Willard 1988:29).

During the mid-1860s, settlers began moving into the Livermore Valley in ever-increasing numbers. The problem with this influx of new residents was the uncertainty of land titles because of the ambiguity of the original Rancho Las Positas boundaries. The U.S. patent for the land grant, issued in February 1859, granted "two leagues, more or less," within specified boundaries. The boundaries described, however, included more than 11 leagues (48,700 acres). In March 1871, the matter was settled in court and two leagues (8,800 acres) were confirmed. This opened much of the valley to pre-emption (rights granted to individuals already living on federal lands) and, along with the recently completed railroad through the valley, helped to increase the population considerably (Baker 1914:48).

Ranching and Farming (ca. 1840s-present)

At the beginning of the American Period, cattle raising was still the most important enterprise in the Livermore Valley. Soon thereafter, however, within eastern Alameda County and the Livermore Valley, growing wheat and barley, and later fruit trees (including oranges, lemons, peach, pear, plum, apple, and apricot) and grape vines, superseded the cattle industry.

Wheat became the dominant crop in the Livermore Valley beginning in the mid-1850s. In 1857, Joseph Black and two brothers named Carrick began raising wheat in west Livermore Valley, and in 1860, Hiram Bailey planted 80 acres on the Las Positas land grant, 3 mi. north

of Livermore. Livermore Valley soon became one of the best grain and hay districts in the state. Livermore hay grown on the Altamont hills was highly regarded and was regularly shipped overseas. In the 1860s and 1870s, grain growing was conducted on a large scale in the Livermore Valley, and it was still an important industry into the 1880s and 1890s. Even into the early 20th century, Livermore valley hay was still recognized as the "best in the world and is sent in immense quantities by rail and vessel to distant points" (Baker 1914:190-191). Although hay and grain continued to be produced well into the 20th century, it was quickly overtaken wine grapes and other fruit, which became the valley's most important product (Baker 1914:34, 47, 178-180, 184, 186, 443).

By the mid-1880s, the potential for fruit growing in many regions of California was realized—foremost among these was Alameda County, and the Livermore Valley in particular. While many thought the land too arid for more than mining and grazing, by 1885 fruit from the Livermore Valley was regularly being shipped across the country (Baker 1914:182). Vineyards began to replace wheat and barley fields in 1880-1881. In 1882, 880 acres of grapes were planted in the Livermore Valley. By 1885, the number of acres of vines had grown to more than 4,000. From 1881 to 1885, 4,200 acres of cereal and hay land in the Livermore Valley were converted to orchards and vineyards. Viticulture was now one of the primary enterprises in the Livermore Valley, and grape production increased steadily each year. By the turn of the 20th century, it was widely recognized that the Livermore Valley was the most important grape growing region in the county (Baker 1914:179-182, 189, 442).

In the first decade of the 20th century, the Livermore Valley became known as the "gold medal section" of the state, as it won numerous prizes at fairs around the country not only for its wine grapes, for which it was most well-known, but also hay, grain, fruit, barley, olives, almonds, and walnuts (Baker 1914:191).

3.3.4 Site Specific Historical Background of Project Area

Land patent records, which document the transfer of land ownership from the federal government to individuals, indicate that the S½ SE¼ of Township 2S, Range 2E Section 26 (the legal land description of the parcel that includes the Project area) was purchased by George W. Harlan on February 5, 1875 (Bureau of Land Management n.d.). When the public lands were sold, land "patents" were issued—deeds transferring land ownership from a sovereign (the U.S. Government) to a buyer. Land patent records include the information recorded when ownership was transferred. The land patent for the parcel that includes the Project area indicates that Harlan purchased both the 80-acre tract in question, as well as the adjacent 80-acre parcel in the N½ NE¼ of Township 2S, Range 2E Section 35 at that time. This ownership is also reflected in 1880 Oakland Daily and Weekly Tribune Map of Alameda County prepared in 1874, which depicts the parcel including the Project area as

owned by G.W. Harlan (Allardt 1874). It also suggests that Harlan occupied the land before it was formally sold to him by the U.S. Government.

A map of Alameda County published by Thompson & West (1878:53) depicts the 80-acre parcel that includes the Project area labeled "Mrs. Harlan, 80A" (Figure 4). The adjacent 80-acre tract to the south, which was also purchased by George W. Harlan in 1875, is labeled as "Geo. May, 80A." While details are unknown, it is evident that Harlan sold ownership of half his tract to George May, and ownership of the remaining half, which includes the Project area, was transferred to (presumably) his wife.

Details about Mr. and Mrs. George W. Harlan are hazy. They are likely related to the large Harlan family that immigrated to California in 1846, many of whom settled farther west in Alameda County. Archival research indicates that a number of individuals named George Harlan were present in Alameda County and the surrounding area in the late-19th century. The most likely identification of the George W. Harlan listed in the land patent records is actually George Alonzo Harlan, who was listed on the 1870 United States Federal Census for Murray Township, Alameda County, as Geo. Harland, with his wife listed simply as Mrs. Harland (U.S. Census Bureau 1870). Harlan was a farmer with interests throughout Alameda County, although he and his wife, Mary, resided in Murray Township in the 1870s. They later moved to Centerville in Washington Township, Alameda County (California State Library n.d.). Mary died in 1895, while George passed away in 1911, both in Irvington, Alameda County. It is unknown when the Harlans sold their property in the Livermore Valley, but records indicate that by the turn of the century the parcel had changed ownership.

The 80-acre parcel owned by Mrs. Harlan was acquired by the Anspacher Brothers sometime before 1900 (Nusbaumer and Boardman 1900). The Anspacher Brothers were originally commission merchants who amassed large amounts of land in the northern Livermore Valley through speculation during the final decades of the 19th century. Many of their properties were also acquired through loan defaults (Wiberg and Dean 2000:31). Before 1910, the property changed hands again and it was acquired by L. A. Myers and Company, indicated as owner on the 1910 Map of Murray Township (Haviland 1910).

By 1912, ownership of the parcel including the Project area had changed hands again as the Garaventa family acquired it. The Garaventa Hills Project is named for the Garaventa family, who moved to the Livermore Valley in the late-19th century. Domingo Garaventa moved to the United States from Italy in 1870 at about the age of 18, and he worked as a farm laborer in Livermore for a number of years. Garaventa's wife, Mary, came to this country from Italy in 1886, and they were married later that year. The Garaventas had five children, although only three survived to adulthood, including their daughter Amelia (born in 1886), and sons Louis (born in 1891) and Henry (born in 1897). During the 1880s, Garaventa bought 160 acres of farmland in the Green School District, which encompasses the Project area (Faulkner

WSA

Project Location with
1878 Alameda County Farm Map

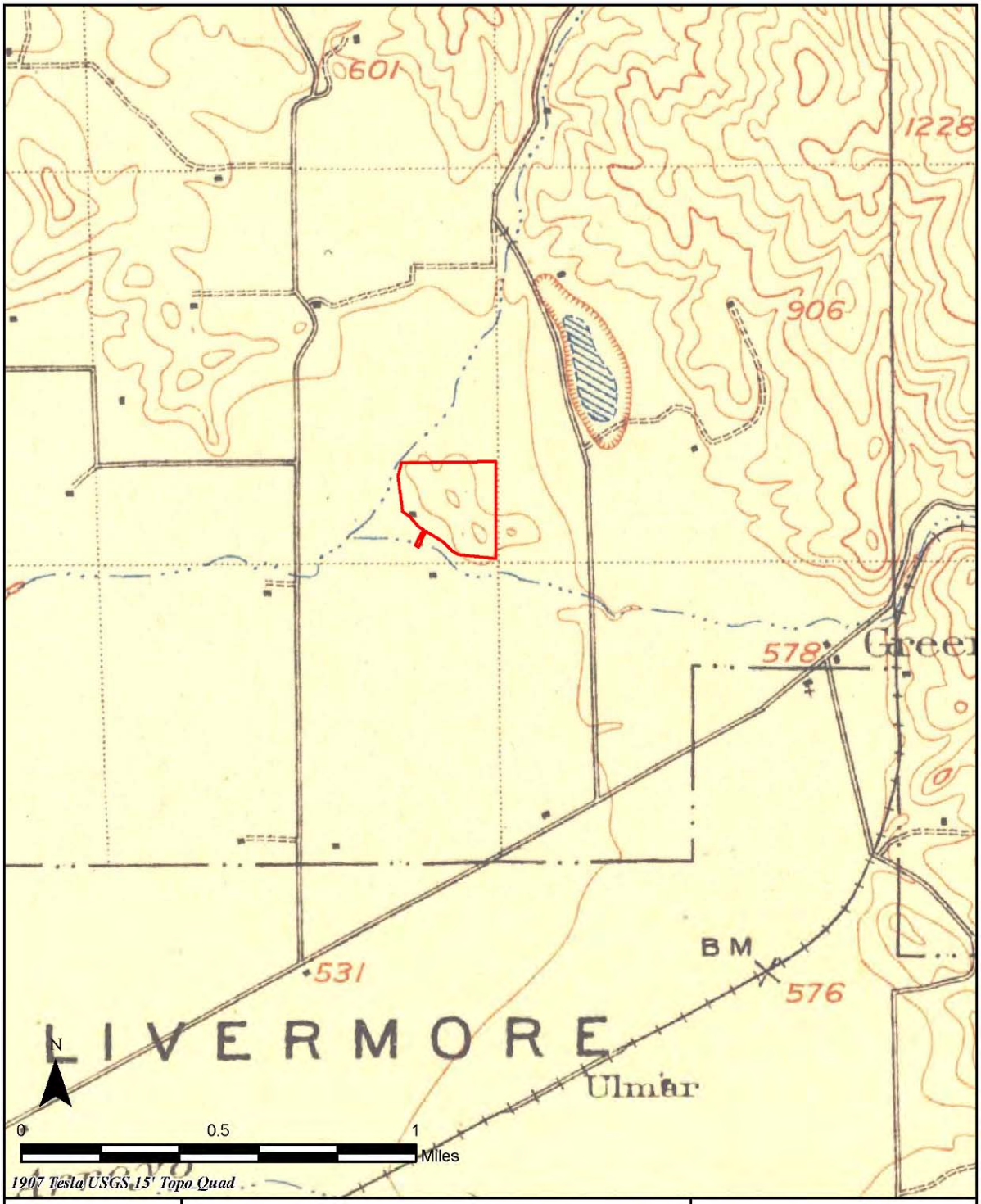
Figure 4
Lamphier-Gregory
Garaventa Hills Project
Livermore, CA

1887:72). Later, in the 1890s, Garaventa bought additional farmland on the first of three parcels north of what became Interstate 580 (U.S. Census Bureau 1880, 1900; Garaventa Wetlands Preserve n.d).

Although no specific deeds or other transaction documents could be located for this Project, Garaventa presumably bought the parcel that includes the present Project area from L. A. Myers and Company around 1910. Domingo Garaventa passed away about that time, and his widow Mary became the head of household. The Garaventa's sons, Louis and Henry Garaventa, worked as laborers on the family farm while Amelia Garaventa worked as a milliner (hatmaker) (U.S. Census Bureau 1910). On the 1912 Map of Murray Township, the 80-acre parcel that includes the Project area, along with the adjoining 80-acre parcels to the west, south, and southwest, are indicated as owned by M. Garaventa – presumably Mary Garaventa (Haviland 1912).

Mary Garaventa passed away during the 1920s, and the land, commonly known as the Vasco Property, passed in equal ownership to Amelia, Louis, and Henry Garaventa (Superior Court of the State of California 1996). Louis and Henry Garaventa continued to farm in the valley—eventually the family owned one-third of Township 2 South Range 2 East (including the Project area), as well as 85 acres on the west side of what became Vasco Road (U.S. Census Bureau 1920, 1930; Garaventa Wetlands Preserve n.d.). The family farmed wheat, barley and oats on their lands until the 1940s when they moved elsewhere, although they retained ownership of the Vasco Property. Henry Garaventa's children, Alwin Garaventa and Valeta Albright (née Garaventa) inherited ownership of the land after Amelia, Louis, and Henry Garaventa all passed away during the 1970s (Superior Court of the State of California 1996; Garaventa Wetlands Preserve n.d.). Alwin Garaventa, Sharon Lee Albright, and Karen Jean Red Elk are the current landowners (ENGEO 2010:Appendix B).

Topographic maps and aerial images of the Project area date from the early-20th century. Maps and photographs of the Garaventa Hills Project area indicate the property was never developed, but has remained vacant grazing and farmland throughout its history. The earliest U.S. Geological Survey (USGS) map, the 1907 Tesla 15-minute USGS topographic map, indicates a single structure within the Project area (Figure 5), but the structure is not depicted on any later maps (see Figure 3) (USGS 1907 [Photorevised 1948]; USGS 1953 [Photorevised 1968 and 1981]). Historical research could not determine the purpose of this structure, and no traces of it were observed during the field survey (see below). The earliest aerial image of the Project area, dating to 1940, shows vacant land with no visible structures, as do later aerial images from 1958 to 2005 (ENGEO 2010:Appendix D).



WSA

Project Location with
1907 Tesla USGS 15' Topo Quad

Figure 5
Lamphier-Gregory
Garaventa Hills Project
Livermore, CA

4.0 Results of the Literature and Records Search

On behalf of WSA, staff at the California Historical Resources Information System, Northwest Information Center (NWIC) at Sonoma State University conducted a records search of the Project vicinity on December 6, 2011 (File No. 11-0601). The records search involved a review of records and maps on file at the NWIC. Results of the records search indicate there are no recorded sites within ¼-mile radius of the Project area. Information on previous archaeological studies within a ¼-mile radius of the Project area was also provided. Relevant pages from the Office of Historic Preservation (OHP) Historic Properties Directory, which includes information regarding National Register of Historic Places, California Register of Historical Resources, California State Historical Landmarks, California State Points of Historical Interest, and historic building surveys, were included with the search results, and no properties within ¼-mile of the Project area are listed. There were also no listings on the California Inventory of Historical Resources or the OHP Archaeological Determinations of Eligibility within ¼-mile of the Project area. Copies of the appropriate sections of the 1907 Tesla 15-minute and the 1953 Altamont 7.5-minute USGS topographic maps were also included in the results.

4.2 Previous Cultural Resource Studies

Two cultural resource studies have been undertaken that include all or part of the Project area, and one additional study has been conducted within ¼-mile of the Project area. These are summarized in Table 1.

The North Livermore survey conducted by Basin Research Associates in 1998 included a small section in the northern part of the current Project area. No cultural resources were observed during that project (Busby 1998). In 2000, Holman and Associates conducted a large-scale survey in north Livermore that also included the current Project area. At that time,

Table 1. Previous Cultural Resource Studies

Study	Authors	Date	Study Type	Title	Location
S-023071	Wiberg and Dean	2000	Survey	Cultural Resources Study for the Vasco-Laughlin Specific Plan and Open Space/Resource Conservation Program, City of Livermore, Alameda County, California	Covers Project area
S-023047	Busby	1998	Survey	Cultural Resources Review, North Livermore Project, City of Livermore, Alameda County, California	Covers portion of Project area
S-023054	Hill	1998	Assessment	Cultural Resources Assessment, Frick and Cornett Subareas, North Livermore Project, City of Livermore, Alameda County, California	Within ¼ mile

the entire parcel was covered with a pedestrian field survey completed on 20 to 40 m transects. No archaeological material was observed during the survey (Wiberg and Dean 2000).

4.3 Previously Recorded Archaeological Resources

There are no previously recorded archaeological sites within ¼-mile of the Project area, and no historic buildings have been recorded within the records search area.

5.0 Native American Consultation

On November 28, 2011, WSA contacted the Native American Heritage Commission (NAHC) by letter to request information on known Native American sacred lands within the Project area and to request a listing of individuals or groups with a cultural affiliation to the Project area. As a response from the NAHC was not received, WSA resent the letter on December 16, 2011. No response to that letter was received. In response to a Notice of Preparation (NOP) sent to the NAHC by the City of Livermore, however, the NAHC provided a list of Native American contacts for the Project area. On December 16, 2011, WSA sent letters to the following 11 contacts identified by the NAHC, requesting comment on the Project: Jakki Kehl; Rosemary Cambra, Chairperson, Muwekma Ohlone Indian Tribe of the San Francisco Bay Area; Andrew Galvan, The Ohlone Indian Tribe; Katherine Erolinda Perez; Ramona Garibay, Representative, Trina Marine Ruano Family; Irene Zwierlein, Chairperson, Amah/Mutsun Tribal Band; Don Hankins; Joseph Mondragon, Tribal Administrator, Amah/Mutsun Tribal Band; Melvin Ketchum III, Environmental Coordinator, Amah/Mutsun Tribal Band; Jean-Marie Feyling, Amah/Mutsun Tribal Band;and Ann Marie Sayers, Chairperson, Indian Canyon Mutsun Band of Costanoan. No responses were received. WSA placed follow-up phone calls on January 3 and January 9, 2012. Copies of this correspondence are provided, and the results of the follow-up telephone calls are summarized, in Appendix A.

6.0 Results of the Archaeological Survey

Although the Project area was previously surveyed in 2000, that survey was part of a larger project and the survey was conducted at a much broader scale than the current survey. Investigators in 2000 surveyed the Project area using 20 to 40 m (65 to 130 ft.) transects (Wiberg and Dean 2000), as compared to the 10 m (33 ft.) transects used for the current survey. In addition, during historic background research for the Project, evidence was found on one of the historic maps that there might have been a structure present on the parcel in 1907. Because this structure was not specifically mentioned in the previous study, it was decided that the Project area should be re-surveyed for this Project.

In accordance with NHPA Section 106, to ensure that no significant cultural resources were missed during the previous survey, and as a means of evaluating potential impacts to cultural resources, WSA archaeologists, Matthew Russell, Ph.D. and David Buckley, B.A. conducted an intensive pedestrian survey of the entire 31.7-acre Project area on December 19, 2011 (see Figure 3). This intensive survey was designed to meet the requirements of Section 106 and was conducted using transect widths of no more than 10 meters (33 ft.). Ground surface visibility throughout the survey area was generally good, with greater than 50% visibility throughout the Project area. Areas of high visibility included drainage channels, exposed rock outcroppings, and abundant rodent burrowing sites.

No prehistoric cultural material was observed during the field survey, and no new archaeological sites were recorded. Twentieth-century material observed during the survey included a plywood target used in aerial mapping that likely dates to the latter part of the 20th century, a barb wire fence dating to the first half of the 20th century, and a small concentration of debris observed at the bottom of an empty cow pond, including broken glass, cow bones, a steel wheel rim, a rubber shoe sole, and an aluminum can, dating to the mid-20th century (Figures 6-8). These were evaluated relative to eligibility criteria for the NRHP and CRHR, and none are recommended as being potentially significant.

Figure 6. Plywood target for aerial mapping.

Figure 7. Barb wire fence located in the southern part of Project area.

Figure 8. Debris scatter located in the bottom of a dry pit.

The areas adjacent to Altamont Creek were considered a high priority during the survey due to the possibility of prehistoric sites near the creek. The creek bank and adjacent areas in the vicinity of the proposed bridge over Altamont Creek, as well as the proposed realignment of the creek, were thoroughly examined and there were no indications of archaeological materials visible on the surface. Although no pre-construction testing of proposed bridge footings was conducted in the location, based on our observations it is unlikely that cultural resources are present.

7.0 Results of Paleontological Resources Assessment

WSA's Paleontologist conducted a paleontological resources assessment of the Project area. The paleontologist identified the geological units within the Project area based on existing geological mapping, the ENGEO Phase I geotechnical report, and readily available data. This section addresses potential Project impacts to paleontological resources that may be present in the Project area.

The Project area is underlain by the fossiliferous late Miocene, marine San Pablo Group sandstone bedrock known to contain important, non-renewable paleontological resources of extinct marine vertebrate and invertebrate fauna. In addition, there are Pleistocene deposits in the Project area that overlie the San Pablo Group along angular unconformity. These deposits are known to contain significant non-renewable paleontological resources, including mammoth, mastodon, sabre cat and camel. The San Pablo Group bedrock and Pleistocene deposits within the Project area are regarded as having a "high potential" to contain significant fossils based on the Society of Vertebrate Paleontologists Guidelines (1995). It is recommended that a professional Paleontologist prepare a paleontological mitigation plan outlining a paleontological monitoring and salvaging plan during construction excavation and ground-disturbing activities for the Project. The full paleontological resources assessment report for the Project area is included in Appendix B.

8.0 Evaluation Under NHPA and CEQA

8.1 NRHP Evaluation Criteria

The NRHP, created under NHPA, is the federal list of cultural resources worthy of preservation. Resources listed in the NRHP include districts, sites, buildings, structures, and objects that are significant in American history, prehistory, architecture, archaeology, engineering, and culture. The NRHP is maintained by the Keeper of the National Register within the National Park Service. To guide the selection of properties included in the NRHP, the Advisory Council on Historic Preservation has developed the National Register Criteria for Evaluation (36 CFR Part 60.4). The criteria are standards by which every property that is nominated to the NRHP is judged. The quality of significance in American

history, architecture, archaeology, and culture is possible in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, material, workmanship, feeling, and association, and meet one of the following criteria:

- Criterion A: A property is associated with events that have made significant contributions to the broad patterns of the history of the United States;
- Criterion B: A property is associated with the lives of people significant in United States history;
- Criterion C: A property embodies the distinctive characteristics of a type, period, or method of construction; represents the work of a master; possesses high artistic value; or represents a significant and distinguishable entity whose components may lack individual distinction; or
- Criterion D: A property has yielded, or may be likely to yield, information important in prehistory or history (36 CFR Part 60.4).

All categories of properties—districts, sites, buildings, structures, and objects—may be judged in relation to any or all of these criteria. Typically, the eligibility to the NRHP of archaeological properties is determined by application of Criterion D, which evaluates the importance of the information the property might contain. Archaeological sites can also be eligible under Criteria A, B and C, which assess the intrinsic value that a property possesses either by virtue of its historical association with an important person or event or as a surviving example of an important type of property. In order to determine the importance of the information a property might contain (i.e., does it meet Criterion D?), a historic context and research design are prepared. The historic context provides the historical background against which any given find can be judged by the NRHP eligibility criteria, establish a period of significance, and possible historical associations. The research design identifies the research questions that can be addressed by the kind of data the property might contain and that cannot be satisfactorily addressed using data from other sources alone.

Integrity. The integrity of a property refers to the property's ability to convey its significance (National Park Service [NPS] 1990:44). The integrity of archaeological sites is evaluated differently from the integrity of architectural resources. For an archaeological resource to contain the level of integrity that is required for NRHP eligibility under Criterion D, the criterion under which resources discovered under this CRAR were evaluated, it "is important that the significant data contained in the property remain sufficiently intact to yield the expected important information" (NPS 1990:23). A fragmentary property type (e.g., a portion of an archaeological site) can be determined to be legally important if the remains are of an identifiable property type that has potential for contributing information to the research questions posed in the research design.

No prehistoric cultural resources were observed or recorded within the Project area. Twentieth-century features and debris observed during the survey were evaluated relative to NRHP eligibility and none are recommended as being potentially significant. No NRHP eligible historic properties are present within the Project area.

8.2 CEQA Evaluation Criteria

CEQA defines significant historical resources as "resources listed or eligible for listing in the California Register of Historical Resources (CRHR)" (Public Resources Code Section 5024.1). A resource may be considered historically significant if it meets the following criteria for listing on the CRHR:

1. it is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage; or
2. it is associated with the lives of persons important to California's past; or
3. it embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
4. it has yielded or is likely to yield information important in prehistory or history (Public Resources Code Section 5024.1).

In order to meet one or more of the criteria listed above, a cultural resource must possess integrity to qualify for listing in the CRHR. Integrity is generally evaluated with reference to qualities including location, design, materials, workmanship, setting, feeling, and association. A potentially eligible site must retain the integrity of the values that would make it significant. Typically, integrity is indicated by evidence of the preservation of the contextual association of artifacts, ecofacts, and features within the archaeological matrix (Criterion 4) or the retention of the features that maintain contextual association with historical developments or personages that render them significant (Criteria 1, 2, or 3). Evidence of the preservation of this context is typically determined by stratigraphic analysis and analysis of diagnostic artifacts and other temporal data (e.g., obsidian hydration, radiocarbon assay) to ascertain depositional integrity or by the level of preservation of historic and architectural features that associate a property with significant events, personages, or styles.

Integrity refers both to the authenticity of a property's historic identity, as shown by the survival of physical characteristics that existed during its historic period and to the ability of the property to convey its significance. This is often not an all-or-nothing scenario (determinations can be subjective); however, the final judgment must be based on the relationship between a property's features and its significance.

Section 15064.5 of the CEQA Guidelines indicates a project may have a significant environmental effect if it causes "substantial adverse change" in the significance of an "historical resource" or a "unique archaeological resource" as defined or referenced in CEQA Guidelines Section 15064.5[b, c] (revised October 26, 1998). Such changes include "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (CEQA Guidelines 1998 Section 15064.5 [b]).

No prehistoric cultural resources were observed or recorded within the Project area. Twentieth-century features and debris observed during the survey were evaluated relative to CRHR eligibility and none are recommended as being potentially significant. No historical resources or unique archaeological resources as defined by CEQA are present within the Project area.

9.0 Impacts and Mitigation

9.1 Previously Undiscovered Archaeological Resources

Although the likelihood of encountering intact cultural resources is considered low, there is the possibility that buried archaeological resources may be located during construction activities. Site preparation, grading, and construction activities could adversely impact previously undiscovered archeological resources. Implementation of the following mitigation measure would reduce potential impacts to undiscovered archeological resources to a less-than-significant level under CEQA.

Mitigation Measure CULT-1: If prehistoric or historic cultural resources are encountered during Project activities, all work within 25 feet of the discovery will be stopped and a qualified archeologist meeting federal criteria under 36 CFR 61 will be contacted to assess the resources and make recommendations.

While prehistoric or historic cultural resources should be avoided by Project activities, if the resources cannot be avoided, they will be evaluated for their potential historic significance in consultation with the City of Livermore and the ACOE. If the resources are recommended to be non-significant, avoidance is not necessary. If the resources are recommended as potentially significant or eligible to the NRHP, they will be avoided. If avoidance is not feasible, Project impacts will be mitigated in accordance with the recommendations of the evaluating archaeologist, Section 106 of the NHPA, and CEQA Guidelines §15126.4 (b)(3)(C), which require development and implementation of a data recovery plan that would include recommendations for the treatment of the discovered archaeological materials. The data recovery plan will be submitted to the City of Livermore and the ACOE for review and approval. Upon approval and completion of the data recovery program, Project construction

activity within the area of the find may resume, and the archaeologist will prepare a report documenting the methods and findings. The report will be submitted to the City of Livermore and the ACOE. Once the report is reviewed and approved by the City of Livermore and the ACOE, a copy of the report will be submitted to the NWIC.

9.2 Previously Undiscovered Paleontological Resources

There is a high potential that important, non-renewable paleontological resources may be located during construction activities. Site preparation, grading, and construction activities could adversely impact previously undiscovered paleontological resources. Implementation of the following mitigation measure would reduce potential impacts to undiscovered paleontological resources to a less-than-significant level under CEQA.

Mitigation Measure CULT-2: If paleontological resources are encountered during Project activities, all work within 25 feet of the discovery will be stopped and a qualified Paleontologist will be contacted to assess the resources and make recommendations.

While paleontological resources should be avoided by Project activities, if the resources cannot be avoided, they will be evaluated for their potential significance in consultation with the City of Livermore and the ACOE. If the resources are recommended to be non-significant, avoidance is not necessary. If the resources are determined to be potentially significant, they will be avoided. If avoidance is not feasible, Project impacts will be mitigated in accordance with the recommendations of the evaluating Paleontologist and CEQA Guidelines (Appendix G, Part V), which require development and implementation of a data recovery plan that would include recommendations for the treatment of the discovered paleontological resources. The data recovery plan will be submitted to the City of Livermore and the ACOE for review and approval. Upon approval and completion of the data recovery program, Project construction activity within the area of the find may resume, and the Paleontologist will prepare a report documenting the methods and findings. The report will be submitted to the City of Livermore and the ACOE.

9.3 Previously Undiscovered Human Remains

Ground disturbing activities associated with site preparation, grading, and construction activities could disturb human remains, including those interred outside of formal cemeteries. The potential to uncover Native American human remains exists in locations throughout California. Although not anticipated, human remains may be identified during site-preparation and grading activities, resulting in a significant impact to Native American cultural resources. Implementation of the following mitigation measure would reduce potential adverse impacts to human remains to a less-than-significant level.

Mitigation Measure CULT-3: Section 7050.5(b) of the California Health and Safety code will be implemented in the event that human remains, or possible human remains, are located during Project-related construction excavation. Section 7050.5(b) states:

> In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27492 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of death, and the recommendations concerning treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code.

The County Coroner, upon recognizing the remains as being of Native American origin, is responsible to contact the NAHC within 24 hours. The Commission has various powers and duties, including the appointment of a Most Likely Descendant (MLD) to the Project. The MLD, or in lieu of the MLD, the NAHC, has the responsibility to provide guidance as to the ultimate disposition of any Native American remains.

10.0 References

Allardt, G.F.

1874 *Official Map of Alameda County, California*. Compiled from Official Surveys and Records and Private Surveys and Published by Authority of the Board of Supervisors of Alameda County. Britton, Rey & Company, Oakland, CA.

Baker, Joseph E. (editor)

1914 *Past and Present of Alameda County, California*. Volume 1. The S. J. Clarke Publishing Company, San Francisco, CA.

Beardsley, Richard K.

1948 Cultural Sequences in Central California Archaeology. *American Antiquity* 14(1):1–29.

1954 *Temporal and Arial relationships in Central California Archaeology*. Reports of the University of California Archaeological Survey. Archaeological Survey, Department of Anthropology, University of California, Berkeley.

Beck, Warren A. and Ynez D. Haase

1974 *Historical Atlas of California*. University of Oklahoma Press, Norman, OK.

Bennyhoff, James A., and Richard E. Hughes

1987 Shell Bead Ornament Exchange Networks Between California and the Western Great Basin. *Anthropological Papers of the American Museum of Natural History* 64(2):79–175. Washington, D.C.

Bocek, Barbara

1986 Hunter-Gatherer Ecology and Settlement Mobility along San Francisquito Creek. Doctoral dissertation, Department of Anthropology, Stanford University, Stanford, CA.

Brown, Lauren

1985 *Grasslands*. National Audubon Society Nature Guides. Alfred A. Knopf, New York, NY.

Brushy Peak Regional Preserve

n.d. Preserve Natural Features. Flyer available at the East Bay Regional Parks District Brushy Peak Regional Preserve, Livermore, CA.

Bureau of Land Management

n.d. General Land Office Records. www.glorecords.blm.gov. Accessed December 7, 2011.

Busby, Colin I

1998 Cultural Resources Review, North Livermore Project, City of Livermore, Alameda County, California. Basin Research Associates, Inc. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-023047).

California State Library

n.d. *Great Registers, 1866-1898*; California History Section, Collection Number: 4 - 2A; CSL Roll No.: 2; FHL Roll No.:976447. Ancestry.com, accessed December 2011.

Cambra, Rose Mary, Alan Leventhal, Laura Jones, Julia Hammett, Les Field, Norma Sanchez, and Robert Jurmain

1996 Archaeological Investigations at Kaphan Umux (Three Wolves) Site, CA-SCL-732: A Middle Period Prehistoric Cemetery on Coyote Creek in Southern San Jose, Santa Clara County, California. Report on file at Caltrans District 4 Offices, Oakland, CA.

Cook, Sherburne F.

1957 The Aboriginal Population of Alameda and Contra Costa Counties, California. *University of California Archaeological Survey Reports* 16(4):134-156.

1976 *The Conflict Between the California Indian and White Civilization*. University of California Press, Berkeley, CA.

Davis, Lee, Richard Hitchcock and Lisa Mertz

1997 Recent American Era, 1900-1996. In 'Native American History Studies for the Los Vaqueros Project: A Synthesis', David A. Fredrickson, Suzanne B. Stewart and Grace H. Ziesing, editors. Anthropological Studies Center, Sonoma State University Academic Foundation, Inc. Prepared for the Contra Costa Water District, Concord, CA.

ENGEO

2010 Phase I Environmental Assessment Report: Proposed Garaventa Hills Estates, Livermore, California. ENGEO, Inc., Ripon, CA.

Esselen Nation

2007 The Ohlone/Costanoan Esselen Nation Today. <www.esselennation.com/ OCENToday.html>. Accessed November 2007.

Faulkner, William B.
1887 *Faulkner's Business and Residence Directory of Murray Township, Alameda, County, California*. Livermore Herald Steam Printing House, Livermore, CA. Reprinted 2006 by the Livermore-Amador Genealogical Society.

Fredrickson, David A.
1973 Early Cultures of the North Coast Ranges, California. Doctoral dissertation, Department of Anthropology, University of California, Davis.
1974 Cultural Diversity in Early Central California: A View from the North Coast Ranges. *The Journal of California Anthropology* 1(1):41-53.
1994 Archaeological Taxonomy in Central California Reconsidered. In *Toward a New Taxonomic Framework for Central California Archaeology. Essays by James A Bennyhoff and David A. Fredrickson*, Richard E. Hughes, editor, pp.93-104. Contributions of the University of California Archaeology Research Facility 52. Berkeley.

Garaventa Wetlands Preserve
n.d. Garaventa Wetlands Preserve, Livermore Area Recreation and Park District. <http://www.larpd.dst.ca.us/parks/maps/16.html> Accessed November 2011.

Groza, Randy G.
2002 An AMS chronology for central California *Olivella* shell beads. Master's thesis. Department of Anthropology, San Francisco State University, San Francisco, CA.

Haviland, P.A.
1910 *Map of Murray Township*. Alameda County, CA.
1912 *Map of Murray Township*. Alameda County, CA.

Heizer, Robert F., and Franklin Fenenga
1939 Archaeological Horizons in Central California. *American Anthropologist* 41:378–399.

Hendry, George W., and Jacob N. Bowman
1940 The Spanish and Mexican adobe and other buildings in the nine San Francisco Bay Counties, 1776 to 1850. Ms. on file at the Bancroft Library, University of California, Berkeley, CA.

Hill, Ward
1998 Cultural Resources Assessment, Frick and Cornett Subareas, North Livermore Project, City of Livermore, Alameda County, California. Basin Research

Associates, Inc. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-023054).

Hughes, Richard E. (editor)

1994 *Toward a New Taxonomic Framework for Central California Archaeology. Essays by James A. Bennyhoff and David A. Fredrickson*. Contributions of the University of California Archaeology Research Facility 52. Berkeley.

Kroeber, Alfred L.

1970 *Handbook of the Indians of California*. The Filmer Brothers Press, Taylor & Taylor, San Francisco, CA.

Levy, Richard

1978 Costanoan. In *Handbook of North American Indians,* Vol. 8, *California*, Robert F. Heizer, editor, pp. 485-495. Smithsonian Institution, Washington, D.C.

Lillard, Jeremiah B., Robert F. Heizer and Franklin Fenenga

1939 An Introduction to the Archeology of Central California. *Sacramento Junior College Department of Anthropology Bulletin* 2. Sacramento, CA.

Lillard, Jeremiah B., and William K. Purves

1936 The Archaeology of the Deer Creek-Cosumnes Area, Sacramento Co., California. S*acramento Junior College, Department of Anthropology Bulletin* 1. Sacramento, CA.

Meyer, Jack and Jeffrey S. Rosenthal

1997 Archaeological and Geoarchaeological Investigations at Eight Prehistoric Sites in the Los Vaqueros Reservoir Area, Contra Costa County, California. Anthropological Studies Center, Sonoma State University Academic Foundation, Rohnert Park, California. Submitted to the Contra Costa Water District, Concord, California. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-020072).

Milliken, Randall

1995 *A Time of Little Choice: The Disintegration of Tribal Culture in the San Francisco Bay Area 1769-1810*. Ballena Press Anthropological Papers No. 43, Menlo Park, CA.

1997a Spanish Contact and Missionization, 1776-1806. In 'Native American History Studies for the Los Vaqueros Project: A Synthesis', David A. Fredrickson, Suzanne B. Stewart and Grace H. Ziesing, editors, pp.88-106. Anthropological

Studies Center, Sonoma State University Academic Foundation, Inc. Prepared for the Contra Costa Water District, Concord, CA.

1997b The Mission and Rancho Eras, 1806-1845. In 'Native American History Studies for the Los Vaqueros Project: A Synthesis', David A. Fredrickson, Suzanne B. Stewart and Grace H. Ziesing, editors, pp.107-144. Anthropological Studies Center, Sonoma State University Academic Foundation, Inc. Prepared for the Contra Costa Water District, Concord, CA.

Milliken, Randall, and James A. Bennyhoff

1993 Temporal Changes in Beads as Prehistoric Grave Goods. In *There Grows a Green Tree: Papers in Honor of David A. Fredrickson*, Greg White, Pat Mikkelsen, William R. Hildebrandt, and Mark E. Basgall, editors, pp. 381-395. Center for Archaeological Research at Davis, Publication 11. University of California, Davis.

Milliken, Randall, Richard T. Fitzgerald, Mark G. Hylkema, Randy Groza, Tom Origer, David G. Bieling, Alan Leventhal, Randy S. Wiberg, Andrew Gottsfield, Donna Gillette, Viviana Bellifemine, Eric Strother, Robert Cartier and David A. Fredrickson

2007 Punctuated Culture Change in the San Francisco Bay Area. In *California Prehistory: Colonization, Culture, and Complexity*, Terry L. Jones and Kathryn A. Klar, editors, pp. 99-123. Altamira Press, Lanham, MD.

Moratto, Michael J.

1984 *California Archaeology*. Academic Press, Orlando, FL.

Muwekma Ohlone Tribe

2007. The Muwekma Ohlone Tribe: A Brief History and the Recognition Process. www.muwekma.org/news/index.html. Accessed November 2007.

National Park Service

1990 *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation*. U.S. Department of the Interior, National Park Service, Washington D.C.

Nelson, Nels C.

1909 *Shellmounds of the San Francisco Bay Region*. University of California Publications in American Archaeology and Ethnology 7(4):310-357. University of California, Berkeley.

Nusbaumer, G. L. and W. F. Boardman
1900 *The Official Map of Alameda County, California*. Tribune Publishing Company, Oakland, CA.

Praetzellis, Mary, Suzanne B. Stewart, and Grace H. Ziesing
1997 The Los Vaqueros Watershed: A Working History. Anthropological Studies Center, Sonoma State University Academic Foundation, Inc., Prepared for Contra Costa Water District. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-019318).

Praetzellis, Mary (editor)
2004 SF-80 Bayshore Viaduct Seismic Retrofit Projects Report on Construction Monitoring, Geoarchaeology, and Technical and Interpretive Studies for Historical Archaeology. Anthropological Studies Center, Sonoma State University. Prepared for Office of Cultural Resources Studies, California Department of Transportation, District 4, Oakland, CA.

Ragir, Sonia
1972 *The Early Horizon in Central California Prehistory*. Contributions of the University of California Archaeological Research Facility 15, University of California, Berkeley.

Rawls, James J., and Walton Bean
1998 *California, An Interpretative History.* McGraw Hill, Boston.

Schenck, W. Egbert, and Elmer J. Dawson
1929 *Archaeology of the Northern San Joaquin Valley*. University of California Publications in American Archaeology and Ethnology 25(4):289-413. Berkeley.

Shipley, William F.
1978 Native Languages of California. In *Handbook of North American Indians*, Vol. 8, *California*, Robert F. Heizer, editor, pp. 80-90. Smithsonian Institution, Washington, D.C.

Shoup, Laurence, Randall T. Milliken and Alan K. Brown
1995 Inigo of Rancho Posolmi: The Life and Times of a Mission Indian and His Land. On file at Woodward Clyde, 500 12th Street, Oakland, CA.

Society of Vertebrate Paleontology

1995 Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources: Standard Guidelines. *Society of Vertebrate Paleontology News Bulletin* 163.

Stewart, Suzanne B.

1994 Native American History of the Los Vaqueros Project Area, Alameda and Contra Costa Counties, California. Anthropological Studies Center, Sonoma State University Academic Foundation, Inc. Prepared for Contra Costa Water District, Concord, CA.

Superior Court of the State of California, Alameda County

1996 *Order Settling First and Final Account of Report of Executor, for Payment of Executor's Commissions for Ordinary Services and Compensation for Extraordinary Services and Attorneys' Fees for Ordinary and Extraordinary Services, and for the Final Distribution Under Will*. No. 211778-4, June 10, 1996.

Thompson & West

1878 *Official and Historical Atlas Map of Alameda County, California*. Thompson & West, Oakland, CA. Reprinted 1976, Valley Publishers, Fresno, CA.

U.S. Census Bureau

1870 United States Federal Census: 1870. Schedule 1. Entry for Murray Township, Alameda County, California. Page 105. Ancestry.com, accessed December 2011.

1880 United States Federal Census: 1880. Schedule 1. Entry for Murray Township, Alameda County, California. Page 49. Ancestry.com, accessed December 2011.

1900 United States Federal Census: 1900. Schedule 1. Entry for Murray Township, Alameda County, California. Page 18. Ancestry.com, accessed December 2011.

1910 United States Federal Census: 1910. Schedule 1. Entry for Murray Township, Alameda County, California. Page 7. Ancestry.com, accessed December 2011.

1920 United States Federal Census: 1920. Schedule 1. Entry for Murray Township, Alameda County, California. Page 2A. Ancestry.com, accessed December 2011.

1930 United States Federal Census: 1930. Schedule 1. Entry for Murray Township, Alameda County, California. Page 6B. Ancestry.com, accessed December 2011.

U.S. Geological Survey

1907 Tesla Quadrangle, California, 15-Minute Series (Topographic), photorevised 1948.

1953 Altamont Quadrangle, California, 7.5-Minute Series (Topographic), photorevised 1968 and 1981.

Wiberg, Randy S.

1997 *Archaeological Investigations at Site CA-ALA-42, Alameda County, California: Final Report.* Coyote Press, Salinas, CA.

Wiberg, Randy S. and Randall Dean

2000 Cultural Resources Study for the Vasco-Laughlin Specific Plan and Open Space/Resource Conservation Program, City of Livermore, Alameda County, California. Holman & Associates. On file at the Northwest Information Center, Sonoma State University, Rohnert Park, CA (S-023071).

Willard, Ruth Hendricks

1988 *Alameda County, California Crossroads: An Illustrated History*. Windsor Publications, Alameda, CA.

Ziesing, Grace H. (ed.)

1997 From Rancho to Reservoir: History and Archaeology of the Los Vaqueros Watershed, California. Anthropological Studies Center, Sonoma State University Academic Foundation, Inc. Prepared for Contra Costa Water District, Concord, CA.

2000 Replacement of the West Approach to the San Francisco-Oakland Bay Bridge: Archaeological Research Design and Treatment Plan, Volume 1. Anthropological Studies Center, Sonoma State University Academic Foundation, Inc. Prepared for CALTRANS, District 4, Oakland, CA.

Appendix A

Native American Heritage Commission Consultation

WSA

Consultants in Archaeology and Historic Preservation

Native American Heritage Commission
915 Capitol Mall, Room 364
Sacramento, CA 95814
(916) 653-4082; Fax (916) 657-5390

November 28, 2011

RE: GARAVENTA HILLS PROJECT, LIVERMORE, ALAMDEDA COUNTY, CA

Dear Native American Heritage Commission:

William Self Associates, Inc. (WSA) has been contracted to assess potential impacts to cultural resources as part of the Garaventa Hills Project, in Livermore, Alameda County, California. The project area is within Township 2 South, Range 2 East, Section 26, as depicted on the Altamont US Geological Survey 7.5 minute topographic quadrangle (1997). The proposed project will include construction of a 76-unit residential development on a 31.7-ac site of vacant grazing land in north Livermore.

We bring this project to the attention of the Native American Heritage Commission with the desire to obtain, from your office, pertinent information regarding prehistoric, historic and/or ethnographic land use and sites of Native American traditional or cultural value that might be known to exist within the project vicinity, as depicted in the Sacred Lands database or other files. We would also appreciate obtaining a list of interested Native American tribal entities or individuals for the project area. We have contacted the Northwest Information Center at Sonoma State University, Rohnert Park to review their files as part of the background research on the project.

We would appreciate a response, at your earliest convenience, should you have information relative to this request. Should you have any questions, I can be reached at (925) 253-9070.

Thank you again for your assistance.

Sincerely,

James M Allen

James Allen, Ph.D., RPA
Principal
Attachment

STATE OF CALIFORNIA Edmund G. Brown Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
(916) 657-5390 - Fax

RECEIVED
DEC -7 2011
COMMUNITY DEVELOPMENT DEPT.

December 5, 2011

Steve Stewart
City of Livermore City Administration Building
1052 S. Livermore Avenue
Livermore, CA 94551

RE: SCH# 2011112045 Garaventa Hills Project; Alameda County

Dear Mr. Stewart:

The Native American Heritage Commission (NAHC) has reviewed the Notice of Preparation (NOP) referenced above. The California Environmental Quality Act (CEQA) states that any project that causes a substantial adverse change in the significance of an historical resource, which includes archeological resources, is a significant effect requiring the preparation of an EIR (CEQA Guidelines 15064(b)). To comply with this provision the lead agency is required to assess whether the project will have an adverse impact on historical resources within the area of project effect (APE), and if so to mitigate that effect. To adequately assess and mitigate project-related impacts to archaeological resources, the NAHC recommends the following actions:

- ✓ Contact the appropriate regional archaeological Information Center for a record search. The record search will determine:
  - If a part or all of the area of project effect (APE) has been previously surveyed for cultural resources.
  - If any known cultural resources have already been recorded on or adjacent to the APE.
  - If the probability is low, moderate, or high that cultural resources are located in the APE.
  - If a survey is required to determine whether previously unrecorded cultural resources are present.
- ✓ If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
  - The final report containing site forms, site significance, and mitigation measurers should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for public disclosure.
  - The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.
- ✓ Contact the Native American Heritage Commission for:
  - A Sacred Lands File Check. **USGS 7.5 minute quadrangle name, township, range and section required.**
  - A list of appropriate Native American contacts for consultation concerning the project site and to assist in the mitigation measures. **Native American Contacts List attached.**
- ✓ Lack of surface evidence of archeological resources does not preclude their subsurface existence.
  - Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) §15064.5(f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.
  - Lead agencies should include in their mitigation plan provisions for the disposition of recovered artifacts, in consultation with culturally affiliated Native Americans.
  - Lead agencies should include provisions for discovery of Native American human remains in their mitigation plan. Health and Safety Code §7050.5, CEQA §15064.5(e), and Public Resources Code §5097.98 mandates the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery.

Sincerely,

Katy Sanchez

Katy Sanchez
Program Analyst
(916) 653-4040

cc: State Clearinghouse

Native American Contact List
Alameda County
December 5, 2011

Indian Canyon Mutsun Band of Costanoan
Ann Marie Sayers, Chairperson
P.O. Box 28
Hollister , CA 95024
ams@indiancanyon.org
831-637-4238
Ohlone/Costanoan

Amah/MutsunTribal Band
Irene Zwierlein, Chairperson
789 Canada Road
Woodside , CA 94062
amah_mutsun@yahoo.com
(650) 851-7747 - Home
(650) 851-7489 - Fax
Ohlone/Costanoan

Jakki Kehl
720 North 2nd Street
Patterson , CA 95363
jakki@bigvalley.net
(209) 892-1060
Ohlone/Costanoan

Don Hankins
P.O. Box 627
Forest Ranch, CA 959421
530-343-3489 - phone/fax
Miwok

Katherine Erolinda Perez
PO Box 717
Linden , CA 95236
canutes@verizon.net
(209) 887-3415
Ohlone/Costanoan
Northern Valley Yokuts
Bay Miwok

Amah/Mutsun Tribal Band
Joseph Mondragon, Tribal Administrator
882 Bay view Avenue
Pacific Grove, CA 94062
831-372-9015
831-372-7078 - fax
Ohlone/Costanoan

Trina Marine Ruano Family
Ramona Garibay, Representative
30940 Watkins Street
Union City , CA 94587
soaprootmo@msn.com
510-972-0645-home
209-688-4753-cell
Ohlone/Costanoan
Bay Miwok
Plains Miwok
Patwin

Amah/Mutsun Tribal Band
Melvin Ketchum III, Environmental Coordinator
7273 Rosanna Street
Gilroy , CA 95020
408-842-3220
Ohlone/Costanoan

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH# 2011112045 Garavent Hills Project; Alameda County.

Native American Contact List
Alameda County
December 5, 2011

Muwekma Ohlone Indian Tribe of the SF Bay Area
Rosemary Cambra, Chairperson
2574 Seaboard Avenue
San Jose , CA 95131
muwekma@muwekma.org
408-205-9714
510-581-5194
Ohlone / Costanoan

Amah/MutsunTribal Band
Jean-Marie Feyling
19350 Hunter Court
Redding , CA 96003
jmfgmc@sbcglobal.net
530-243-1633
Ohlone/Costanoan

The Ohlone Indian Tribe
Andrew Galvan
PO Box 3152
Fremont , CA 94539
chochenyo@AOL.com
(510) 882-0527 - Cell
(510) 687-9393 - Fax
Ohlone/Costanoan
Bay Miwok
Plains Miwok
Patwin

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH# 2011112045 Garavent Hills Project; Alameda County.

December 16, 2011

Ms. Ann Marie Sayers, Chairperson
Indian Canyon Mutsun Band of Costanoan
P.O. Box [redacted]
Hollister, CA 95024

RE: GARAVENTA HILLS PROJECT, LIVERMORE, ALAMDEDA COUNTY, CA

Dear Ms. Sayers:

William Self Associates, Inc. (WSA) has been contracted to assess potential impacts to cultural resources as part of the Garaventa Hills Project, in Livermore, Alameda County, California. The project area is within Township 2 South, Range 2 East, Section 26, as depicted on the attached Altamont US Geological Survey 7.5 minute topographic quadrangle (1997). The proposed project will include construction of a 76-unit residential development on a 31.7-acre site of vacant grazing land in north Livermore.

We would appreciate receiving any comments you may have regarding cultural resources or sacred sites issues within the immediate project area. If you could provide your comments in writing to the address below, or call me, we will make sure the comments are provided to our client as part of this project.

We would appreciate a response, at your earliest convenience, should you have information relative to this request. Should you have any questions, I can be reached at (925) 253-9070.

Thank you again for your assistance.

Sincerely,

James M Allan

James Allan, Ph.D., RPA
Principal

Attachment

SAMPLE

Garaventa Hills Project
Record of Native American Contacts and Comments
Addresses and phone numbers withheld to protect privacy

Native American Contact	Date of Notification Letter	Response to Letter (Date)	Date of Phone Contact	Date of Follow-Up Phone Contact	Comments
Ms. Jakki Kehl	12/16/11	No response	01/03/12	01/09/12	No comments specific to Project area, but would like opportunity to comment on DEIR
Ms. Rosemary Cambra Chairperson, Muwekma Ohlone Indian Tribe of the San Francisco Bay Area	12/16/11	No response	01/03/12	01/09/12	Voicemail box full. Could not leave message.
Mr. Andrew Galvan The Ohlone Indian Tribe	12/16/11 (letter) 01/03/12 (email)	No response	01/09/12	01/12/12	Left voicemail
Ms. Katherine Erolinda Perez	12/16/11	No response	01/03/12	01/09/12	Left voicemail
Ms. Ramona Garibay Representative, Trina Marine Ruano Family	12/16/11	No response	01/03/12	n/a	No comments
Ms. Irene Zwierlein Chairperson, Amah/Mutsun Tribal Band	12/16/11	No response	01/03/12	01/09/12	Left voicemail
Ms. Ann Marie Sayers Chairperson, Indian Canyon Mutsun Band of Costanoan	12/16/11	No response	01/03/12	01/09/12	Left voicemail
Mr. Don Hankins	12/16/11	No response	01/03/12	n/a	No comments specific to Project area, but concerned about visibility from Brushy Peak, Vasco Caves and other sacred sites in the area.
Mr. Joseph Mondragon Tribal Administrator, Amah/Mutsun Tribal Band	12/16/11	No response	01/03/12	01/09/12	Left voicemail and message.
Mr. Melvin Ketchum III, Environmental Coordinator, Amah/Mutsun Tribal Band	12/16/11	No response	01/03/12	01/09/12	Left voicemail
Ms. Jean-Marie Feyling Amah/Mutsun Tribal Band	12/16/11	No response	01/03/12	n/a	No comments

Appendix B

Paleontological Resources Assessment Report

January 12, 2012

To: **Matthew A. Russell, Ph.D., RPA**
Project Manager
William Self Associates
Pacific Region Office
PO Box 219261-D
Avenida de Orinda
Orinda, CA 94563
Ph. 925-253-9070

From: **James R. Allen, M. Sci., PG #8335**
5300 Iron Horse Pkwy. #369
Dublin, CA 94568
Ph. 925-413-0054

RE: ASSESSMENT OF THE PALEONTOLOGICAL SENSITIVITY FOR THE PROPOSED GARAVANTA HILLS PROJECT LIVERMORE , CALIFORNIA

Dear Dr. Russell:

Per your request, I have conducted and prepared a paleontological resources assessment of the Garaventa Hills Project (Project), a 76-unit residential development on a 31.7-ac site of vacant grazing land in north Livermore, California (Figure 1). In brief, the proposed project site is underlain by the fossiliferous late Miocene, marine San Pablo Group sandstone bedrock known to contain important, non-renewable paleontological resources of extinct marine vertebrate and invertebrate fauna. In addition, there are Pleistocene deposits on site which overlie the San Pablo Group along angular unconformity. These deposits are known to contain significant non-renewable paleontological resources of: rare marine vertebrates, terrestrial vertebrates of mammoth, mastodon, sabre cat and camel to name just a few. The San Pablo Group bedrock and Pleistocene Deposits at the project are regarded as having a "High Potential" to contain significant fossils based on the Society of Vertebrate Paleontologists Guidelines (1995). Construction-related

excavation will impact potentially fossiliferous Pleistocene deposits and Miocene-age sandstone bedrock. It is recommended here that a Professional Geologist prepare a mitigation report outlining a paleontological monitoring plan and salvaging plan/program during any construction excavation and ground-disturbing activities for the project.

Please contact me with questions.

Sincerely,

James R. Allen, M.Sci., PG #8335
5300 Iron Horse Pkwy. #369
Dublin, CA 94568
Cell Ph. 925-413-0054

ASSESSMENT OF THE PALEONTOLOGICAL SENSITIVITY FOR THE PROPOSED GARAVANTA HILLS PROJECT LIVERMORE , CALIFORNIA.

Introduction

James R. Allen, M.Sci., PG #8335, has been contracted by William Self Associates, Inc. (WSA) to perform a paleontological resources assessment for the Garaventa Hills Project (Project), Livermore, California (Figure 1, 2). The project is a 76-unit residential development on a 31.7-ac site of vacant grazing land in north Livermore. The project will involve a ground-disturbing excavations and realignment of Altamont Creek.

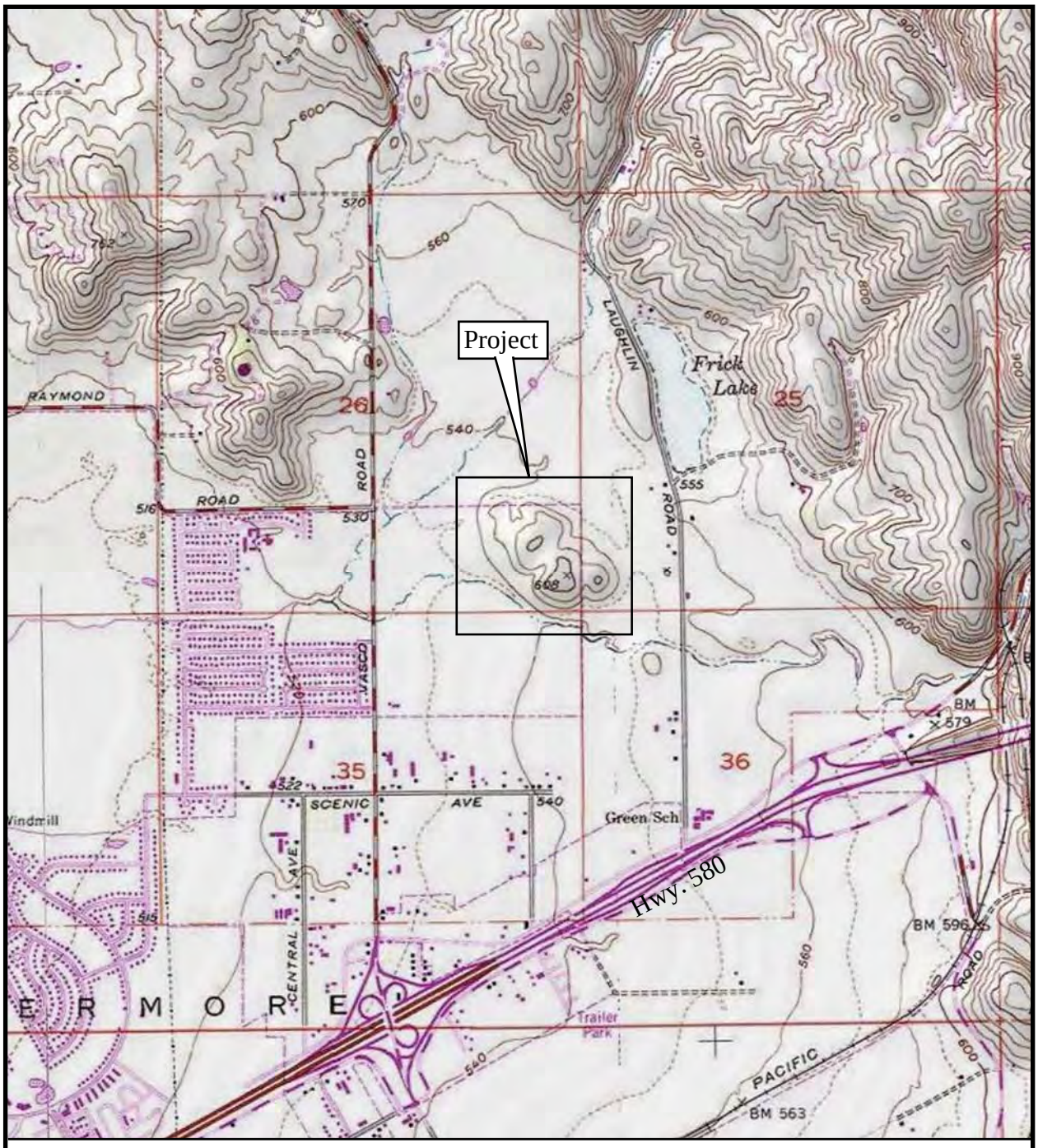
Paleontological Records Search

This limited study included reviews of pertinent geological and paleontological literature & locality information at California State University, East Bay on June 9, 2012; United States Geological Survey on June 6, 2012 and at the University of California Berkeley on January 7, 2012 .

Regulatory Framework

Fundamental protection for paleontological resources is established at the federal, state and local government level, through the regulations summarized in the paragraphs that follow. Specific approaches for implementing these protections are provided by implementing guidelines set by the Society of Vertebrate Paleontology.

The measures and methods outlined herein are designed to meet the requirements of the National Environmental Policy Act (NEPA), and the state law protecting fossils, the California Environmental Quality Act (CEQA), regarding impacts to paleontological resources and if implemented during construction of the Project, will ensure compliance. Proposed monitoring and mitigation methods are in part derived from the Society of Vertebrate Paleontology (SVP) standard guidelines (1995, 1996). These measures and



Source: USGS: Altamont 7.5-minute Topographic Quadrangle Map

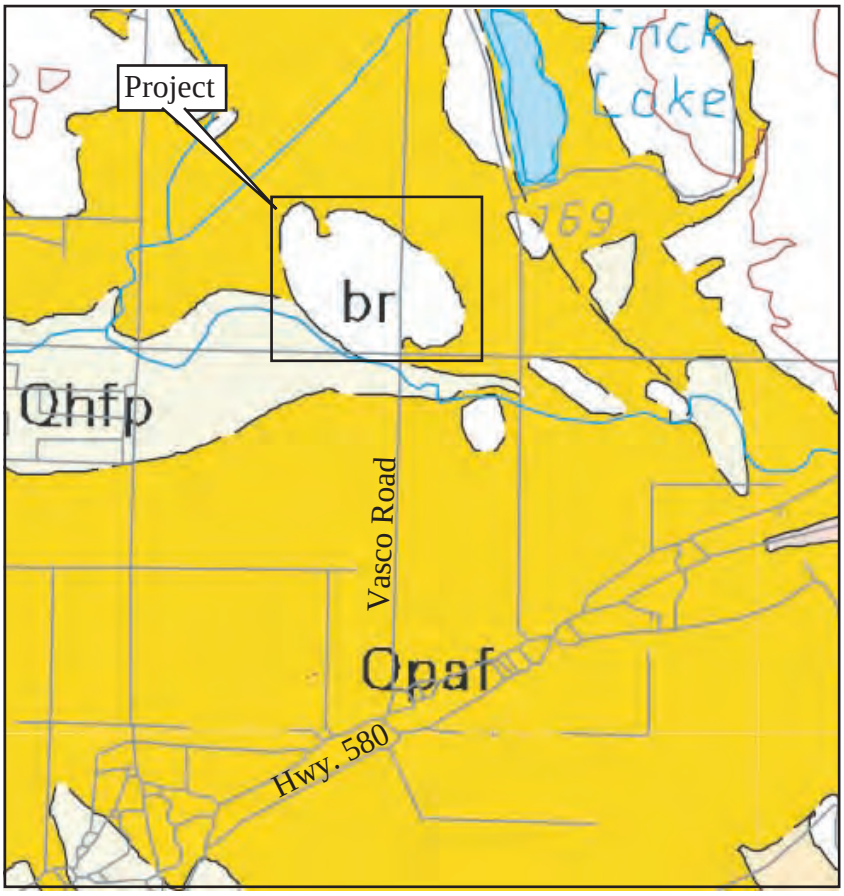
Location Map of Project Paleontological Assessment StudyArea	Figure 1
Lamphier-Gregory Garaventa Hills Project Livermore,CA	

methods have been widely used in California and have proven to be successful in protecting and preserving significant paleontological resources while allowing for the timely completion of construction work. This paleontological assessment report prepared herein is designed to ensure compliance and meet the requirements of:

- The National Environmental Policy Act (NEPA) does not provide specific guidance regarding paleontological resources, but the NEPA requirement that federal agencies take all practicable measures to "preserve important historic, cultural, and natural aspects of our national heritage" (NEPA Section 101[b][4]) is interpreted as applying to paleontological materials.

- Destruction of a "unique paleontological resource or site or unique geologic feature" constitutes a significant impact under CEQA (CEQA *Guidelines* Appendix G). Appendix G provides a checklist of questions a lead agency should address. The question on the checklist with respect to paleontology is: "Would the project directly or indirectly destroy a unique paleontological resource?" The treatment of paleontological resources under CEQA generally requires an evaluation of resources in a project's area of potential effect; an assessment of potential impacts on significant or unique resources; and the development of mitigation measures for potentially significant impacts, which may include monitoring combined with data recovery or avoidance (or both).

- Several sections of the California Public Resources Code (PRC) are designed to offer protection to paleontological resources. Section 5097.5 prohibits "knowing and willful" excavation, removal, destruction, injury, and defacement of any paleontologic feature on public lands (lands under state, county, city, district, or public authority jurisdiction or the jurisdiction of a public corporation), except where the agency with jurisdiction has granted express permission. Section 30244 requires reasonable mitigation for impacts on paleontological resources that occur as a result of development on public lands.



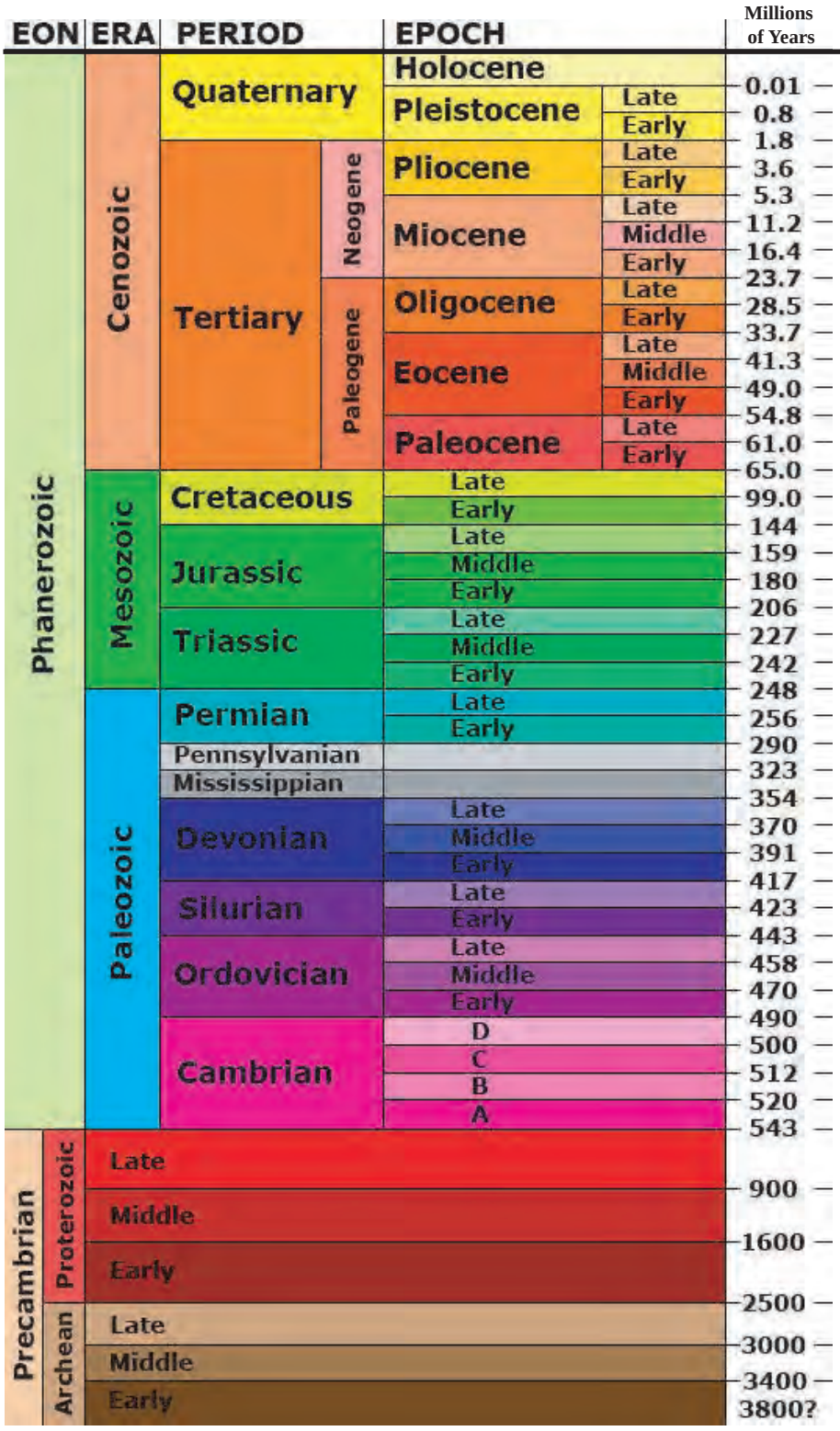
Geologic Explanation:
Qhfp: Alluvial terrace deposits (Holocene; 8,000 years old- Recent)
Qpaf: Alluvial Fans and Fluvial Deposits (Pleistocene, 2.8 Million years to 8,000 years)
br: San Pablo Group marine sandstone (late Miocene, 12 Million years to 9 Million years old)

Source:
Graymer, R.W., Jones, D.L., and Brabb, E.E., 1994, Preliminary geologic map emphasizing bedrock formations in Contra Costa County, California: A digital database: U.S. Geological Survey Open-File Report 94-622, scale 1:75,000.
Helley, E.J. and Graymer, R.W., 1997, Quaternary Geology of Alameda County, and parts of Contra Costa, Santa Clara, San Mateo, San Francisco, Stanislaus, and San Joaquin Counties, California: A digital database, USGS Open File Report 97-97.

Geologic Map of Project
Paleontological Assessment StudyArea

Lamphier-Gregory Garaventa Hills Project
Livermore,CA

Figure 2



USGS Time Scale from: http://3dparks.wr.usgs.gov/coloradoplateau/timescale.htm

Geologic Time Scale of Project Geology
Paleontological Assessment StudyArea

Figure 3

Lamphier-Gregory Garaventa Hills Project
Livermore,CA

- The Federal Antiquities Act of 1906 (16 United States Code [USC] 431–433) was enacted with the primary goal of protecting cultural resources in the United States. As such, it prohibits appropriation, excavation, injury, or destruction of "any historic or prehistoric ruin or monument, or any object of antiquity" located on lands owned or controlled by the federal government, without permission of the secretary of the federal department with jurisdiction. It also establishes criminal penalties, including fines or imprisonment, for these acts, and sets forth a permit requirement for collection of antiquities on federally owned lands. Neither the Antiquities Act itself nor its implementing regulations (43 Code of Federal Regulations [CFR] 3) specifically mentions paleontological resources. However, several federal agencies—including the National Park Service, U.S. Bureau of Land Management, and U.S. Department of Agriculture Forest Service (Forest Service)—have interpreted *objects of antiquity* as including fossils. Consequently, the Antiquities Act represents an early cornerstone for efforts to protect the nation's paleontological resources.

- The Archaeological and Paleontological Salvage Statute (23 USC 305) amended the Antiquities Act of 1906 via the following text: *Funds authorized to be appropriated to carry out this title to the extent approved as necessary, by the highway department of any State, may be used for archaeological and paleontological salvage in that state in compliance with the Act entitled "An Act for the preservation of American Antiquities," approved June 8, 1906 (PL 59-209; 16 USC 431-433), and State laws where applicable.*

  The Federal-Aid Highway Act of 1935 (20 USC 78) provides specific authority to use federal funds for salvage of paleontological sites impacted by highway projects.

Site Geology and Paleontology

The geology of the proposed Project site consists of the Miocene San Pablo Group exposed in the central portion of the Project and overlain by remnant Pleistocene deposits along the margins of the Project (Figures 2 and 3). Both sedimentary units were deposited in either a submerged, near-shore marine environment for the San Pablo Group and a fluvio-lacustrine system (rivers and lakes) for the Pleistocene Deposits. The San Pablo Group sandstone was deposited in a shallow marine sea that connected to the Pacific Ocean during the Miocene (~10-15 million years ago) and before Mt. Diablo/East Bay Hills had been uplifted. Later in time (from 2 – 10 million years ago), during slow tectonic uplift of the East Bay Hills, as strike-slip faulting propagated northward through this area and subduction-related tectonics ceased, a new terrestrial environment was created. The San Pablo sea rolled westward as streams and rivers began pouring from the newly uplifting East Bay Hills and Diablo Range area into paleo alluvial valleys and floodplains, ushering in a new paleoenvironment for which now extinct, latest Miocene to Pleistocene vertebrates, dominated the landscape. The geology and paleontology is briefly discussed below.

Pleistocene Deposits

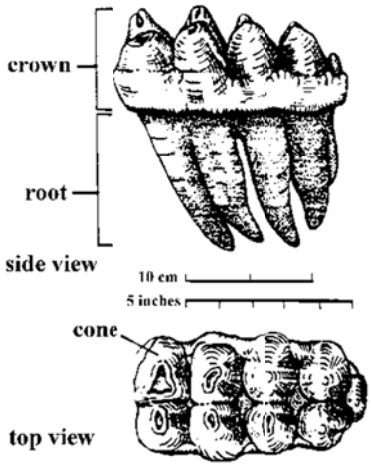
Holocene deposits (Qhfp) of loosely consolidated sands and gravels are not regarded paleontologically significant because their age is too young. The deposits mapped as "Qpaf" on Figure 2 are described by Helley and Graymer (1994) as "Alluvial Fans and Fluvial Deposits and are Pleistocene in age (approximately 10,000 years to 2 Million years old; Figure 3). Helley and Graymer (1997) describe this unit as brown dense gravely and clayey sand or clayey gravel that fines upward to sandy clay. They locally contain fresh water mollusks and extinct late Pleistocene vertebrate fossils. I recently discovered mammoth remains in Qpaf deposits similar to that of the Project area. These consisted of tusks, skull and leg bones near Fallon Road, in east Dublin, California (see photographs below). Significant paleontological resources from this unit also include other Ice Age fossils such as plants (pines, sycamore, willow, oak, cattail), invertebrates (fresh water mussel, clam, snail), and vertebrates (sunfish, sucker, minnow, stickleback, salamander, bull frog, mallard, turkey, peeper frog, toad, turtle, lizard, snake, goose,

owls, shrew, mole, woodrat, ground squirrel, gopher, cottontail, sabercat, jaguar, wolf, coyote, fox, bear, badger; camel, antelope, deer, ox, peccary, mammoth, mastodon, giant ground sloth and horse (Savage, 1951)). This surficial deposit overlies the fossil-rich Briones Formation (Trask, 1922; Conduit, 1938; Hall, 1958).

Photograph of cross-section cut across Mammoth tusk, along the short axis in Pleistocene deposits, Dublin, California. Portion of skull bone located above the rock hammer.

Photograph of cross-section cut across Mammoth tusk, along the short axis in Pleistocene deposits, Dublin, California.

Example Pleistocene Mastodon fossil



Drawing shows a side view and a top view of a (***Mammut americanum***) typical upper third molar of an American mastodon.

Geologists and Paleontologists recovering Pleistocene fossil mammoth (Left) and mammoth tusk (Right) from the Irvington Formation near Saber Cat road in Fremont, CA.

Pleistocene fossil **Smilodon *californicus*** (saber tooth tiger) on left. Artist rendition on right.

San Pablo Group

The sedimentary formation mapped as “br” on Figure 2 is the ~10-15 million Year Old San Pablo Group and this formation is exposed on the hill within the Project limits. It underlies Pleistocene-age Qpaf deposits on the flanks of the hill and flat areas along the margins of the hill. The San Pablo Group consists of sandstone, siltstone, minor conglomerate and fossil shell breccia bedrock. The San Pablo Group contains a tuffaceous layer with a K/Ar age of 14.5+0.4 Ma (Lindquist and Morganthaler, 1991). Vertebrate paleontological ages coupled with the volcanic age date suggest an age range of ~10 to 15 million years ago for the timing of deposition of the Briones Formation.

Desmostylus fossil similar what was collected in the Briones Formation of the San Pablo Group in the Mission Peak area (Left). Artist rendition of ***Desmostylus*** during the Miocene.

Typical near-shore, marine, fossil shell-rich sandstone of the San Pablo Group.

Standards of Significance

The Society of Vertebrate Paleontology has identified vertebrate fossils, their taphonomic and associated environmental indicators, and fossiliferous deposits as significant nonrenewable paleontological resources. Botanical and invertebrate fossils and assemblages may also be considered significant resources (Conformable Impact Mitigation Guidelines Committee 1995). The following is taken from Committee for Conformable Impact Mitigation Guidelines found at (http://www.vertpaleo.org/society/polstatconformimpactmigig.cfm) and serves herein as guidelines to evaluate the paleontological sensitivity of the proposed site. Impacts on paleontological resources were evaluated following guidelines published by the SVP (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995). This analysis reflects professional judgment in light of information available from the published geologic and paleontologic literature and museum databases.

Vertebrate Fossils are significant nonrenewable paleontological resources that are afforded protection by federal, state and local environmental laws and guidelines. The potential for destruction or degradation by construction impacts to paleontological resources on public lands (federal, state, county. or municipal) and land selected for development under the jurisdiction of various governmental planning agencies is recognized. The sensitivity of rock units in which fossils occur may be divided into three operational categories:

I. HIGH POTENTIAL Rock units from which vertebrate or significant invertebrate fossils or significant suites of plant fossils have been recovered are considered to have a have potential for containing significant non renewable fossilferous resources. These units include but are not limited to, sedimentary formations and some volcanic formations which contain significant nonrenewable paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. Sensitivity comprises both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate. invertebrate, or botanical and (b) the importance of recovered evidence for new and significant taxononic, phylogenetic, ecologic, or stratigraphic data. Areas which contain potentially datable organic remains older than Recent, including deposits associated with nests or middens, and areas which may contain new vertebrate deposits, traces, or trackways are also classified as significant.

II. UNDETERMINED POTENTIAL. Specific areas underlain by sedimentary rock units for which little information is available are considered to have undetermined fossilferous potentials. Field surveys by a qualified vertebrate paleontologist to specifically determine the potentials of the rock units are required before programs of impact mitigation for such areas may be developed.

III. LOW POTENTIAL. Reports in the paleontological literature or field surveys by a qualified vertebrate paleontologist may allow determination that some areas or units have low potentials for yielding significant fossils. Such units will be poorly represented by

specimens in institutional collections. These deposits generally will not require protection or salvage operations.

Table 1 below lists the geologic units known to contain sensitive paleontological material or units that have the potential to contain sensitive paleontological material. This table is intended to evaluate their paleontological sensitivity based on the SVP's criteria. Impacts on paleontological resources were evaluated following guidelines published by the SVP (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995). This analysis reflects professional judgment in light of information available from the published geologic and paleontological literature and museum databases. Construction excavation will impact potential fossiliferous surficial deposits and sandstone bedrock.

Table 1: Sedimentary Geology and Paleontology of the Project area.

Geologic Unit*	**Age**	**Fossil Content and Paleontological Sensitivity****
Pleistocene Deposits (Qpaf)	10,000 years old to 2.8 Million years old	plants (pines, sycamore, willow, oak, cattail), invertebrates (fresh water mussel, clam, snail), and vertebrates (sunfish, sucker, minnow, stickleback, salamander, bull frog, mallard, turkey, peeper frog, toad, turtle, lizard, snake, goose, owls, shrew, mole, woodrat, ground squirrel, gopher, cottontail, sabercat, jaguar, wolf, coyote, fox, bear, badger; camel, antelope, deer, ox, peccary, mammoth, mastodon, giant ground sloth and horse (Savage, 1951)). This surficial deposit overlies the fossil-rich Briones Formation (Trask, 1922; Conduit, 1938; Hall, 1958).
San Pablo Group (br)	Late Miocene	Contains reported fossil localities of unique invertebrate and rare, unique and significant vertebrate fossils (Hall, 1956, 1958). Some reported fossils: gastropods (snails); pelecypods (clams), paleobotanical (plant materials) and micropaleontological specimens (small snails)

** Paleontological sensitivity was evaluated using the criteria of the Society of Vertebrate Paleontology (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995; Stirton, 1939; Savage, 1951 and Ham, 1952).

Impacts, Paleontological Sensitivity Evaluation and Recommendations

Construction excavation will impact the geologic formations and deposits with the Project. Fossils have been reported from localities in close proximity to the proposed project from the San Pablo Group, which underlies the proposed project and Pleistocene deposits. The proposed project area is classified here as "High Potential" to contain rock units from which vertebrate or significant invertebrate fossils have been recovered and are considered to have a potential for containing significant non renewable fossiliferous resources.

Vertebrate content alone would indicate that these geologic formations and deposits should be considered highly sensitive for paleontological resources (e.g., Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995). The excavations for the proposed project will disturb the underlying San Pablo Group bedrock and Pleistocene deposits, and there is a high probability that potentially fossiliferous sediments will be affected. Based on the limited literature and fossil locality reviews conducted, it is determined here that the proposed project may directly or indirectly destroy a unique paleontological resource due to the presence of the fossiliferous San Pablo Group bedrock and Pleistocene deposits at the proposed project. A mitigation plan outlining paleontological monitoring during construction activities and a paleontological salvage program should be developed by a Professional Geologist.

Limitations

The geologic and paleontological information and recommendations contained within are based on the geologic and paleontological resources available to James R. Allen at the time of this report. When plans for this project are more complete, James R. Allen should be notified in case this report requires modifications or addendums. If James R.

Allen is not retained to perform this function, James R. Allen cannot be responsible for the impact that a lack of final review might have on a successful project. The findings, recommendations, specifications, or professional advice contained herein have been made in general accordance with generally accepted professional paleontological practices in the local area at the time. No other warranties are implied or expressed.

References

Aarons, B.L., 1958, Geology of a portion of the Las Trampas Ridge and Hayward quadrangles, California: Berkeley, University of California, M.A. thesis.

Blake, M. C., Jr., Bartow, J. A., Frizzell, V. A., Jr., Schlocker, Julius, Sorg, Dennis, Wentworth, C. M., and Wright, R. H., 1974, Preliminary geologic map of Marin and San Francisco Counties and parts of Alameda, Contra Costa, and Sonoma Counties, California: U. S. Geological Survey Map MF-574.

Conduit, C., 1938, The San Pablo flora of west central California: Carnegie Institute of Washington Publications Contributions to Paleontology, v. 476, p. 217-268.

Doumani, G.I., 1957, Stratigraphy of the San Pablo Group, Contra Costa County, California: Berkeley, University of California, M.A. thesis, 72 p.

Durham, J.W., 1944, Megafaunal zones of the Oligocene of northwestern Washington: University of California Publications in Geological Sciences, v. 27, no. 5, p. 101-240.

Freeberg, J., 1990, Selected references to the geologic environment of Alameda County: U.S. Geological Survey Library Circular, 28 p.

Graymer, R.W., 2000, Geologic map and map database of the Oakland metropolitan area, Alameda, Contra Costa, and San Francisco Counties, California: U.S. Geological Survey Miscellaneous Field Studies Map 2342, U.S. Geological Survey, Menlo Park, CA.

Grimsich, J.L., Scott, G.R., Swisher, C.C., III, and Curtis, G.H., 1996, Paleomagnetism and 40Ar/39Ar dating of the Miocene Contra Costa Group, Berkeley Hills, California [abs.]: EOS, Transactions, American Geophysical Union, v. 77, no. 46, p. 165.

Hall, C.A., Jr., 1956, The Geology of the Pleasanton Area, Alameda County, California: Ph.D. dissertation in Geology, School of Mineral Sciences, Stanford University, 269 p.

Hall, C.A., Jr., 1958, Geology and Paleontology of the Pleasanton Area, Alameda and Contra Costa Counties, CA: University of California Publications in Geological Sciences, v. 34:1, 89 p.

Ham, C.K., 1952, Geology of Las Trampas Ridge, Berkeley Hills, California: California Division of Mines and Geology Special Report 22, p. 1-26.

Helley, E.J., and Graymer, R.W., 1997a, Quaternary geology of Alameda County and surrounding parts of Contra Costa, Santa Clara, San Mateo, San Francisco, Stanislaus, and San Joaquin Counties, California: A digital database: U.S. Geological Survey Open-

File Report 97-97, includes plotfiles for 2 sheets, scale 1:100,000, database description pamphlet, 13 pp, geologic description and interpretation pamphlet, 8 pp.

Jones, D.L., and Curtis, G.H., 1991, Guide to the geology of the Berkeley Hills, central Coast Ranges, California, *in* Sloan, D., and Wagner, D.L., eds., Geologic Excursions in Northern California: San Francisco to the Sierra Nevada, California Division of Mines and Geology Special Publication 109, p. 63-74.

Jones, D. L., Graymer, R. W., Wang, C., McEvilly, T. V., and Lomax, A, 1994, Neogene transpressive evolution of the California Coast Ranges: Tectonics, v. 13, p. 561-574.

Kleinpell, R.M., 1938, Miocene stratigraphy of California, IX: Tulsa, OK, American Association of Petroleum Geologists, 450 p.

Merriam, J. C. 1896. *Sigmogomphius Le Contei*. A new castoroid rodent from the Pliocene near Berkeley, California. University of California, Bulletin of the Department of Geology, 1(13):363-370.

Pease, M.H. Jr., 1954, Geology of the Sobrante Anticline and vicinity, Briones Valley quadrangle, Contra Costa County, California: Berkeley, University of California, M.A. thesis, 92 p.

Radbruch, D.H., 1957, Areal and engineering geology of the Oakland West quadrangle, California: U.S. Geological Survey Miscellaneous Investigation Series Map I-239, scale 1:24,000.

Radbruch, 1969, Areal and engineering geology of the Oakland East Quadrangle, California: U.S. Geological Survey Map GQ-769, 1:24,000 scale.

Radbruch, D.H., and Case, J.E., 1967, Preliminary geologic map and engineering geologic information, Oakland and vicinity, California: U.S. Geological Survey Open-File Report 67-183, 1:24,000 scale.

Robinson, G.D., 1956, Geology of the Hayward quadrangle, California: U.S. Geological Survey Miscellaneous Geologic Quadrangle Map GQ-88, 1 sheet, scale 1:24,000.

Savage, D.E., 1951, Late Cenozoic vertebrates of the San Francisco Bay region: University of California Publications Bulletin of the Department of Geological Sciences, v. 28, p. 215-314.

Sheehan, J.R., 1956, Structure and stratigraphy of N.W. Contra Costa County, California: Berkeley, University of California, M.A. thesis.

Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee. 1995. Assessment and mitigation of adverse impacts to nonrenewable

paleontologic resources: standard guidelines. *Society of Vertebrate Paleontology News Bulletin* 163.

Stirton, R.A., 1939, Late Cenozoic Vertebrates of the San Francisco Bay Region. *Univ. Calif. Public. Geol. Sci.*, Vol. 24, pp.339-410, 95 figs.

Trask, P.D., 1922, The Briones formation of Middle California, University of California Publications, Bulletin of the Department of Geological Sciences,Vol. 13, No. 5, pp. 133-174, plates 1-8.

United States Geological Survey, 1997, Oakland East US Geological Survey 7.5 minute topographic quadrangle.

Wagner, D. L., and Jennings, C.W. 1981. Geologic Map of the San Francisco Sheet, California, *California Division of Mines and Geology - Regional Map Series*. Map scale 1:250,000.

Wagner, J.R., 1978, Late Cenozoic history of the Coast Ranges east of San Francisco Bay: Berkeley, University of California, Ph.D. thesis, 160 p., 12 plates.

Weaver, C.E., Beck, R.S., Bramlette, M.N., Carlson, S.A., Forrest, L.C., Kelley, F.R., Kleinpell, R.M., Putnam, W.C., Taliaferro, N.L., Thorup, R.R., VerWieke, W.A., Watson, E.A., 1944, Correlation of the marine Cenozoic formations of western North America [chart no. 11]: Geological Society of America Bulletin, v. 55, no. 5, p. 569-598.

Willian Self Associates, Inc., 2009, Cultural resources Assessment Report, 24 Adobe Lane Project Orinda, Contra Costa County, California.

Appendix E:

Preliminary Geotechnical Recommendations Report and Fault Rupture Hazard Study

PRELIMINARY GEOTECHNICAL RECOMMENDATIONS REPORT

PROPOSED GARAVENTA HILLS ESTATES
LIVERMORE, CALIFORNIA

Submitted to:

Mr. Scott Roylance
RL Communities
San Ramon, CA 94583

November 30, 2010
Project No. 9126.000.000

Copyright © 2010 By ENGEO Incorporated. This Document May Not Be Reproduced In Whole Or In Part By Any Means Whatsoever, Nor May It Be Quoted Or Excerpted Without The Express Written Consent Of ENGEO Incorporated

- Expect Excellence -

Project No.
9126.000.000

November 30, 2010

Mr. Scott Roylance
RL Communities
5000 Executive Parkway, Suite 530
San Ramon, CA 94583

Subject: Proposed Garaventa Hills Estates
APN 099B-5300-010
Livermore, California

PRELIMINARY GEOTECHNICAL RECOMMENDATIONS REPORT

Dear Mr. Roylance:

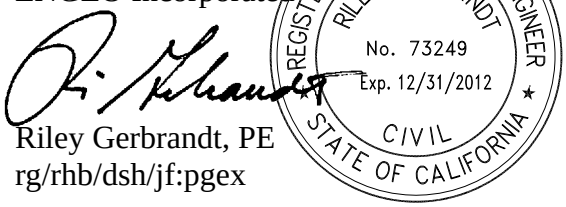
With your authorization, we completed this preliminary geotechnical recommendations report for the proposed Garaventa Hills Estates in Livermore, California as outlined in our agreement dated November 1, 2010. We characterized the subsurface conditions at the site in order to provide the enclosed preliminary geotechnical recommendations for design of the development proposed for the subject area. It is our opinion that the proposed development is feasible from a geotechnical standpoint.

We are pleased to have been of service to you on this project and are prepared to consult further with you and your design team as the project progresses. Our experience and that of our profession clearly indicate that the risk of costly design, construction, and maintenance problems can be significantly lowered by retaining the design geotechnical engineering firm to review the project plans and specifications as well as to provide geotechnical observation and testing services during construction. Please let us know when working drawings are nearing completion, and we will be glad to discuss these additional services with you.

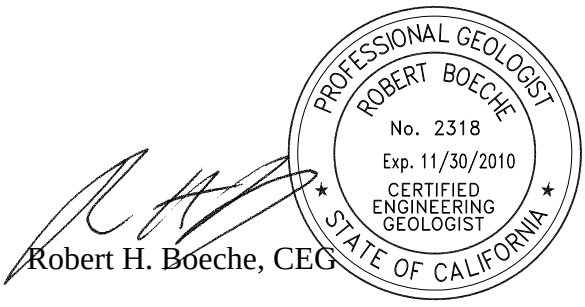
If you have any questions or comments regarding this report, please contact us at your convenience, and we will be glad to discuss them with you.

Sincerely,

ENGEO Incorporated



Riley Gerbrandt, PE



Robert H. Boeche, CEG

rg/rhb/dsh/jf:pgex

cc: 1 – Pat Toohey, RL Communities

TABLE OF CONTENTS

Letter of Transmittal

Page

1.0 INTRODUCTION 1

1.1 PURPOSE AND SCOPE 1
1.2 SITE LOCATION AND DESCRIPTION 1
1.3 PROPOSED DEVELOPMENT 2

2.0 GEOLOGY AND SEISMICITY 2

2.1 GEOLOGIC SETTING 2
2.2 FAULTING AND SEISMICITY 2
2.3 SITE GEOLOGY 3
2.3.1 Alluvium (Qa) 3
2.3.2 Briones of Ciebro Sandstone (Tbr) 3
2.3.3 Residual Soils 3

3.0 SUBSURFACE PROFILE 4

3.1 FIELD EXPLORATION 4
3.2 SURFACE CONDITIONS 4
3.3 SUBSURFACE CONDITIONS 5
3.4 GROUNDWATER 6
3.5 LABORATORY TESTING 6

4.0 DISCUSSION AND CONCLUSIONS 7

4.1 SEISMIC HAZARDS 7
4.1.1 Ground Rupture 7
4.1.2 Ground Shaking 7
4.1.3 Ground Lurching 8
4.1.4 2007 California Building Code (CBC) Seismic Design Parameters 8
4.1.5 Liquefaction and Densification Due to Earthquake Shaking 8
4.1.6 Lateral Spreading 9
4.2 SLOPE STABILITY 9
4.3 EXPANSIVE SOILS 9
4.4 SWELL/SETTLEMENT RELATED TO DEEP FILL 9
4.5 COMPRESSIBLE SOILS 10
4.6 DIFFERENTIAL FILL THICKNESS 10
4.7 CUT-FILL TRANSITION LOTS AND CUT LOTS 10
4.8 CORROSIVITY CONSIDERATIONS 10
4.9 KEYWAYS AND BENCHED FILLS 11
4.10 CONCLUSIONS 12

TABLE OF CONTENTS (Continued)

5.0 RECOMMENDATIONS 12

5.1 GRADING 12
5.1.1 Demolition and Stripping 12
5.1.2 Colluvium Removal 13
5.1.3 Selection of Materials 13
5.1.4 Imported Materials 14
5.1.5 Fill Placement 14
5.1.6 Graded Slopes 15
5.1.7 Toe Keyways 15
5.1.8 Construction of Subsurface Drainage Facilities 15
5.1.9 Slope Toe Buttress 16
5.1.10 Cut and Cut-Fill Transitions 16
5.1.11 Differential Fills 17
5.1.12 Erosion Control 17
5.1.13 Monitoring and Testing 17
5.2 FOUNDATION SYSTEM 17
5.2.1 Preliminary Post-tensioned Mat Foundation Design 18
5.2.2 Secondary Slabs-on-Grade 18
5.3 RETAINING WALLS 19
5.4 PRELIMINARY PAVEMENT DESIGN 20
5.5 DRAINAGE 21
5.6 REQUIREMENTS FOR LANDSCAPING IRRIGATION 22
5.7 UTILITIES 22

6.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS 23

SELECTED REFERENCES
FIGURES
APPENDIX A – Logs of Test Borings
APPENDIX B – Laboratory Test Results
APPENDIX C – Guide Contract Specifications

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

The purpose of this report is to evaluate the suitability of site development and to provide preliminary geotechnical recommendations for grading and foundation design for the proposed residential development in Livermore, California. We prepared this report as outlined in our agreement dated November 1, 2010. RL Communities authorized ENGEO to conduct the proposed scope of services, which included the following:

- Review of available literature, geologic maps, and previous geotechnical reports pertinent to the site
- Subsurface field exploration
- Soil laboratory testing
- Analysis of the geotechnical data
- Report preparation of our findings and recommendations

For our use we received the following:

- A preliminary site plan entitled *Bear Creek Drive Property* delivered via email on November 15, 2010; and
- Electronic topographic information delivered via email on November 8, 2010.

This report was prepared for the exclusive use of our client and their consultants for design of this project. In the event that any changes are made in the character, design or layout of the development, we must be contacted to review the conclusions and recommendations contained in this report to determine whether modifications are necessary. This document may not be reproduced in whole or in part by any means whatsoever, nor may it be quoted or excerpted without our express written consent.

1.2 SITE LOCATION AND DESCRIPTION

The proposed site is located approximately ¼ mile east of Vasco Road and directly west of Bear Creek Road in Livermore, California as shown on the Vicinity Map, Figure 1. The Property measures approximately 31.7 acres in area and is identified with Assessor's Parcel Number 099B-5300-10. See the Site Plan, Figure 2 for a detailed view of the site, and see Figure 3 for photographs of the property that were obtained during the field exploration.

Existing residential developments are located to the south, southeast, and northeast of the subject site; an unnamed creek is located immediately south of the property boundary of the site. The project site varies in elevation between approximately 537 and 607 feet above mean sea level, with topography consisting of gentle hills, ridges, rock outcrops, and drainage swales.

1.3 PROPOSED DEVELOPMENT

The current preliminary site plan for the project is dated November 15, 2010. The site development, as shown on this plan, includes excavating into and grading the side slopes of the existing two hills to construct approximately 3:1 (horizontal:vertical) slopes, placement of fill across the majority of the site, construction of up to 30-foot-high and 3:1 fill slopes along the property boundaries, preparation of approximately 76 residential lots of approximately 6,500 square feet in size, and construction of associated roadways and utilities. We understand the proposed residential structures will be relatively lightweight, timber-framed single-family units supported by a shallow foundation system.

Proposed site grading includes maximum cut depths of approximately 20 feet and maximum fill thicknesses of approximately 30 feet. In general, cut and fill slopes over 10 feet high are proposed at a slope gradient of 3:1 (horizontal:vertical).

2.0 GEOLOGY AND SEISMICITY

2.1 GEOLOGIC SETTING

The study area is located in the Coast Ranges geomorphic province of California. The Coast Ranges are characterized by a series of northwest-trending valleys and mountain ranges. The bedrock in this region has been folded and faulted in a tectonic setting that is experiencing translational and compressional deformations of the Earth's crust.

In this part of the San Francisco Bay Area, the bedrock units include a series of Pliocene non-marine sedimentary rock, Miocene-age marine sedimentary rock and Miocene-age Briones sandstone.

2.2 FAULTING AND SEISMICITY

The right-lateral strike-slip Greenville fault is mapped along the northeastern portion of the site. The Greenville fault is classified as a Holocene-active feature by the California Geological Survey (CGS). The northeastern portion of the site is located within a State of California Earthquake Fault Zone for the Greenville fault. The approximate limits of the Earthquake Fault Zone are depicted on Earthquake Fault Zone Map, Figure 4.

The Greenville fault has been investigated on adjacent properties east of the site by BSK and Associates (1990). Based on the findings of their exploration, BSK recommended setbacks for

residential structures from two identified fault traces. The locations of the recommended setbacks appear to project into the northeastern portion of the site.

The Working Group on California Earthquake Probabilities (WGEP) (2007) evaluated the 30-year probability of a M6.7 or greater earthquake occurring on the known active fault systems in the Bay Area, including the Greenville fault. The WGEP calculated an overall probability of 63 percent for the Bay Area as whole, and a probability of 3 percent for the Greenville fault.

2.3 SITE GEOLOGY

The geologic conditions at the site have been characterized based on review of published geologic maps, examination of aerial photographs, review of previous nearby geotechnical explorations, and geologic reconnaissance. The study area is depicted on the Regional Geologic Map, Figure 5. The various geologic units observed within the study area are discussed below.

2.3.1 Alluvium (Qa)

Alluvium has been deposited along the drainage courses onsite by flowing water. The alluvial deposits encountered in our borings range from approximately 0 to 13 feet thick. The alluvial deposits generally consist of crudely stratified silty to clayey sands interbedded with clays and silts. The alluvial deposits vary from medium stiff or loose to hard or very dense and from non-plastic to low plasticity.

2.3.2 Briones of Ciebro Sandstone (Tbr)

Briones of Ciebro Sandstone was encountered throughout the site, as shown on the Regional Geologic Map, Figure 5. This unit consists primarily of sandstone that is friable to strong and moderately to highly fractured. This formation contains some fossiliferous sandstone beds that are very well cemented, which may be excavated using heavy construction equipment.

2.3.3 Residual Soils

On ridges and spurs, bedrock is capped with a relatively thin layer of residual soil that develops essentially in place from weathering of the underlying parent material. The residual soils typically vary from approximately ½ to 6 feet thick. The residual soils encountered at the site consist predominantly of dark brown sandy silt. The residual soils generally vary in consistency from medium stiff to hard. Based on visual examination and laboratory testing, the residual soils appear to have low expansion potential.

3.0 SUBSURFACE PROFILE

3.1 FIELD EXPLORATION

Our field exploration included drilling ten borings at various locations on the site. We performed our field exploration on November 9, 2010. The approximate locations of the borings and of photographs obtained from the site are shown on the Site Plan, Figure 2. The approximate locations of borings and of photographs were estimated using retail-grade handheld global positioning satellite (GPS) devices during the field exploration. These approximate locations should be considered accurate only to the degree implied by the method used.

An ENGEO representative observed the drilling and logged the subsurface conditions encountered at each boring location. We retained a truck-mounted Soil Test Ranger drill rig and crew to advance the borings using solid-flight auger methods. The borings were advanced to depths ranging from approximately 1.5 to 26.5 feet below existing grade. We permitted and backfilled the borings in accordance with the requirements of the Zone 7 Water Agency.

We obtained bulk soil samples from drill cuttings and retrieved disturbed soil samples at various intervals in the borings using both a 3-inch O.D. Modified California-type split-spoon sampler fitted with 6-inch-long brass liners, and a 2-inch O.D. Standard Penetration Test (SPT) split-spoon sampler.

The driven samplers were advanced into the soil and rock materials by dropping a 140-pound hammer through a 30-inch free fall. The field blow counts were recorded as the number of blows needed to drive the sampler 18 inches in 6-inch increments. Unless otherwise indicated, the blows per foot recorded on the boring log represent the accumulated number of blows required to drive the last 1 foot of penetration; the blow counts have not been converted using any correction factors. When sampler driving was difficult, penetration was recorded only as inches penetrated for approximately 50 hammer blows.

We used the field logs to develop the report logs in Appendix A. The logs depict subsurface conditions at the exploration locations for the date of exploration; however, subsurface conditions may vary with time

3.2 SURFACE CONDITIONS

The site is generally hilly with downslopes that radiate from the hilltops within the approximate center of the site. As shown on the topographic data provided to us, site elevations range from approximately 607 feet at the top of the southeastern hill to approximately 539 feet at the southwestern corner of the property.

We observed the following site features during our reconnaissance and review of available documents:

- The axis of an anticline, whose strike trends from the southeast portion of the site to the northwest portion of the site, exists at approximately the center of the property. The hilltops are approximately located on this axis. Several rock outcrops were observed along this axis on the hilltops and ridges. Figure 3 includes photographs of these hilltops, ridges, and outcrops.

- An active fault trace of the Greenville Fault Zone is mapped near the northeastern property corner of the site. The Earthquake Fault Zone includes a portion of the northeastern quarter of the property. See the Earthquake Fault Zone Map (Figure 4) for the approximate location of the mapped fault trace and the Earthquake Fault Zone. A photograph included in Figure 3 shows the fault setbacks within the neighboring residential developments.

- The majority of the property is vegetated by seasonal grasses and weeds.

- Boulders were observed along the southern property boundary of the site; these may have been placed here during grading of the drainage channel to the south of the property.

- A seasonal drainage swale is located in the southern portion of the site. The length of this swale extends from the ridge at approximately the center of the site to the southern property boundary.

- BSK (1990) identified oil seepage on the property east of the site. However, no evidence of oil seepage was observed during our field exploration

Please refer to the Site Plan (Figure 2) for more information on site features.

3.3 SUBSURFACE CONDITIONS

Subsurface soils at the site generally consist of relatively thin deposits of residual and/or alluvial soils underlain by Briones of Ciebro Sandstone. The test boring logs contain the soil or rock type, color, consistency, and visual classification in general accordance with the Unified Soil Classification System. The test boring logs graphically depict the subsurface conditions encountered at the time of the field exploration. Appendix A also provides additional exploratory information in the general notes to the test boring logs. A generalized summary of the sub-surface conditions is described below:

Within the elevated hill areas, we observed approximately 1 to 3 feet of moist, medium stiff to hard, dark brown sandy silt overlying Briones of Ciebro Sandstone.

In the more flat areas, such as those typified by boring locations 1-B1 and 1-B6 through 1-B8, we observed approximately 8 to 13 feet of alluvial soils overlying very intensely weathered to weathered Briones of Ciebro Sandstone. These alluvial soils generally consisted of a surficial layer of moist, medium stiff to hard dark brown sandy silt overlying a hard, yellowish brown or reddish brown sandy clay. The underlying unit consisted of mottled pale brown and reddish

brown weathered to very intensely weathered Briones of Ciebro Sandstone. The reddish brown mottles within the Briones of Ciebro Sandstone included deposits of clayey material that are assumed to have accumulated from infiltrating materials and/or from the weathering of the bedrock.

In Boring 1-B1, an approximately 3-foot-thick layer of olive brown silty sand was encountered underlying the sandy clay and overlying the Briones of Ciebro Sandstone. This material was encountered in a loose and saturated condition.

3.4 GROUNDWATER

Groundwater was encountered in Boring 1-B1. The depth to initial groundwater contact was recorded as approximately 10.5 feet below existing grade, while the depth to groundwater immediately prior to backfilling the boring was recorded as approximately 6 feet below existing grade. Groundwater was not encountered in the other borings during drilling or backfilling. Fluctuations in groundwater level should be expected to occur over time due to precipitation, changes in drainage patterns, and/or irrigation.

3.5 LABORATORY TESTING

The samples collected during drilling were examined in our laboratory to confirm field classifications. Representative samples recovered from our borings were tested for the following physical characteristics:

TABLE 1

Characteristic	Test Method
Natural Unit Weight	ASTM D-2216
Natural Moisture Content	ASTM D-2216
Atterberg Limits	ASTM D-4318
Particle-Size Analysis	ASTM D-422 ASTM D-1140
Unconfined Compression	ASTM D-2166
Corrosion Analysis	ASTM D-1498 ASTM D-4972 ASTM G-57 ASTM D-4658M ASTM D-4327 ASTM D-4327

Selected laboratory test results are included on the test boring logs in Appendix A. Individual test results are presented in Appendix B.

4.0 DISCUSSION AND CONCLUSIONS

The site was evaluated with respect to known geologic hazards common to the San Francisco Bay Region. The primary hazards identified and the risks associated with these hazards with respect to the planned development are discussed in the following sections of this report.

4.1 SEISMIC HAZARDS

Seismic hazards can generally be classified as primary and secondary. The primary effect is ground rupture, which is also called surface faulting. The common secondary seismic hazards include ground shaking, lurch cracking, soil liquefaction, lateral spreading, landslides, tsunamis, and seiches. Based on topographic and lithologic data, risk from regional subsidence or uplift, tsunamis, or seiches is considered low to unlikely at the site.

4.1.1 Ground Rupture

As noted above, the eastern portion of the site is located within a State of California Earthquake Fault Zone for the Greenville fault. The approximate limits of the Earthquake Fault Zone are depicted on the Earthquake Fault Zone Map (Figure 4). To evaluate the possible presence of faulting onsite and the location of setbacks, we recommend that a geologic subsurface fault exploration be performed and that a report be prepared that summarizes the results of the exploration.

4.1.2 Ground Shaking

An earthquake of moderate to high magnitude generated within the San Francisco Bay Region could cause considerable ground shaking at the site; similar such events have occurred in the past. To mitigate the shaking effects, all structures, as a minimum, should be designed using sound engineering judgment and the 2007 California Building Code (CBC) requirements. Seismic design provisions of current building codes generally prescribe minimum lateral forces, applied statically to the structure, combined with the gravity forces of dead-and-live loads. The code-prescribed lateral forces are generally considered to be substantially smaller than the comparable forces that would be associated with a major earthquake. Therefore, structures should be able to: (1) resist minor earthquakes without damage, (2) resist moderate earthquakes without structural damage but with some nonstructural damage, and (3) resist major earthquakes without collapse but with some structural as well as nonstructural damage. Conformance to the current building code recommendations does not constitute any kind of guarantee that significant structural damage would not occur in the event of a maximum magnitude earthquake; however, it is reasonable to expect that a well-designed and well-constructed structure will not collapse or cause loss of life in a major earthquake (SEAOC, 1999).

4.1.3 Ground Lurching

Ground lurching is a result of the rolling motion imparted to the ground surface during energy released by an earthquake. Such rolling motion can cause ground cracks to form in weaker soils. The potential for the formation of these cracks is considered greater at contacts between deep alluvium and bedrock. Such an occurrence is possible at the site as in other locations in the Bay Area. However, based on the relatively thin, stiff soils encountered on the site, it is our opinion that the cracking is expected to be minor.

4.1.4 2007 California Building Code (CBC) Seismic Design Parameters

Based on the subsurface soil conditions encountered and local seismic sources, the site may be characterized for design based on 2007 California Building Code using the following information.

TABLE 2

Coefficient	Value
Mapped MCE Spectral Response Acceleration at Short Periods, S_S	1.957
Mapped MCE Spectral Response Acceleration at a Period of 1 second, S_1	0.752
Site Class	D
MCE, 5% Damped, Spectral Response Acceleration at Short Periods Adjusted for Site Class Effects, S_{MS}	1.957
MCE, 5% Damped, Spectral Response Acceleration at a Period of 1 second Adjusted for Site Class Effects, S_{M1}	1.128
Design, 5% Damped, Spectral Response Acceleration at Short Periods, S_{DS}	1.305
Design, 5% Damped, Spectral Response Acceleration at a Period of 1 second, S_{D1}	0.752

4.1.5 Liquefaction and Densification Due to Earthquake Shaking

Liquefaction is a phenomenon in which saturated cohesionless soils are subject to a temporary, but essentially total, loss of shear strength because of pore pressure build-up under the reversing cyclic shear stresses associated with earthquakes. Densification is the associated settlement that occurs in liquefiable soils or loose soils above and below the groundwater level.

Based on our review of the boring and laboratory data, a layer of loose silty sand was encountered at the northeastern corner of the site. This layer is susceptible to liquefaction. We recommend colluvial and loose alluvial soil materials to be removed as part of the remedial grading as discussed in Section 5, below. Provided these materials are removed, it is our opinion that the potential for liquefaction or densification of the soils is unlikely.

4.1.6 Lateral Spreading

Lateral spreading is the horizontal movement of soil on top of liquefied granular or sandy soils or weak clayey soils induced by strong seismic shaking. Lateral spreading can cause severe cracking and differential displacement of the ground surface. Areas most susceptible to lateral spreading are unengineered man-made fill and loose cohesionless alluvial deposits along streams and channels. In our opinion, lateral spreading at the development area is unlikely at this site, provided the loose alluvial deposits will be removed within the proposed development area.

4.2 SLOPE STABILITY

Slope instabilities can be a significant hazard; however, they can generally be mitigated by proper grading. No known landslides or areas of instability were observed at the time of our field work, and none are shown on the available regional geologic maps. Due to the strength of the soil and rock material that were encountered throughout the site, it is our opinion that the proposed slopes, shown with a maximum 3:1 gradient, are feasible.

4.3 EXPANSIVE SOILS

Expansive soils shrink and swell as a result of moisture changes. This can cause heaving and cracking of slabs-on-grade, pavements, and structures founded on shallow foundations. Based on our subsurface exploration, laboratory test results, and preliminary project data, it is our opinion that the swell potential of expansive soils may be reduced by grading methods such as fill compaction at a high moisture content, and controlling the degree of compaction effort. Expansive soil mitigation recommendations are presented in Section 5 of this report.

.

4.4 SWELL/SETTLEMENT RELATED TO DEEP FILL

According to the preliminary grading plans, fills up to about 30 feet thick will be placed in the swales and low-lying areas.

Studies have shown that engineered fills in residential development sites typically experience increases in moisture content after building construction due to increases in irrigation or natural conditions and to alternation of drainage pattern. This process may take about 5 to 10 years after irrigation commences, or even more, before the fill becomes fully wetted. The wetting process can cause settlement or swell (hydrocompression due to wetting) depending on soil type, compaction, moisture content, and the overburden pressures (fill thickness).

Based on laboratory test data conducted at the site and nearby sites with the same soil and rock formation, the swell potential for low confining pressures (shallow fill) is significantly reduced when the soil samples are compacted to a relatively lower compaction and at a higher moisture content, and the settlement potential for high confining pressures (deep fill) are compacted to a relatively higher compaction. Compaction and moisture content requirements to address this issue are provided in Section 5.

4.5 COMPRESSIBLE SOILS

Consolidation settlement of native soils may be significant if not properly mitigated according to recommendations in this report. Settlement at the site could be generated from: (1) consolidation of the alluvial and colluvial deposits in the swale areas where fills will be placed, (2) compression of the deep fills due to their own weight, and (3) compression of soils beneath foundation systems due to building loads.

Based on the exploration data, we estimate long-term post-construction settlement will be approximately 1 to 2 inches, with the exception of the previously mentioned loose silty sand layer in the northeastern corner of the site and limited colluvium deposits within drainage swales. It is our opinion that post-construction settlement may be reduced and mitigated with corrective grading measures provided in Section 5.

4.6 DIFFERENTIAL FILL THICKNESS

Differential settlement may occur within lots planned on fills above existing steep slopes. Differential building movements, although not seriously damaging, may become apparent for large differentials in fill thickness. Based on the existing topography, the conceptual grading, and the conceptual lot layout, it is our opinion relatively few lots will be located in a differential fill condition. Differential fill lots, if identified once final grading plans become available, may be mitigated by incorporating the overexcavation recommendation provided in Section 5.

4.7 CUT-FILL TRANSITION LOTS AND CUT LOTS

Some residential lots in this project site will likely be entirely in cut or traversed by a cut-fill transition. We anticipate that significant variations in material properties may occur in areas of cut or cut-and-fill daylighting if not mitigated during site grading. Such unmitigated situations can be detrimental to building performance. We provide recommendations in Section 5 below to mitigate the effect on structures caused by differential subgrade performance over cuts and cut-fill transition zones.

4.8 CORROSIVITY CONSIDERATIONS

The 2007 CBC references the ACI (Section 4.3, Table 4.3.2), which provides the following guidelines to characterize the potential exposure for sulfate attack and associated recommendations for concrete in contact with soil based upon the exposure risk.

TABLE 3

Sulfate Exposure	Sulfate In Water, (ppm) or (mg/kg)	Water Soluble Sulfate (So4) in Soil, % by Weight (%)	Cement Type	Maximum Water - Cement Ratio	Minimum F'_c (psi)
Negligible	0 – 150	0.0 – 0.1	---	---	---
Moderate	150 – 1,500	0.1 – 0.2	II, IP(MS), IS(MS), P(MS), I(PM)(MS), I(SM)(MS)	0.50	4,000
Severe	1,500 – 10,000	0.2 – 2.0	V	0.45	4,500
Very Severe	over 10,000	over 2.0	V plus pozzolan	0.45	4,500

Limited sulfate testing was conducted on soil samples that were obtained during the field exploration from Borings 1-B3 and 1-B6. The sulfate lab test results indicate the sulfate exposure may be categorized as "Negligible" in accordance with Table 19-A-4 of the California Building Code (CBC). For "Negligible" sulfate exposure, the CBC indicates that either Type I or Type II Portland Cement may be used for concrete mix designs for the project. The analytical lab test results are included in Appendix B. We did not perform testing for corrosion potential based on electrical resistivity, chloride content, or pH. Corrosion testing for these parameters may be required for buried metal or for buried cement-mortar coated metal.

Mass grading of cut and fill areas may expose or deposit soil material with a corrosion potential different from the limited samples tested as part of this study. It is our opinion that near-surface soil samples should be collected from the building pads for corrosion testing after the site grading is complete. If testing is deemed undesirable, modified Type II cement can be used in foundation concrete for structures at the project site. Additionally, concrete should incorporate a maximum water cement ratio of 0.45 and a minimum compressive strength of 4,500 psi. It should be noted, however, that the structural engineering design requirements for concrete might result in more stringent concrete specifications.

4.9 KEYWAYS AND BENCHED FILLS

We anticipate that significant cut-and-fill slopes will be constructed for this project, which will require the construction of drained keyways and benched fills in order to provide proper stability of the compacted fill. We present typical recommendations for keyways, benching, and subdrains in Figures 6 through 8. ENGEO should be retained to review the final grading plans and provide locations and layouts for fill keyways, benching, and subdrains.

4.10 CONCLUSIONS

It is our opinion, based on the existing exploration and laboratory test results, that the residential development proposed for the subject site is feasible from a geotechnical standpoint. The primary geotechnical consideration is the location of the nearby Greenville fault and the need for further study to address potential setbacks of improvements with the mapped fault zone. Additionally, consideration of the potential seismic forces that are appropriate to the various design of proposed earthworks, structures, and improvements is critical. Secondary geotechnical considerations include mitigation of expansive soils, settlement of fills, and long-term stability of slopes. The recommendations included in this report, along with other sound engineering practices, should be incorporated in the design and construction of the project.

5.0 RECOMMENDATIONS

5.1 GRADING

All grading and project development plans should be coordinated with the Geotechnical Engineer so that known soil and geologic hazards are mitigated as necessary. Preparation of a corrective grading plan to incorporate detailed geotechnical engineering recommendations for keyway dimensions, subdrain locations, and geogrid-reinforced slopes and walls, if necessary, should be provided during review of the final 40-scale (1" = 40') grading plans for the project.

ENGEO should be notified at least 48 hours prior to grading to coordinate our schedule with the grading contractor. Grading operations should meet the requirements of the Guide Contract Specifications included in Appendix C and must be observed and tested by ENGEO's field representatives. After the grading operations commence, geologic observations of cut areas should be made at frequent intervals by the Engineering Geologist. This is advised so that modified geologic recommendations can be incorporated into updated grading plans as grading proceeds. The Engineering Geologist should be notified at least 48 hours prior to the start of cutting of significant slopes.

Ponding of stormwater, other than within engineered detention basins, should not be permitted at the site, particularly during work stoppage for rainy weather. Before the grading is halted by rain, positive slopes should be provided to carry surface runoff to storm drainage structures in a controlled manner to prevent erosion damage.

5.1.1 Demolition and Stripping

Site development will commence with the removal of improvements and their foundations, and buried structures including abandoned utilities and septic tanks and their leach fields, if any exist. All existing non-engineered artificial fills, vegetation, debris or soft compressible soils should be removed from any location to be graded, from areas to receive fill or structures, and from those areas to serve as borrow. The depth of removal of such materials should be determined by the

Geotechnical Engineer in the field at the time of grading. Evaluation of unsuitable deposits should be performed during grading by sampling and laboratory analyses.

The existing vegetation and trees should be removed from areas to receive fill and those areas to serve for borrow. Topsoil is estimated to be from 2 to 3 inches in thickness depending on location. As a minimum, tree roots should be removed at least 3 feet below finished grade in cut lots and 3 feet below original grade in fill lots. The actual depths of stripping and tree root removal should be determined by the Geotechnical Engineer's representative in the field during grading. Subject to approval by the Landscape Architect, strippings and organically contaminated soils can be used in landscape areas. Otherwise, such soils should be removed from the project site. Any topsoil that will be retained for future use in landscape areas should be stockpiled in areas where it will not interfere with grading operations.

Within the development areas, excavations resulting from demolition and stripping which extend below final grades should be cleaned to firm undisturbed soil as determined by the Geotechnical Engineer's representative. Following clearing and grubbing, all depressions in areas to be filled should be scarified, moisture conditioned and backfilled with compacted engineered fill. The requirements for backfill materials and placement procedures are the same as those for engineered fill as described in the "Monitoring and Testing" section. No loose or uncontrolled backfilling of depressions resulting from demolition and stripping is permitted.

5.1.2 Colluvium Removal

In general, compressible colluvium within the development area should be removed. The extent of the actual removals should be determined by the Geotechnical Engineer based on review of 40-scale grading plans as well as observations in the field during grading.

5.1.3 Selection of Materials

With the exception of the organic near-surface materials, the site soils and rocks containing less than 3 percent organics are suitable for use as engineered fill.

Based on our experience in similar rock formations encountered in adjacent sites, the onsite sedimentary bedrock can be ripped with conventional heavy equipment. Large rock fragments may result from excavation of other bedrock formations. Rocks greater than 6 inches in size (if encountered) should be placed at depths greater than 10 feet from finished grade. Rocks greater than 18 inches in size (if any) should be broken down such that their maximum dimension is less than 18 inches, or otherwise removed from the site. The large rock burial areas can include the recreational sport area, below the fill slopes, and other non-residential fill areas.

Difficult trenching for installation of utilities may be encountered in cut areas underlain by resistant bedrock. Due to the blockiness of this rock, overbreak of trench sidewalls and oversize spoils are expected. To facilitate installation of underground utilities in these areas, we suggest that the roadway areas be overexcavated to below the planned depth of utilities.

5.1.4 Imported Materials

The Geotechnical Engineer should be informed if any importation of soil is contemplated. Import materials, if any are needed, must meet the requirements contained in Section 2.02B, Part I of the Guide Contract Specifications in Appendix C. A sample of the proposed import material should be submitted to the Geotechnical Engineer for evaluation by laboratory testing prior to site delivery.

5.1.5 Fill Placement

Areas to receive fill should be excavated to expose a firm undisturbed surface. The area should then be scarified to a depth of 12 inches, moisture conditioned and recompacted to provide adequate bonding with the initial lift of fill. All fills should be placed in thin lifts. The lift thickness should not exceed 8 inches or the depth of penetration of the compaction equipment used, whichever is less. Track rolling to compact faces of slopes is usually not sufficient; typically, slopes should be overfilled a minimum of 2 feet and cut back to design grades. The following compaction recommendations should be used for the placement and compaction of fills:

TABLE 4

Fill Location	Materials	Minimum Relative Compaction (%)	Minimum Moisture Content (Percentage Points Above Optimum Moisture Content)
Within upper 5 feet of finish grade	Expansive	87 to 92	5
	Non-expansive	90	3
From upper 5 to 50 feet of finished grade	Expansive	90	4
	Non-expansive	90	3
Base keyways and fills located below 50 feet of finished grade	Expansive	95	3
	Non-expansive	95	2

For the purpose of the above compaction requirements, expansive material is defined as soil with a Plasticity Index greater then 12. Relative compaction refers to in-place dry density of the fill material expressed as a percentage of the maximum dry density as determined by ASTM D-1557-91. Optimum moisture is the moisture content corresponding to the maximum dry density. We recommend that the fills be compacted at moisture contents higher than optimum as determined by ASTM D-1557-91 to minimize the effects of swell and/or hydrocompression.

5.1.6 Graded Slopes

For preliminary design purposes, we recommend that major graded slopes should generally be inclined at 3:1 (horizontal:vertical). If desired, slopes can locally be inclined as steep as 2:1 between pads or at other locations to facilitate project land planning, but not higher than 10 feet. However, slopes steeper than recommended above should be evaluated by ENGEO on a case-by-case basis, so that we can provide appropriate geotechnical design recommendations. Depending on slope height and local conditions, construction of slopes steeper than recommended could require selective grading with granular materials or reinforcement with geogrids. Both methods are commonly used in the Bay Area and are known to be feasible and cost-effective.

The stability of cut slopes in bedrock materials is largely dependent on the planned cut location and the orientation of the cut slope with respect to the bedrock structure or other planes of geologic weakness. The Engineering Geologist should examine all cut slope exposures in the field. If adverse bedrock structure or other zones of geologic weakness are encountered in the cut slopes during grading, it may be necessary to provide supplemental slope buttress recommendations.

5.1.7 Toe Keyways

All fills should be adequately keyed into firm natural materials unaffected by shrinkage cracks. Typical minimum key sizes and typical keyway subdrains are shown in Figures 6 and 7, respectively. Recommended keyway sizes and locations will be provided based on the final grading plans. Horizontal benches should be excavated into firm soil or bedrock as the filling proceeds. The vertical spacing of benches should be no more than 5 feet unless otherwise recommended by the Geotechnical Engineer. The actual size of the keyways and benches should be determined by the Geotechnical Engineer in the field during grading.

5.1.8 Construction of Subsurface Drainage Facilities

Subsurface drainage systems should be installed in all keyways and in swales or natural drainage ways, which are to be filled. The approximate locations of the recommended subdrains should be shown on the final 40-scale grading plans.

Drainage courses which are to be filled should be provided with adequate subsurface drainage prior to placement of any fill. Swales should be cleaned to a firm soil or rock base. A subdrain should then be installed through the center of the subexcavation, as shown on Figure 7. Desiccated, cracked surface clays and slumping soils located along the swale areas should be removed, and the slopes should be benched prior to the placement of fill. Actual limits of subexcavation should be determined in the field at the time of grading by the Geotechnical Engineer.

Additional subdrains should be added where seepage or wet conditions are encountered during excavation. Subdrain systems should consist of a minimum 6-inch-diameter perforated pipe encased in an 18-inch minimum thickness of Caltrans Class 2 Permeable Material or coarse rock wrapped in geotextile filter fabric. Typical subdrain details are shown in Typical Subdrain Detail, Figure 7. The subdrain pipe and drainage blanket should meet the requirements contained in Section 2.05, Part I of the Guide Contract Specifications presented in Appendix C.

Discharge from the subdrains will generally be low. However, in some instances, such discharges may be continuous. Subdrains should outlet into the storm drain system or to other approved outlets, and their locations should be documented for future maintenance.

5.1.9 Slope Toe Buttress

All cut or natural slopes that are adjacent to improved areas will require construction of a drained, buttressed debris bench as shown on Debris Bench Detail, Figure 8. The drained, buttressed debris bench should consist of a drained keyway excavated into firm bedrock and backfilled with engineered fill. The outboard side of the debris bench should be provided with a concrete v-ditch discharging into an approved outlet.

The minimum debris bench width should be at least 30 feet, which can be narrowed to 15 feet in areas where a roadway or open parking area is planned between the toe of cut slopes and the development areas. It should be noted that if this narrower stabilization scheme is utilized, slope debris and slough is likely to encroach onto the paved areas. All debris benches will require periodic maintenance, consisting of the removal and disposal of accumulated slope detritus. Proper access should be provided for the heavy equipment which may be required for removal of slide debris from benches and paved areas.

5.1.10 Cut and Cut-Fill Transitions

We anticipate that significant variations in material properties, particularly shrink/swell characteristics, will occur in the cut areas and in the areas of cut-and-fill transition as shown in Cut/Fill Lot Detail, Figure 9. Such situations may have detrimental effects on building performance if not mitigated in the grading of the site. Therefore, it is recommended that the swell potential of the subgrade materials in building areas that are entirely in cut or located over cut-and-fill transitions be made more uniform. This can be accomplished by subexcavating the natural soil cover and the native rock and replacing the subexcavated material with engineered fill. The subexcavation depth should be 3 feet below pad grade for cut-to-fill lots and 2 feet for cut lots. The subexcavated material can be used to backfill the excavation; however, the more expansive soil cover should be used outside building areas or in mass graded fills more than 3 feet below finished grades. Cut/Fill Lot Detail (Figure 9) represents the typical overexcavation recommended to mitigate the effects of differing materials located under a structure.

5.1.11 Differential Fills

A program of subexcavation within individual lots may be required to limit differential movement to be less than ½ inch under the building footprints. We recommend that the differential of fill thickness within a building pad not be greater than the lesser of 10 feet or one-half the deepest fill. Local subexcavation of soil material and replacement by engineered fill will be necessary to achieve this requirement. Overexcavation requirements will be provided by the Geotechnical Engineer based on a review of the final grading plans.

5.1.12 Erosion Control

The tops of fill or cut slopes should be graded in such a way as to prevent water from flowing freely down the slopes. Due to the nature of the site soil and bedrock, graded slopes may experience severe erosion when grading is halted by heavy rain. Therefore, before work is stopped, a positive gradient away from the tops of slopes should be provided to carry the surface runoff away from the slopes to areas where erosion can be controlled. It is vital that no completed slope be left standing through a winter season without erosion control measures having been provided.

Because the existing bedrock is relatively nutrient-poor, it may be difficult for vegetation to become properly established, resulting in a potential for slope erosion. Revegetation of graded slopes can be aided by retaining the organic-rich strippings and spreading these materials in a thin layer (approximately 6 inches thick) on the graded slopes prior to the winter rains and following rough grading. When utilizing this method, it is sometimes possible to minimize hydroseeding. All landscaped slopes should be maintained in a vegetated state after project completion. The use of drought-tolerant vegetation requiring infrequent drip irrigation during summer is recommended. No pressurized irrigation lines should be placed on or near the tops of graded slopes.

5.1.13 Monitoring and Testing

It is important that all site preparations for site grading be done under the observation of a Geotechnical Engineer's field representative. The Geotechnical Engineer's field representative should observe all graded area preparation, including demolition and stripping following the recommendations contained in the Guide Contract Specifications in Appendix C. The final grading plans should be submitted to the Geotechnical Engineer for review.

5.2 FOUNDATION SYSTEM

Design of foundation elements should consider swell potential of the foundation soils. The recommendations of fill placement in Section 5.1.5 are intended to reduce the effect of expansive soils. These effects can be further reduced by the choice of a proper foundation system as well as designing foundations to extend below much of the zone of seasonal moisture variation. The

provided recommendations can be expected to reduce the cracking and distress that is common to construction on expansive soils. However, minor cracking and distress should be anticipated in the structures and the slabs-on-grade.

5.2.1 Preliminary Post-tensioned Mat Foundation Design

The following preliminary mat foundation recommendations are based on soil materials collected in the borings. The preliminary soil design parameters presented below assume that post-tensioned mats are designed according to the method recommended in "Design of Post-Tensioned Slabs-On-Ground" (Post-Tensioning Institute, 2004, 3rd Edition).

Preliminary post-tensioned mat design parameters are provided below:

Center Lift Condition:	Edge Moisture Variation Distance, e_m= 9.0 feet Differential Soil Movement, y_m = 0.2 inches
Edge Lift Condition:	Edge Moisture Variation Distance, e_m = 5.0 feet Differential Soil Movement, y_m= 0.5 inches

Post-tensioned slabs should be designed for an average allowable soil pressure of 2,000 pounds per square foot (psf) or 3,000 psf for concentrated loads. These values may be increased by one-third when considering total loads, including wind or seismic loads.

A minimum mat thickness of 10 inches is recommended. The actual thickness of the slab should be determined by the project Structural Engineer. A wafflemat with voids between the ribs would also be appropriate at the site. The perimeter should be thickened to at least 12 inches, and the minimum soil backfill height against the mat at the perimeter should be 6 inches.

5.2.2 Secondary Slabs-on-Grade

This section provides guidelines for secondary slabs, such as walkways around the buildings. Secondary slabs-on-grade should be constructed structurally independent of the foundation system. This allows slab movement to occur with reduced potential for foundation distress. Where secondary slab-on-grade construction is anticipated, care must be exercised in attaining a near-saturation condition of the subgrade soil before concrete placement. Improved slab performance can be achieved by replacing the expansive soils with non-expansive or lime-treated materials.

Secondary slabs-on-grade should be designed specifically for their intended use and loading requirements. Cracking of conventional slabs should be expected due to concrete shrinkage. Slabs-on-grade should be reinforced for control of cracking, and frequent control joints should be provided to control the cracking. Reinforcement should be designed by the Structural Engineer. In our experience, welded wire mesh may not be sufficient to control slab cracking. As a

minimum, secondary slabs-on-grade should be reinforced with No. 3 bars spaced 18 inches on center each way.

Secondary slabs-on-grade should have a minimum thickness of 4 inches. A 4-inch-thick layer of clean crushed rock or gravel (Section 2.04, Part I of Guide Contract Specifications) should be placed under slabs. Exterior slabs should be constructed with thickened edges extending at least beneath the granular material into compacted soil to reduce water infiltration. Slabs should slope away from the buildings at a slope of at least 2 percent to prevent water from flowing toward the building.

5.3 RETAINING WALLS

Unrestrained walls constructed on level foreground should be designed for active lateral fluid pressure and a dynamic increment as provided below. The resultant force of the dynamic increment portion of wall loading (approximately an upside down triangular distribution) should be applied at a height 60 percent of the way up the wall.

TABLE 5

Backfill Slope Condition	Active Pressure (pcf)	Dynamic Increment (pcf)
Level	50	10
4:1	55	25
3:1	60	40
2:1	70	55

Passive pressures acting on foundations and keyways may be assumed as 250 pounds per cubic foot (pcf) provided that the area in front of the retaining wall is level for a distance of at least 10 feet or three times the depth of foundation and keyway, whichever is greater. The upper one foot of soil should be excluded from passive pressure computations unless it is confined by pavement or a concrete slab.

The friction factor for sliding resistance may be assumed as 0.35. It is recommended that retaining wall footings be designed using an allowable bearing pressure of 2,000 pounds per square foot (psf) in firm native materials or fill. Walls on sloping terrain should be supported on drilled piers. The design height for walls on sloping ground should be increased to a level where there is 10 feet horizontal distance to the face of the slope. The passive resistance can be started below this level. An equivalent fluid weight of 250 pounds per cubic foot (pcf) acting on 1.5 times the pier diameter may be used to evaluate passive resistance. Appropriate safety factors against overturning and sliding should be incorporated into the design calculations.

The Geotechnical Engineer should be consulted on design values where surcharge loads, such as from automobiles, are expected. In addition, if the walls are located close together, surcharge from the structure above the wall should be incorporated in the wall design.

All retaining walls should be provided with drainage facilities to prevent the build-up of hydrostatic pressures behind the walls. Wall drainage may be provided using a 4-inch-diameter perforated pipe embedded in Class 2 permeable material (Part I of Guide Contract Specifications, Section 2.05B), or free-draining gravel surrounded by synthetic filter fabric. The width of the drain blanket should be at least 12 inches. The drain blanket should extend to about one foot below the finished grades. As an alternative, prefabricated synthetic wall drain panels can be used. The upper one foot of wall backfill should consist of low-permeability on-site soils. Collector perforated pipes should be directed to an outlet approved by the Civil Engineer. Subdrain pipe, drain blanket and synthetic filter fabric should meet the minimum requirements as listed in Part I of the Guide Contract Specifications.

All backfill should be placed in accordance with recommendations provided above for engineered fill. Light equipment should be used during backfill compaction to reduce possible overstressing of the walls.

5.4 PRELIMINARY PAVEMENT DESIGN

Based on our observations of the material at the project site, we anticipate that the R-Value of the soil utilized for sub-grade preparation to be greater than or equal to 20, with a likely probability that the R-Value of the soil utilized for subgrade preparation will be greater than 25. Please note the City of Livermore may have more stringent minimum pavement section requirements than those listed below. The more stringent pavement section requirements should be incorporated into the design for you project. The following table of asphalt pavement and base rock sections assume on-site Traffic Index (TI) of 5.0, and are calculated using the methods contained in Topic 608 of Highway Design Manual by Caltrans.

TABLE 6

R-Value	AC (inches)	AB (inches)
10	3.0	9.0
15	3.0	8.0
20	3.0	7.5
25	3.0	6.5
26+	3.0	6.0

Notes: AC is asphaltic concrete
AB is aggregate base Class 2 Material with minimum R = 78

The above preliminary pavement sections are provided for estimating only. We recommend the actual subgrade material should be tested for R-value and the Traffic Indices and minimum pavement section(s) should be confirmed by the Civil Engineer and City of Livermore.

Pavement materials and construction should comply with the specifications and requirements of the Standard Specifications by the State of California Division of Highways, City of Livermore and the following minimum requirements.

- All clayey (PI>12) pavement subgrades should be scarified to a depth of 12 inches below finished subgrade elevation, moisture conditioned to at least 4 percentage points above optimum and compacted to at least 90 percent relative compaction and in accordance with city requirements. Where granular soils (PI $\leq$ 12) are present at subgrade, the minimum moisture content can be reduced to 2 percentage points above optimum and the minimum relative compaction should be 95 percent.

- Subgrade soils should be in a stable, non-pumping condition at the time aggregate base materials are placed and compacted.

- Aggregate base materials should meet current Caltrans specifications for Class 2 aggregate base and should be compacted to at least 95 percent of maximum dry density.

- Asphalt paving materials should meet current Caltrans specifications for asphalt concrete.

- All concrete curbs separating pavement and irrigated landscaped areas should extend to below the bottom of adjacent aggregate baserock materials.

5.5 DRAINAGE

The building pad must be positively graded at all times to provide for rapid removal of surface water runoff from the foundation systems and to prevent ponding of water under floors or seepage toward the foundation systems at any time during or after construction.

Ponding of stormwater must not be permitted on the building pad during prolonged periods of inclement weather. As a minimum requirement, finished grades should have slopes of at least 3 to 5 percent within 7 feet from the exterior walls at right angles to them to allow surface water to drain positively away from the structures. For paved areas, the slope gradient can be reduced to 2 percent. All surface water should be collected and discharged into the storm drain system. Landscape mounds must not interfere with this requirement.

All roof stormwater should be collected and directed to downspouts. Stormwater from roof downspouts should be directed to a solid pipe that discharges to the street, to an approved outlet, or onto an impervious surface, such as the concrete apron or pavement area that will drain at a 2 percent slope gradient.

5.6 REQUIREMENTS FOR LANDSCAPING IRRIGATION

Vegetation should not be planted immediately adjacent to structures. If planting adjacent to the building is desired, we recommend using plants that require very little moisture with drip irrigation systems.

Sprinkler systems should not be installed where they may cause ponding or saturation of foundation soils within 5 feet of the walls or under structures. Ponding or saturation of foundation soils may cause loss of soil strength, and movements of the foundation and slabs.

Irrigation of landscaped areas should be strictly limited to that necessary to sustain vegetation. Excessive irrigation could result in saturation and weakening of foundation soils. The Landscape Architect and prospective owners should be informed of the surface drainage requirements included in this report.

5.7 UTILITIES

It is recommended that utility trench backfilling be done under the observation of a Geotechnical Engineer. Pipe zone backfill (i.e., material beneath and immediately surrounding the pipe) may consist of a well-graded import or native material less than ¾ inch in maximum dimension compacted in accordance with recommendations provided above for engineered fill. Trench zone backfill (i.e., material placed between the pipe zone backfill and the ground surface) may consist of native soil compacted in accordance with recommendations for engineered fill.

Material used for pipe zone backfill should consist of fine- to medium-grained sand or a well-graded mixture of sand and gravel, but this material should not be used within 2 feet of finish grades. In general, uniformly graded gravel should not be used for pipe or trench zone backfill due to the potential for migration of: (1) soil into the relatively large void spaces present in this type of material, and (2) water along trenches backfilled with this type of material. All utility trenches entering buildings and paved areas must be provided with an impervious seal consisting of native materials or concrete where the trenches pass under the building perimeter or curb lines. The impervious plug should extend at least 3 feet to both sides of the crossing.

Care should be exercised where utility trenches are located beside foundation areas. Utility trenches constructed parallel to foundations should be located entirely above a plane extending down from the lower edge of the footing at an angle of 45 degrees. Utility companies and Landscape Architects should be made aware of this information.

Utility trenches in paved areas should be constructed in accordance with local agency requirements. Compaction of trench backfill by jetting should be avoided. The owner should be notified if a conflict between city or other agency requirements and the recommendations contained in this report is observed to provide a resolution prior to submitting bids.

6.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

This report is issued with the understanding that it is the responsibility of the owner to transmit the information and recommendations of this report to developers, owners, buyers, architects, engineers, and designers for the project so that the necessary steps can be taken by the contractors and subcontractors to carry out such recommendations in the field. The conclusions and recommendations contained in this report are solely professional opinions.

The professional staff of ENGEO Incorporated strives to perform its services in a proper and professional manner with reasonable care and competence but is not infallible. There are risks of earth movement and property damages inherent in land development. We are unable to eliminate all risks or provide insurance; therefore, we are unable to guarantee or warrant the results of our services.

This report is based upon field and other conditions discovered at the time of preparation of ENGEO's report. This document must not be subject to unauthorized reuse that is, reusing without written authorization of ENGEO. Such authorization is essential because it requires ENGEO to evaluate the document's applicability given new circumstances, not the least of which is passage of time. Actual field or other conditions will necessitate clarifications, adjustments, modifications or other changes to ENGEO's documents. Therefore, ENGEO must be engaged to prepare the necessary clarifications, adjustments, modifications or other changes before construction activities commence or further activity proceeds. If ENGEO's scope of services does not include on-study area construction observation, or if other persons or entities are retained to provide such services, ENGEO cannot be held responsible for any or all claims arising from or resulting from the performance of such services by other persons or entities, and from any or all claims arising from or resulting from clarifications, adjustments, modifications, discrepancies or other changes necessary to reflect changed field or other conditions.

SELECTED REFERENCES

American Concrete Institute, 2005, Building Code Requirements for Structural Concrete (ACI 318-05) and Commentary (ACI 318R-05).

Blake, T. F., 2000, EQFAULT, A Computer Program for the Deterministic Prediction of Peak Horizontal Acceleration from Digitized California Faults.

BSK and Associates, Geotechnical and Seismic Hazards Investigation, 58 acre property, Laughlin Road. Livermore, California. Dated February 22, 1990.

Dibblee, T. W., 2006, Geologic Map of Altamonte Quadrangle, Contra Costa & Alameda Counties, California, Livermore Map (DF-196).

Graymer, R. W. et al., 1996, Preliminary Geologic Map Emphasizing Bedrock Formations in Alameda County, California: Derived from the Digital Database Open-File 96-252, U.S. Geological Survey.

International Code Council, 2007 California Building Code.

SEAOC, 1996, Recommended Lateral Force Requirements and Tentative Commentary.

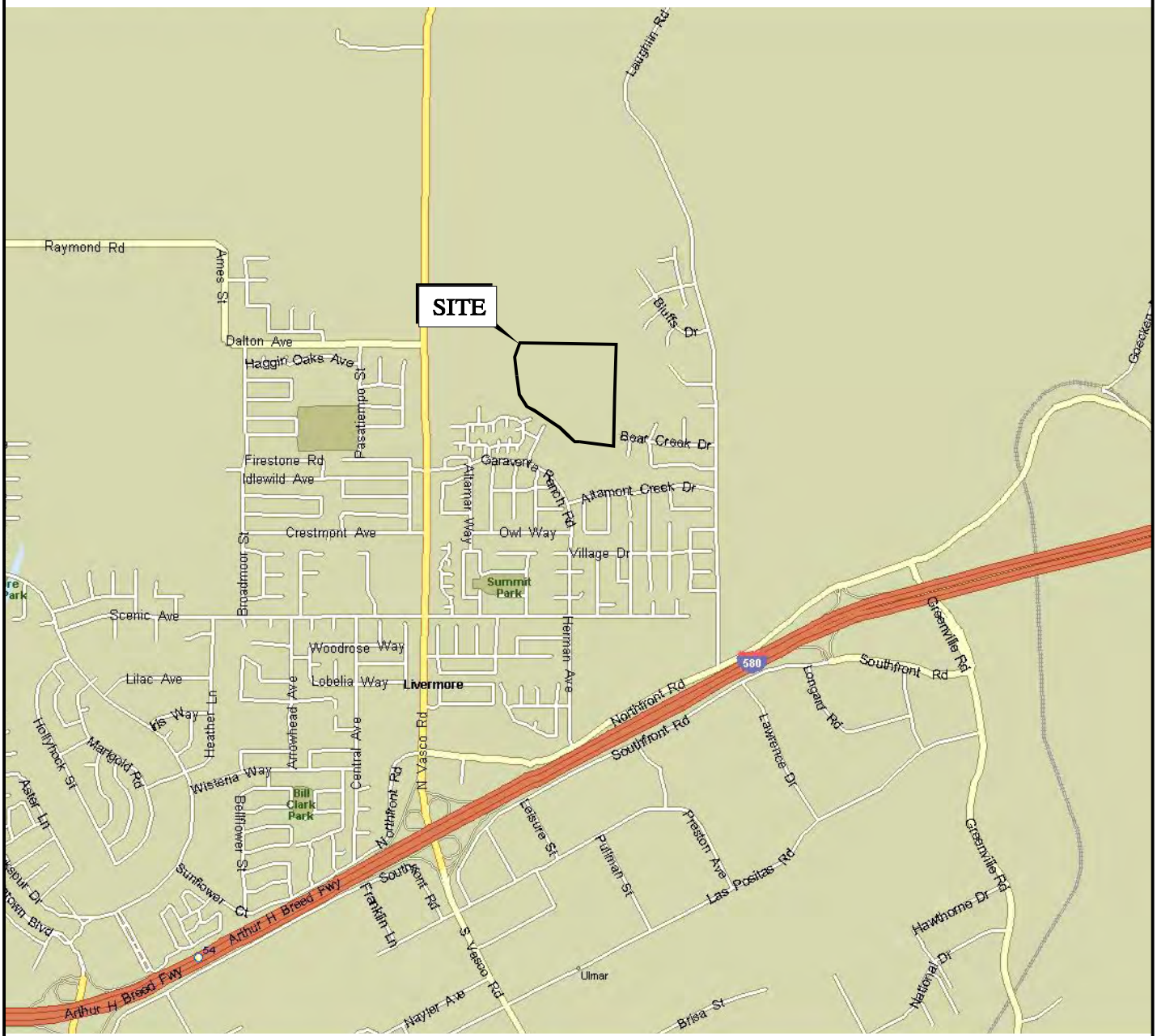
Working Group on California Earthquake Probabilities 2007 (Published 2008). "The Uniform California Earthquake Rupture Forecast, Version 2 (UCERF 2)." U.S. Geological Survey Open-File Report 2007-1437 and California Geological Survey Special Report 203.

LIST OF FIGURES

Figure 1 - Vicinity Map
Figure 2 - Site Plan
Figure 3 - Site Photographs
Figure 4 - Earthquake Fault Zone Map
Figure 5 – Regional Geologic Map
Figure 6 - Typical Keyway Detail
Figure 7 - Typical Subdrain Detail
Figure 8 - Debris Bench Detail
Figure 9 - Cut/Fill Lot Detail

FIGURES

© 2010 BY ENGEO INCORPORATED. THIS DOCUMENT MAY NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER, NOR MAY IT BE QUOTED OR EXCERPTED WITHOUT THE EXPRESS WRITTEN CONSENT OF ENGEO INCORPORATED.



0 FEET 2000

0 METERS 1000

BASE MAP SOURCE: BASE MAP SOURCE: MS STREETS AND TRIPS

VICINITY MAP

GARAVENTA HILLS ESTATES

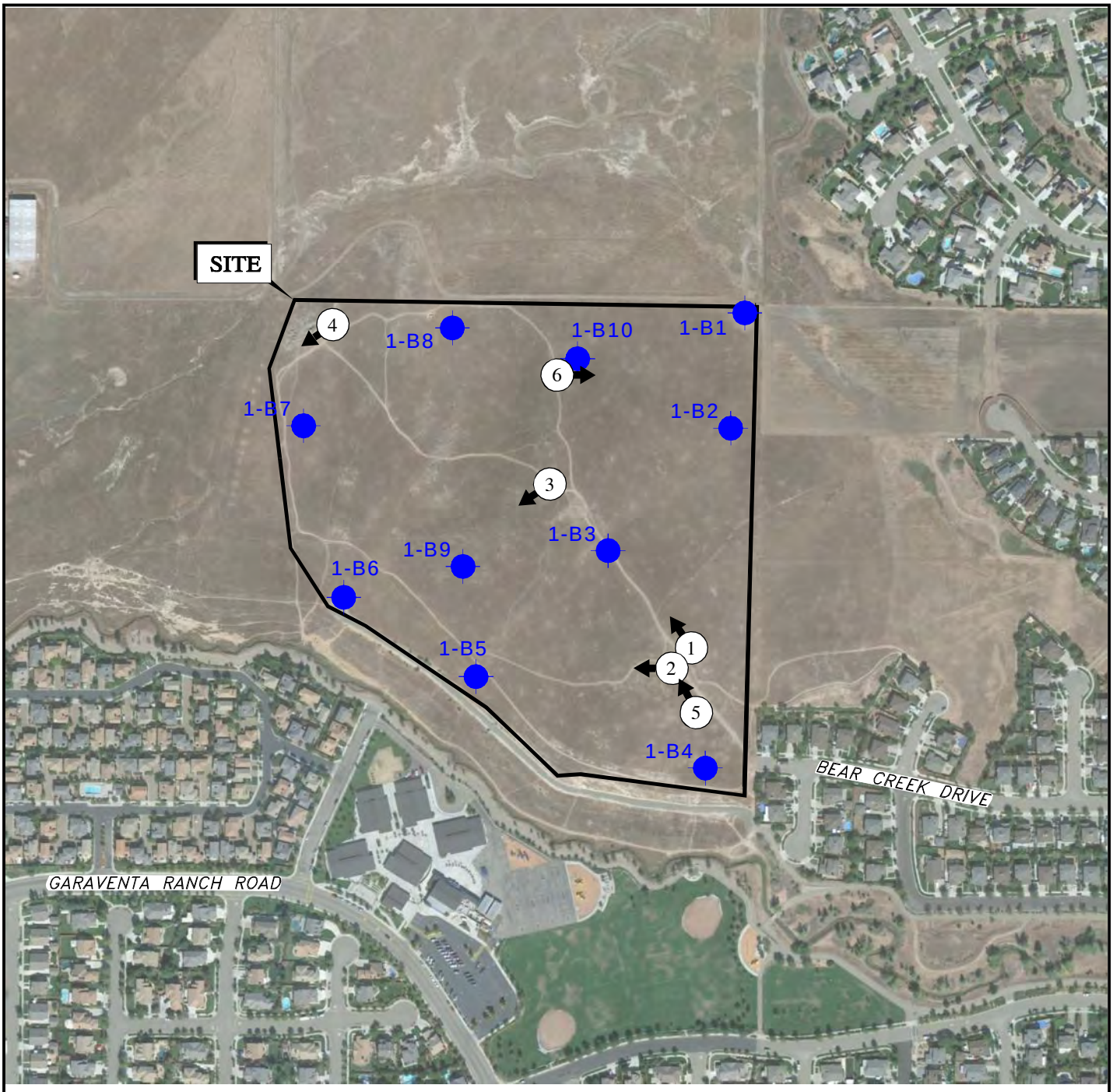
LIVERMORE, CALIFORNIA

PROJECT NO.: 9126.000.000	FIGURE NO. 1
DATE: DECEMBER 2010	
DRAWN BY: SRP	CHECKED BY: DSH

G:\Drafting\DRAFTING2_Dwg\9126\000\GEX\9126000000-1-VicinityMap-1210.dwg 12-01-10 01:57:14 PM spotters

ORIGINAL FIGURE PRINTED IN COLOR

© 2010 BY ENGEO INCORPORATED. THIS DOCUMENT MAY NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER, NOR MAY IT BE QUOTED OR EXCERPTED WITHOUT THE EXPRESS WRITTEN CONSENT OF ENGEO INCORPORATED.



EXPLANATION

1-B10 — APPROXIMATE LOCATION OF BORING

6 — APPROXIMATE LOCATION AND DIRECTION OF PHOTOGRAPH

N

0 FEET 400

0 METERS 200

BASE MAP SOURCE: GOOGLE EARTH, 2003

ENGEO Expect Excellence

SITE PLAN

GARAVENTA HILLS ESTATES

LIVERMORE, CALIFORNIA

PROJECT NO.: 9126.000.000			FIGURE NO. 2
DATE: DECEMBER 2010			
DRAWN BY: SRP	CHECKED BY: DSH		

G:\Drafting\DRAFTING2_Dwg\9126\000\GEX\9126000000-2-SitePlan-1210.dwg 12-01-10 01:58:06 PM spatters

ORIGINAL FIGURE PRINTED IN COLOR

COPYRIGHT © 2010 BY ENGEO INCORPORATED. THIS DOCUMENT MAY NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER, NOR MAY IT BE QUOTED OR EXCERPTED WITHOUT THE EXPRESS WRITTEN CONSENT OF ENGEO INCORPORATED.

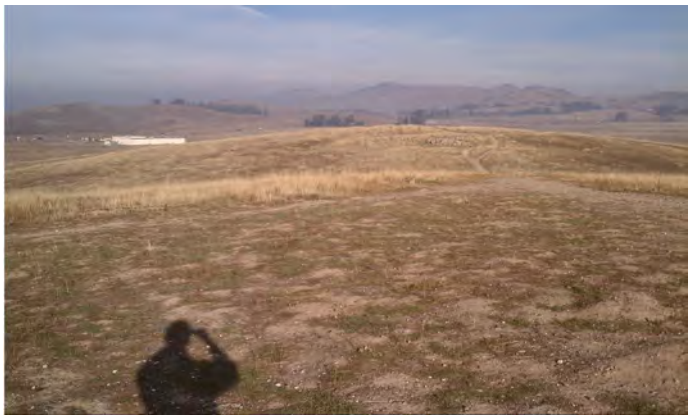


PHOTO 1: VIEW FROM SOUTHEASTERN KNOLL LOOKING NORTHWEST - BOULDERS VISIBLE

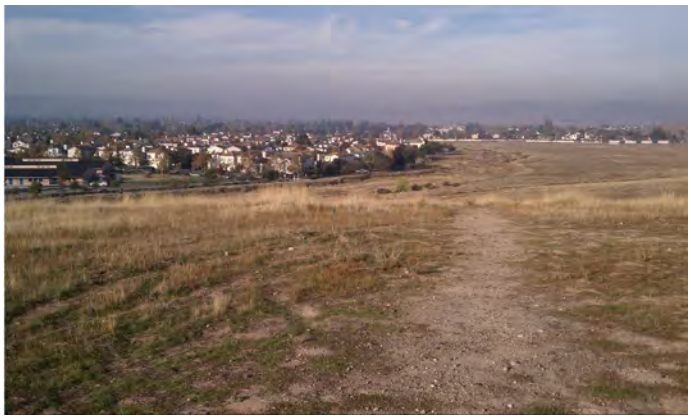


PHOTO 2: VIEW FROM SOUTHEASTERN KNOLL LOOKING WEST - EXISTING CREEK VISIBLE

PHOTO 3: VIEW FROM CENTRAL KNOLL LOOKING SOUTHWEST - BOULDERS AND OUTCROPS VISIBLE

PHOTO 4: VIEW OF BOULDERS AND ROCK OUTCROPS AT NORTHWEST CORNER OF SITE LOOKING SOUTHWEST

PHOTO 5: BEDROCK OUTCROPS VIEWED ON SHOULDER OF SOUTHEASTERN KNOLL

PHOTO 6: VIEW FROM BORING 1-B10 LOOKING EAST - FAULT SETBACK VISIBLE

ENGEO Expect Excellence

SITE PHOTOGRAPHS

GARAVENTA HILLS ESTATES

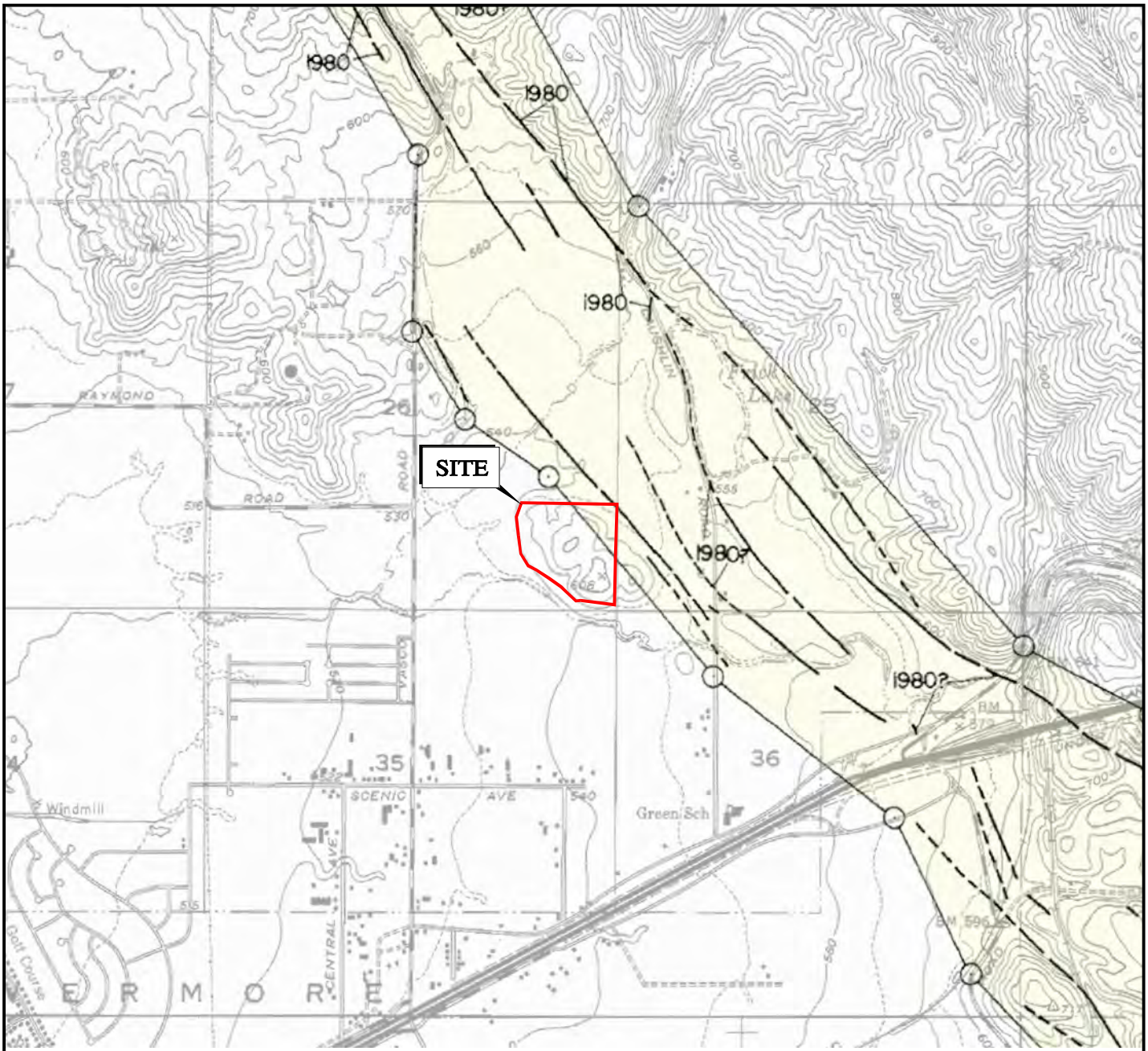
LIVERMORE, CALIFORNIA

PROJECT NO.: 9126.000.000			FIGURE NO. 3
DATE: DECEMBER 2010			
DRAWN BY: SRP	CHECKED BY: DSH		

G:\Drafting\DRAFTING2_Dwg\9126\000\GEX\9126000000-3-SitePhotos-1210.dwg 12-01-10 01:59:05 PM spatters

ORIGINAL FIGURE PRINTED IN COLOR

© 2010 BY ENGEO INCORPORATED. THIS DOCUMENT MAY NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER, NOR MAY IT BE QUOTED OR EXCERPTED WITHOUT THE EXPRESS WRITTEN CONSENT OF ENGEO INCORPORATED.



EXPLANATION

1906 C
?

FAULTS CONSIDERED TO HAVE BEEN ACTIVE DURING HOLOCENE TIME AND TO HAVE A RELATIVELY HIGH POTENTIAL FOR SURFACE RUPTURE; SOLID LINE WHERE ACCURATELY LOCATED, LONG DASH WHERE APPROXIMATELY LOCATED, SHORT DASH WHERE INFERRED, DOTTED WHERE CONCEALED; QUERY (?) INDICATES ADDITIONAL UNCERTAINTY. EVIDENCE OF HISTORIC OFFSET INDICATED BY YEAR OF EARTHQUAKE-ASSOCIATED EVENT OR C FOR DISPLACEMENT CAUSED BY CREEP OR POSSIBLE CREEP

SPECIAL STUDIES ZONE BOUNDARIES; DELINEATED AS STRAIGHT-LINE SEGMENTS THAT CONNECT ENCIRCLED TURNING POINTS SO AS TO DEFINE SPECIAL STUDIES ZONE SEGMENTS

N

0 FEET 2000
0 METERS 1000

BASE MAP SOURCE: CDMG, 1993

ENGEO Expect Excellence

EARTHQUAKE FAULT ZONE MAP

GARAVENTA HILLS ESTATES

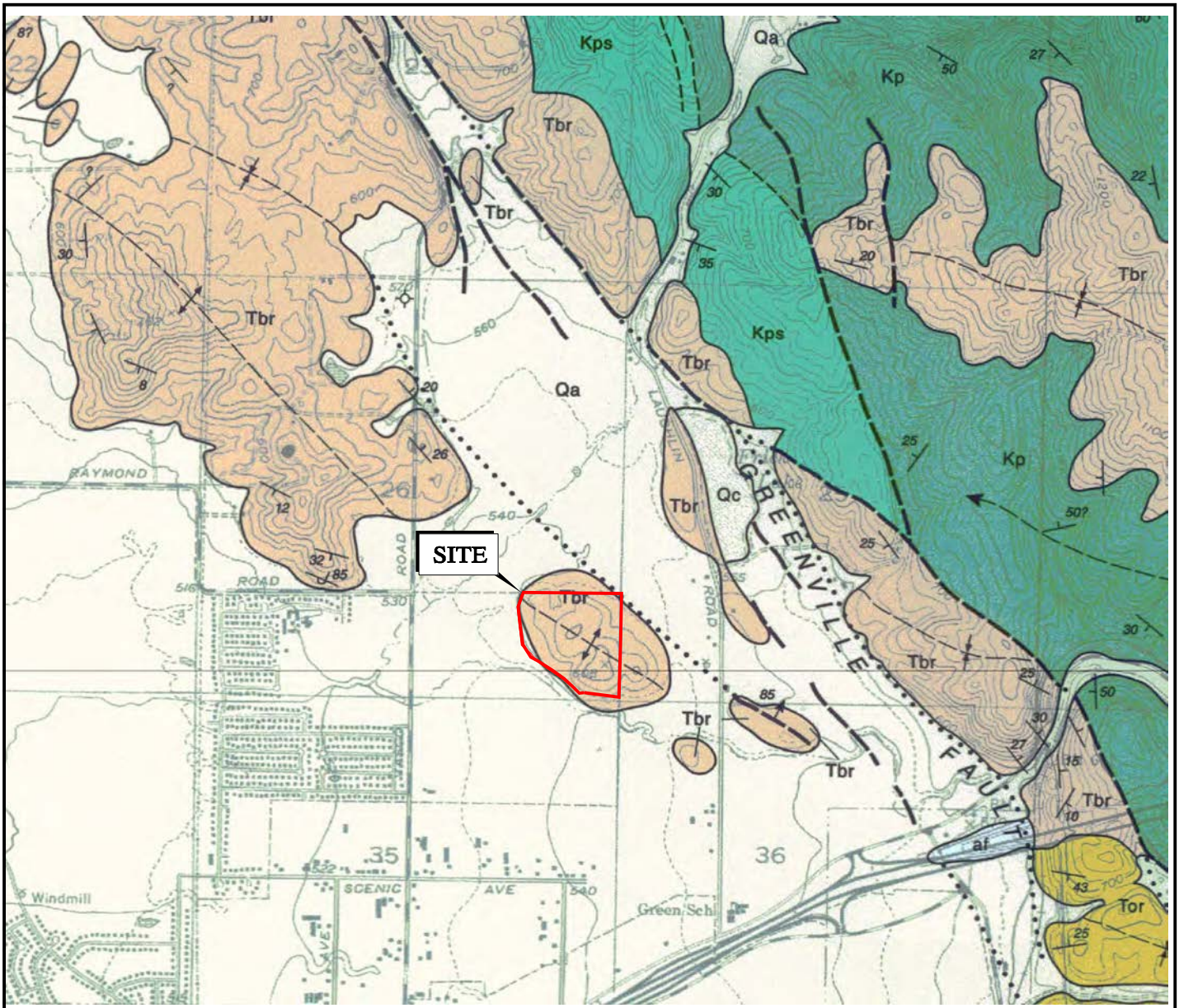
LIVERMORE, CALIFORNIA

PROJECT NO.: 9126.000.000		FIGURE NO. 4
DATE: DECEMBER 2010		
DRAWN BY: SRP	CHECKED BY: DSH	

G:\Drafting\DRAFTING2_Dwg\9126\000\GEX\9126000000-4-EarthquakeFaultZonesMap-1210.dwg 12-01-10 02:00:02 PM spatters

ORIGINAL FIGURE PRINTED IN COLOR

© 2010 BY ENGEO INCORPORATED. THIS DOCUMENT MAY NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER, NOR MAY IT BE QUOTED OR EXCERPTED WITHOUT THE EXPRESS WRITTEN CONSENT OF ENGEO INCORPORATED.



EXPLANATION

Qa	ALLUVIAL PEBBLE GRAVEL
Tor	ORINDIA FORMATION
Tbr	BRIONES OF CIERBO SANDSTONE
Kps	PANOCHE FLORMATION - SANDSTONE
Kp	PANOCHE FORMATION - SHALE OR CLAYSTONE

ANTICLINE

SYNCLINE

STRIKE AND DIP OF BEDDING

STRIKE AND DIRECTION OF DIP

STRIKE AND DIP OF OVERTURNED BEDDING

FAULT: DASHED WHERE INDEFINITE OR INFERRED, DOTTED WHERE CONCEALED, QUERIED WHERE EXISTENCE IS DOUBTFUL. PARALLEL VERTICAL MOVEMENT IS SHOWN BY U/D (U= UPTHROWN SIDE, D= DOWNTHROWN SIDE). SHORT ARROW INDICATES DIP OF FAULT PLANE. SAWTEETH ARE ON UPPER PLATE OF LOW ANGLE THRUST FAULT.

N

0 FEET 2000

0 METERS 1000

BASE MAP SOURCE: DIBBLEE, 2006

ENGEO Expect Excellence

REGIONAL GEOLOGIC MAP

GARAVENTA HILLS ESTATES

LIVERMORE, CALIFORNIA

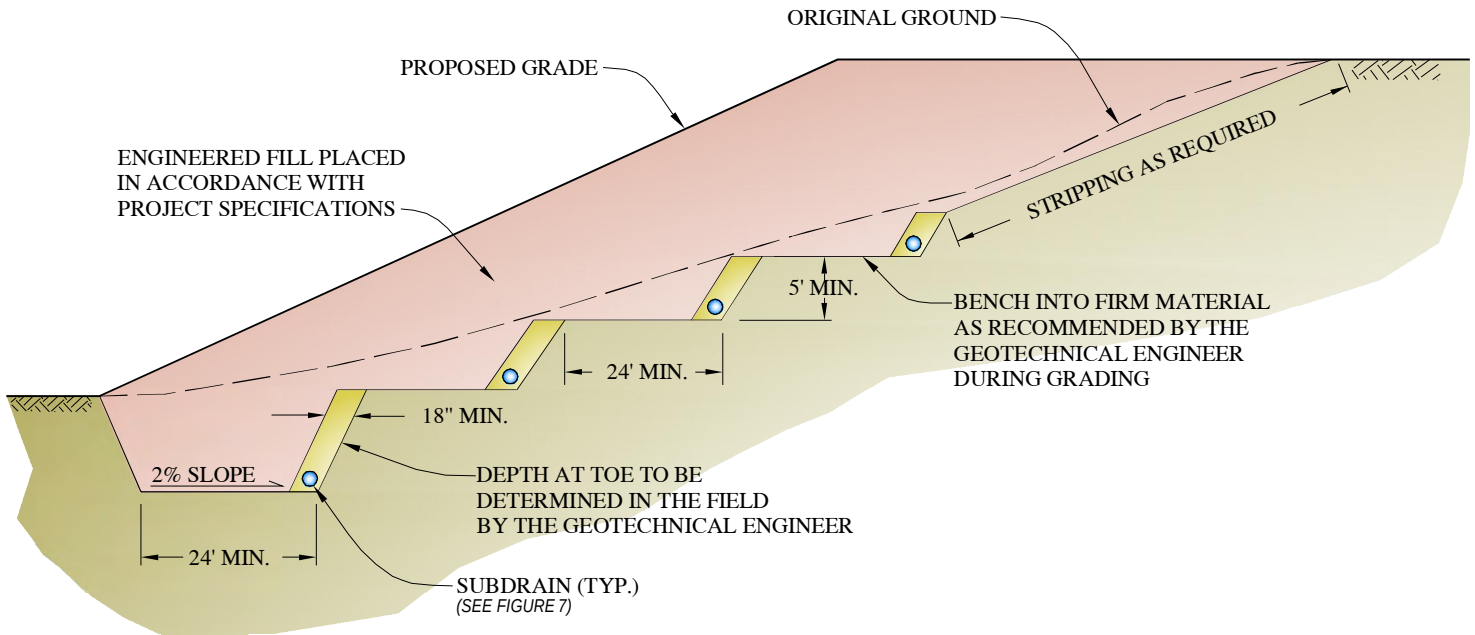
PROJECT NO.: 9126.000.000		FIGURE NO. 5
DATE: DECEMBER 2010		
DRAWN BY: SRP	CHECKED BY: DSH	

G:\Drafting\DRAFTING2_Dwg\9126\000\GEX\9126000000-5-RegionalGeologicMap-1210.dwg 12-01-10 02:02:02 PM spatters

ORIGINAL FIGURE PRINTED IN COLOR

COPYRIGHT © 2010 BY ENGEO INCORPORATED. THIS DOCUMENT MAY NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER, NOR MAY IT BE QUOTED OR EXCERPTED WITHOUT THE EXPRESS WRITTEN CONSENT OF ENGEO INCORPORATED.

G:\Drafting\DRAFTING2_Dwg\9126\000\GEX\9126000000-6-Keywaydetail-1210.dwg 12-01-10 02:03:11 PM spotters



BASE MAP SOURCE: UNKNOWN

NO SCALE

ENGEO Expect Excellence

TYPICAL KEYWAY DETAIL

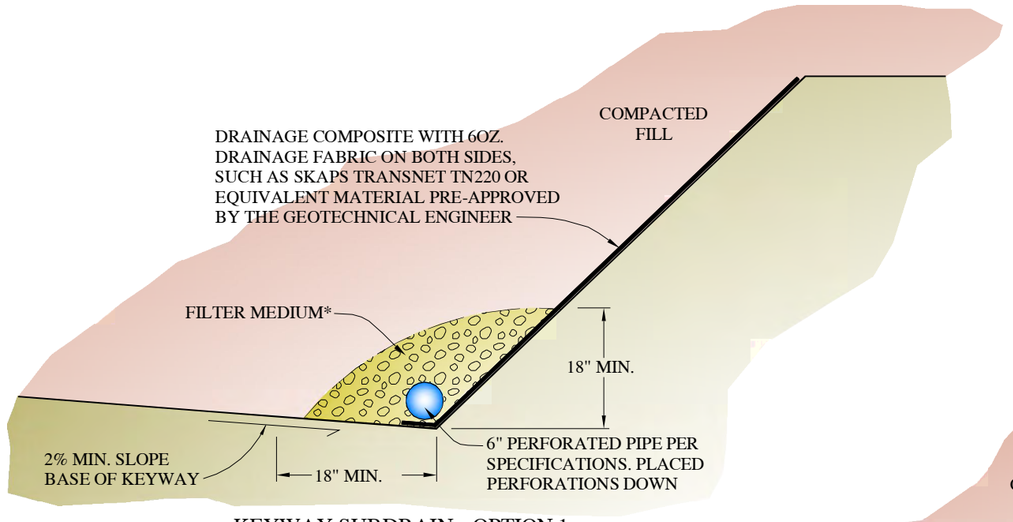
GARAVENTA HILLS ESTATES

LIVERMORE, CALIFORNIA

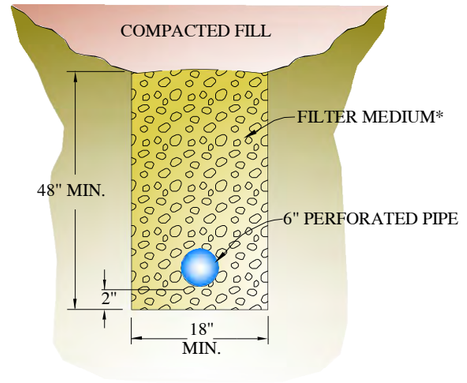
PROJECT NO.: 9126.000.000	FIGURE NO. 6
DATE: DECEMBER 2010	
DRAWN BY: SRP	CHECKED BY: DSH

ORIGINAL FIGURE PRINTED IN COLOR

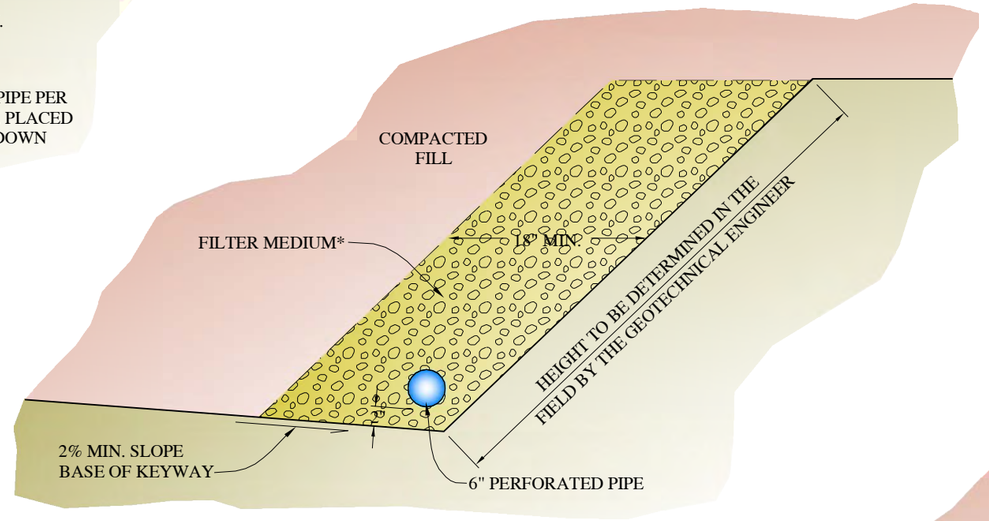
COPYRIGHT © 2010 BY ENGEO INCORPORATED. THIS DOCUMENT MAY NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER, NOR MAY IT BE QUOTED OR EXCERPTED WITHOUT THE EXPRESS WRITTEN CONSENT OF ENGEO INCORPORATED.



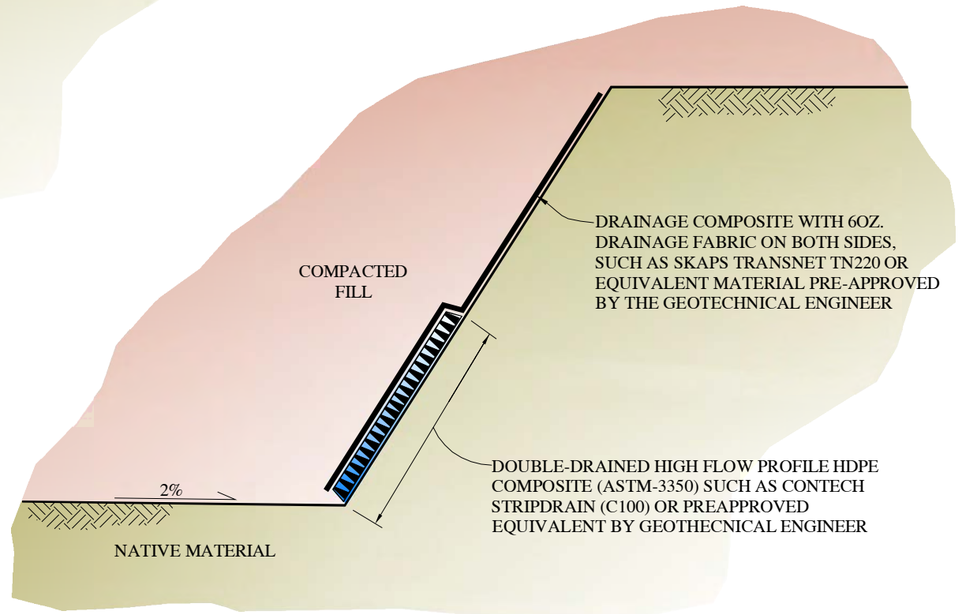
KEYWAY SUBDRAIN - OPTION 1



SWALE SUBDRAIN



KEYWAY SUBDRAIN - OPTION 2



ALTERNATE KEYWAY SUBDRAIN - OPTION 3
(FOR DEPTHS LESS THAN 30 FEET)

*FILTER MEDIUM

ALTERNATIVE A

CLASS 2 PERMEABLE MATERIAL

MATERIAL SHALL CONSIST OF CLEAN, COARSE SAND AND GRAVEL OR CRUSHED STONE, CONFORMING TO THE FOLLOWING GRADING REQUIREMENTS:

SIEVE SIZE	% PASSING SIEVE
1"	100
3/4"	90–100
3/8"	40–100
#4	25–40
#8	18–33
#30	5–15
#50	0–7
#200	0–3

ALTERNATIVE B

CLEAN CRUSHED ROCK OR GRAVEL WRAPPED IN FILTER FABRIC

ALL FILTER FABRIC SHALL MEET THE FOLLOWING MINIMUM AVERAGE ROLL VALUES UNLESS OTHERWISE SPECIFIED BY ENGEO:

GRAB STRENGTH (ASTM D-4632)	180 lbs
MASS PER UNIT AREA (ASTM D-4751)	6 oz/yd^2
APPARENT OPENING SIZE (ASTM D-4751)	70–100 U.S. STD. SIEVE
FLOW RATE (ASTM D-4491)	80 gal/min/ft
PUNCTURE STRENGTH (ASTM D-4833)	80 lbs

NOTES:

1. *ALL PIPE JOINTS SHALL BE GLUED*
2. *ALL PERFORATED PIPE PLACED PERFORATIONS DOWN*
3. *1% FALL (MINIMUM) ON ALL TRENCHES AND DRAIN LINES*

BASE MAP SOURCE: UNKNOWN

NO SCALE

ENGEO Expect Excellence

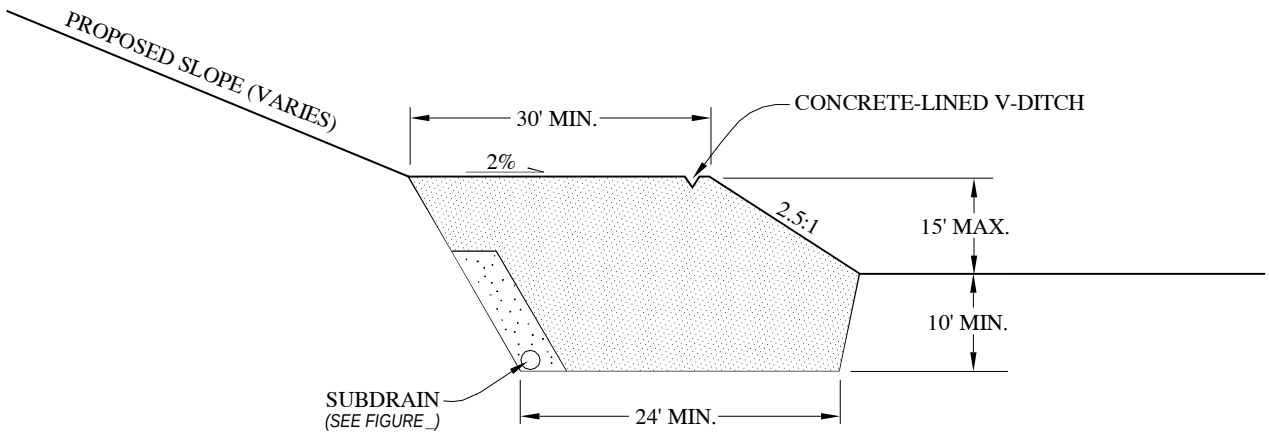
TYPICAL SUBDRAIN DETAIL
GARAVENTA HILLS ESTATES
LIVERMORE, CALIFORNIA

PROJECT NO.: 9126.000.000		FIGURE NO. 7
DATE: DECEMBER 2010		
DRAWN BY: SRP	CHECKED BY: DSH	

ORIGINAL FIGURE PRINTED IN COLOR

G:\Drafting\DRAFTING2_Dwg\9126\000\GEX\9126000000-7SubdrainDetail-1210.dwg 12-01-10 02:05:24 PM spatters

COPYRIGHT © 2010 BY ENGEO INCORPORATED. THIS DOCUMENT MAY NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER, NOR MAY IT BE QUOTED OR EXCERPTED WITHOUT THE EXPRESS WRITTEN CONSENT OF ENGEO INCORPORATED.



ACTUAL SIZE AND DEPTH OF KEYWAY TO BE DETERMINED IN THE FIELD BY THE GEOTECHNICAL ENGINEER

NO SCALE

ENGEO Expect Excellence

DEBRIS BENCH DETAIL

GARAVENTA HILLS ESTATES

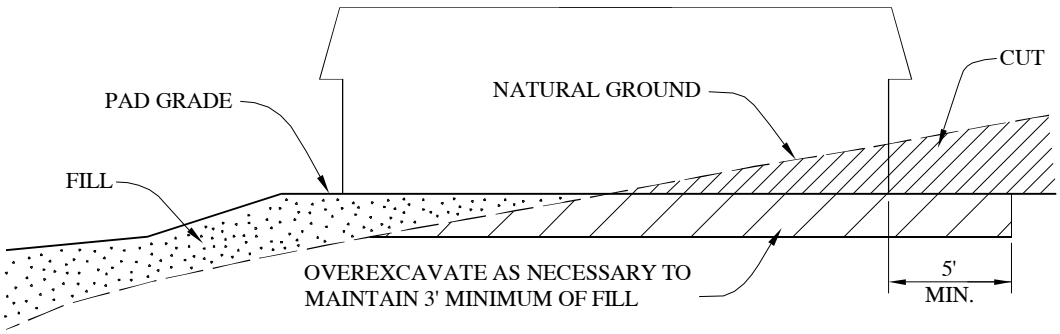
LIVERMORE, CALIFORNIA

PROJECT NO.: 9126.000.000		FIGURE NO. 8
DATE: DECEMBER 2010		
DRAWN BY: SRP	CHECKED BY: DSH	

G:\Drafting\DRAFTING2_Dwg\9126\000\GEX\9126000000-8-DebrisBenchDetail-1210.dwg 12-01-10 02:07:04 PM spatters

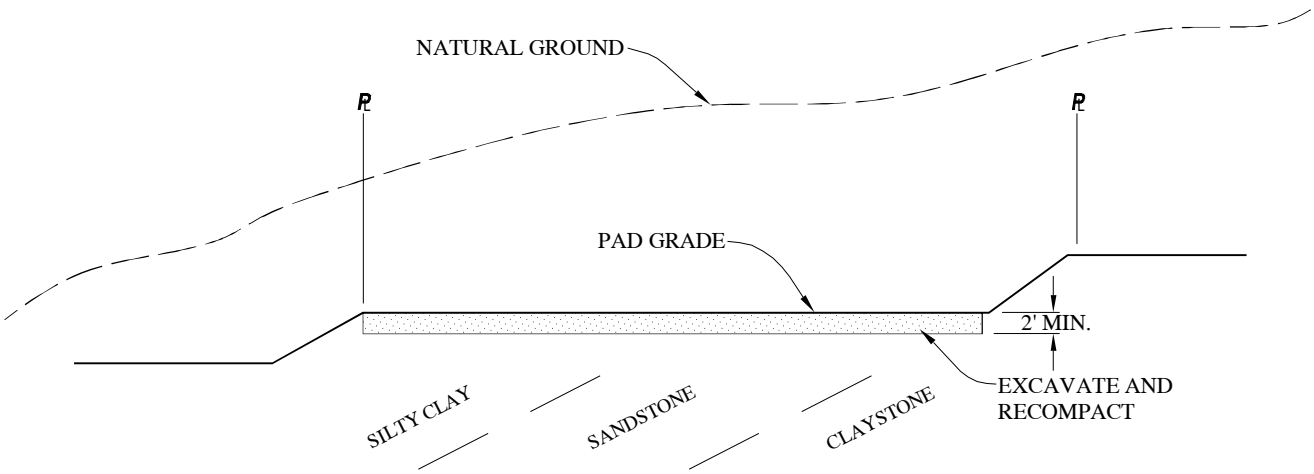
ORIGINAL FIGURE PRINTED IN COLOR

COPYRIGHT © 2010 BY ENGEO INCORPORATED. THIS DOCUMENT MAY NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER, NOR MAY IT BE QUOTED OR EXCERPTED WITHOUT THE EXPRESS WRITTEN CONSENT OF ENGEO INCORPORATED.



WHERE LOTS ARE PARTIALLY IN FILL, AND PARTIALLY IN CUT, THE CUT PORTION MUST BE OVEREXCAVATED AS SHOWN

CUT/FILL LOT



WHERE LOTS ARE COMPLETELY IN CUT, THE UPPER 2' SHOULD BE EXCAVATED AND RECOMPACTED AS SHOWN

CUT LOT

NO SCALE

ENGEO Expect Excellence

CUT/FILL LOT DETAIL
GARAVENTA HILLS ESTATES
LIVERMORE, CALIFORNIA

PROJECT NO.: 9126.000.000	FIGURE NO. 9
DATE: DECEMBER 2010	
DRAWN BY: SRP	CHECKED BY: DSH

G:\Drafting\DRAFTING2_Dwg\9126\000\GEX\9126000000-9-CutFillDetail-1210.dwg 12-01-10 02:07:58 PM spatters

ORIGINAL FIGURE PRINTED IN COLOR

APPENDIX A

Key to Test Boring Logs
Logs of Test Borings

APPENDIX A

KEY TO BORING LOGS

MAJOR TYPES			DESCRIPTION
COARSE-GRAINED SOILS MORE THAN HALF OF MAT'L LARGER THAN #200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LESS THAN 5% FINES	GW - Well graded gravels or gravel-sand mixtures GP - Poorly graded gravels or gravel-sand mixtures
		GRAVELS WITH OVER 12 % FINES	GM - Silty gravels, gravel-sand and silt mixtures GC - Clayey gravels, gravel-sand and clay mixtures
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LESS THAN 5% FINES	SW - Well graded sands, or gravelly sand mixtures SP - Poorly graded sands or gravelly sand mixtures
		SANDS WITH OVER 12 % FINES	SM - Silty sand, sand-silt mixtures SC - Clayey sand, sand-clay mixtures
FINE-GRAINED SOILS MORE THAN HALF OF MAT'L SMALLER THAN #200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50 % OR LESS		ML - Inorganic silt with low to medium plasticity CL - Inorganic clay with low to medium plasticity OL - Low plasticity organic silts and clays
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50 %		MH - Elastic silt with high plasticity CH - Fat clay with high plasticity OH - Highly plastic organic silts and clays
	HIGHLY ORGANIC SOILS		PT - Peat and other highly organic soils

For fine-grained soils with 15 to 29% retained on the #200 sieve, the words "with sand" or "with gravel" (whichever is predominant) are added to the group name.

For fine-grained soil with >30% retained on the #200 sieve, the words "sandy" or "gravelly" (whichever is predominant) are added to the group name.

GRAIN SIZES

U.S. STANDARD SERIES SIEVE SIZE					CLEAR SQUARE SIEVE OPENINGS			
200	40	10	4	3/4 "	3"	12"		
SILTS AND CLAYS	SAND			GRAVEL			COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE			

RELATIVE DENSITY

SANDS AND GRAVELS	BLOWS/FOOT (S.P.T.)
VERY LOOSE	0-4
LOOSE	4-10
MEDIUM DENSE	10-30
DENSE	30-50
VERY DENSE	OVER 50

CONSISTENCY

SILTS AND CLAYS	STRENGTH*
VERY SOFT	0-1/4
SOFT	1/4-1/2
MEDIUM STIFF	1/2-1
STIFF	1-2
VERY STIFF	2-4
HARD	OVER 4

SAMPLER SYMBOLS

- Modified California (3" O.D.) sampler
- California (2.5" O.D.) sampler
- S.P.T. - Split spoon sampler
- Shelby Tube
- Continuous Core
- Bag Samples
- Grab Samples
- NR No Recovery

MOISTURE CONDITION

DRY	Dusty, dry to touch
MOIST	Damp but no visible water
WET	Visible freewater

LINE TYPES

- ———— Solid - Layer Break
- – – – – – Dashed - Gradational or approximate layer break

GROUND-WATER SYMBOLS

- Groundwater level during drilling
- Stabilized groundwater level

(S.P.T.) Number of blows of 140 lb. hammer falling 30" to drive a 2-inch O.D. (1-3/8 inch I.D.) sampler

* Unconfined compressive strength in tons/sq. ft., asterisk on log means determined by pocket penetrometer

ENGEO INCORPORATED

LOG OF BORING 1-B1

ENGEO INCORPORATED

Geotechnical Exploration
Garaventa Hills Estates
Livermore, CA
9126.000.000

DATE DRILLED: 11/9/2010
HOLE DEPTH: Approx. 26½ ft.
HOLE DIAMETER: 5.0 in.
SURF ELEV (): Approx. 550 ft.

LOGGED / REVIEWED BY: R. Gerbrandt / DSH
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			CLAYEY SAND (SC), reddish brown to grayish brown, medium dense, moist			13					13.9	112.4	
	1		SILTY SAND (SM), yellowish brown, medium dense, moist			18							
5			SANDY CLAY (CL), yellowish brown, very stiff, moist			29							
	2												
10	3		SILTY SAND (SM), olive brown, loose, wet		▽	25				14	18.7	102.3	
						6							
	4		SANDY SILT (ML), yellowish brown with black, medium stiff, moist										
15						13				57	17.2	113	
	5												
20	6					18							
	7												
25													

LOG OF BORING 1-B1

Geotechnical Exploration
Garaventa Hills Estates
Livermore, CA
9126.000.000

DATE DRILLED: 11/9/2010
HOLE DEPTH: Approx. 26½ ft.
HOLE DIAMETER: 5.0 in.
SURF ELEV (): Approx. 550 ft.

LOGGED / REVIEWED BY: R. Gerbrandt / DSH
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
	8		SANDY SILT (ML), yellowish brown with black, medium stiff, moist			33							
			Bottom of boring at approximately 26 ½ feet. Groundwater encountered at10 ½ feet.										

LOG OF BORING 1-B2

Geotechnical Exploration
Garaventa Hills Estates
Livermore, CA
9126.000.000

DATE DRILLED: 11/9/2010
HOLE DEPTH: Approx. 6¼ ft.
HOLE DIAMETER: 5.0 in.
SURF ELEV (): Approx. 560 ft.

LOGGED / REVIEWED BY: R. Gerbrandt / DSH
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
	1		SILT (ML), brown, medium dense to hard, moist, with sub-rounded gravels			22 18							
5			SILTY SAND (SM), yellowish brown to pale brown, hard, with fine sub-rounded gravels			25/4							
			Bottom of boring at approximately 6 ¼ feet. No groundwater encountered.										

LOG OF BORING 1-B3

Geotechnical Exploration
Garaventa Hills Estates
Livermore, CA
9126.000.000

DATE DRILLED: 11/9/2010
HOLE DEPTH: Approx. 2½ ft.
HOLE DIAMETER: 5.0 in.
SURF ELEV (): Approx. 590 ft.

LOGGED / REVIEWED BY: R. Gerbrandt / DSH
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			CLAYEY SAND (SC), brown, dense, moist, medium fine sand. Rock at bottom of sample			39					9.3	111.1	
			Bottom of boring at approximately 2 ½ feet. No groundwater encountered.										

LOG OF BORING 1-B4

Geotechnical Exploration
Garaventa Hills Estates
Livermore, CA
9126.000.000

DATE DRILLED: 11/9/2010
HOLE DEPTH: Approx. 2¼ ft.
HOLE DIAMETER: 5.0 in.
SURF ELEV (): Approx. 565 ft.

LOGGED / REVIEWED BY: R. Gerbrandt / DSH
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			topsoil										
			SANDSTONE, pale yellowish brown			50/3							
			Bottom of boring at approximately 2 ¼ feet. No groundwater encountered.										

LOG OF BORING 1-B5

ENGEO INCORPORATED

Geotechnical Exploration
Garaventa Hills Estates
Livermore, CA
9126.000.000

DATE DRILLED: 11/9/2010
HOLE DEPTH: Approx. 5½ ft.
HOLE DIAMETER: 5.0 in.
SURF ELEV (): Approx. 550 ft.

LOGGED / REVIEWED BY: R. Gerbrandt / DSH
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			SANDY SILT (ML), pale brown, medium dense, moist, trace roots, with fine sub-rounded gravels			30							
	1					37							
5			SANDSTONE, pale yellowish brown			55/6							
			Bottom of boring at approximately 5 ½ feet. No groundwater encountered.										

LOG - GEOTECHNICAL GINT BORELOGS.GPJ ENGEO INC.GDT 12/1/10

LOG OF BORING 1-B6

ENGEO INCORPORATED

Geotechnical Exploration
Garaventa Hills Estates
Livermore, CA
9126.000.000

DATE DRILLED: 11/9/2010
HOLE DEPTH: Approx. 11 ft.
HOLE DIAMETER: 5.0 in.
SURF ELEV (): Approx. 540 ft.

LOGGED / REVIEWED BY: R. Gerbrandt / DSH
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			SANDY SILT (ML), brown, hard, moist				20	17	3	65			
			SILTY SAND (SM), pale brown, very dense, moist			50							
	1					59							
5			SANDY CLAY (CL), reddish brown, hard, moist, with fine sub-rounded gravel			58/6							
	2												
10	3		SANDSTONE, pale yellow			70/6							
			Bottom of boring at approximately 11 feet. No groundwater encountered.										

LOG OF BORING 1-B7

ENGEO INCORPORATED

Geotechnical Exploration
Garaventa Hills Estates
Livermore, CA
9126.000.000

DATE DRILLED: 11/9/2010
HOLE DEPTH: Approx. 16½ ft.
HOLE DIAMETER: 5.0 in.
SURF ELEV (): Approx. 545 ft.

LOGGED / REVIEWED BY: R. Gerbrandt / DSH
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			SANDY SILT (ML), dark brown, hard, dry, trace fine gravel			27							
			SANDY CLAY (CL), brown to reddish brown, hard, dry, trace fine sub-rounded gravel			50/1							
5	1					75/4							
	2												
10	3		SILTY SAND TO CLAYEY SAND (SC-SM), pale brown mottled with reddish brown, medium dense, moist, very weathered, becomes very dense and less weathered			20							
	4												
15	5		Bottom of boring at approximately 16 ½ feet. No groundwater encountered.			70							

LOG OF BORING 1-B8

ENGEO INCORPORATED

Geotechnical Exploration
Garaventa Hills Estates
Livermore, CA
9126.000.000

DATE DRILLED: 11/9/2010
HOLE DEPTH: Approx. 8¾ ft.
HOLE DIAMETER: 5.0 in.
SURF ELEV (): Approx. 560 ft.

LOGGED / REVIEWED BY: R. Gerbrandt / DSH
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			SANDY SILT (ML), dark brown, hard, dry, trace fine gravel			18							
	1		SANDY CLAY (CL), brown, hard, moist, trace fine gravel			27							
5						54/6	23	14	9		11.1	118.9	
	2		SILTY SAND (SM), pale yellowish brown, trace fine gravel			50/3							
			SILTY SANDSTONE, pale brown mottled with dark reddish brown										
			Bottom of boring at approximately 8 ¾ feet. No groundwater encountered.										

LOG - GEOTECHNICAL GINT BORELOGS.GPJ ENGEO INC.GDT 12/1/10

LOG OF BORING 1-B9

ENGEO INCORPORATED

Geotechnical Exploration
Garaventa Hills Estates
Livermore, CA
9126.000.000

DATE DRILLED: 11/9/2010
HOLE DEPTH: Approx. 1¾ ft.
HOLE DIAMETER: 5.0 in.
SURF ELEV (): Approx. 560 ft.

LOGGED / REVIEWED BY: R. Gerbrandt / DSH
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			SANDY SILT (ML), dark brown, hard, dry, trace fine sub-rounded gravel										
			SILTY SAND (SM), reddish brown, very dense			50/2							
			Bottom of boring at approximately 1 ¾ feet. No groundwater encountered.										

LOG OF BORING 1-B10

Geotechnical Exploration
Garaventa Hills Estates
Livermore, CA
9126.000.000

DATE DRILLED: 11/9/2010
HOLE DEPTH: Approx. 2¼ ft.
HOLE DIAMETER: 5.0 in.
SURF ELEV (): Approx. 580 ft.

LOGGED / REVIEWED BY: R. Gerbrandt / DSH
DRILLING CONTRACTOR: West Coast Exploration
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

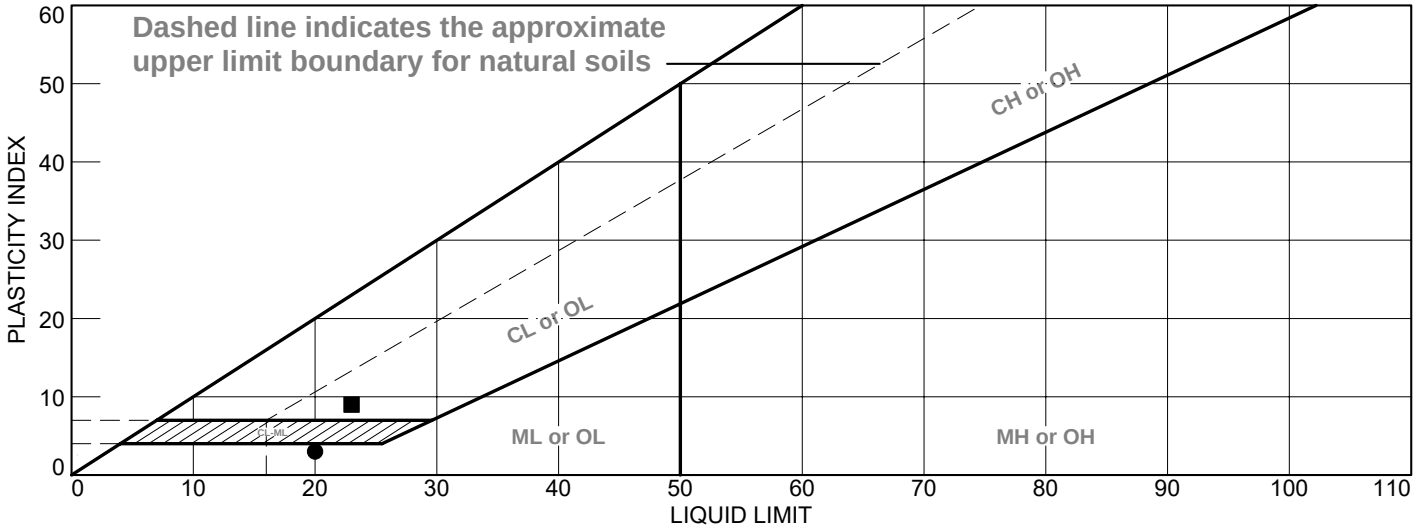
Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			SANDY SILT (ML), dark brown, hard, dry, trace fine grained sub-rounded gravel			50/4							
			SILTY SANDSTONE, pale brown										
			Bottom of boring at approximately 2 ½ feet. No groundwater encountered.										

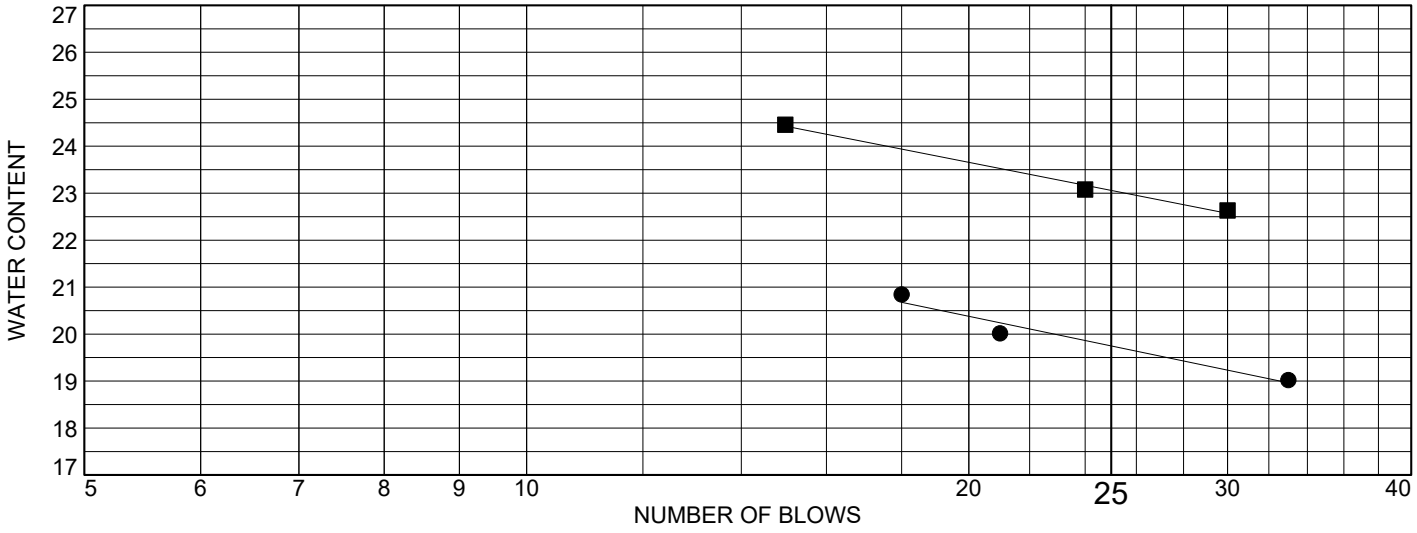
APPENDIX B

Laboratory Test Data

APPENDIX B

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	See Boring Logs	20	17	3	83.7	65.4	ML
■	See Boring Logs	23	14	9			

Project No. 9126.000.000 **Client:**

Project: Garaventa Hills Estates - Livermore, CA

● **Sample Number:** 1-B6 @ 0.5'

■ **Sample Number:** 1-B8 @ 5.5'

Remarks:

ENGEO INCORPORATED

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Plate

ENGEO INCORPORATED

MOISTURE-DENSITY TESTS

PROJECT NAME: **Garaventa Hills Estates** REPORT DATE: **11/19/10**

PROJECT NO: **9126.000.000** TESTED BY: **JRB**

SAMPLE NO.	1-B1	1-B1	1-B1	1-B3	1-B8			
DEPTH (FT.)	2	11	16	2	5.5			
DENSITY FACTOR (F)	0.8282	0.8282	0.8282	0.8282	0.8282			
SAMPLE HEIGHT (IN.)	5.40	5.82	4.70	5.78	4.65			
TARE NO.	f	SF	Y	C	II			
WET WT. + TARE (GM.)	922.7	938.6	837.5	941.7	823.7			
DRY WT. + TARE (GM.)	820.9	804.3	727.4	869.8	749.6			
TARE WT. (GM)	88.1	85.2	86.0	94.6	81.8			
WT. OF WATER (GM.)	101.8	134.3	110.1	71.9	74.1	0.0	0.0	0.0
WT. OF DRY SOIL, (GM.)	732.8	719.1	641.4	775.2	667.8	0.0	0.0	0.0
WATER CONTENT (%)	**13.9**	**18.7**	**17.2**	**9.3**	**11.1**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**
DRY DENSITY (PCF)	**112.4**	**102.3**	**113.0**	**111.1**	**118.9**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**

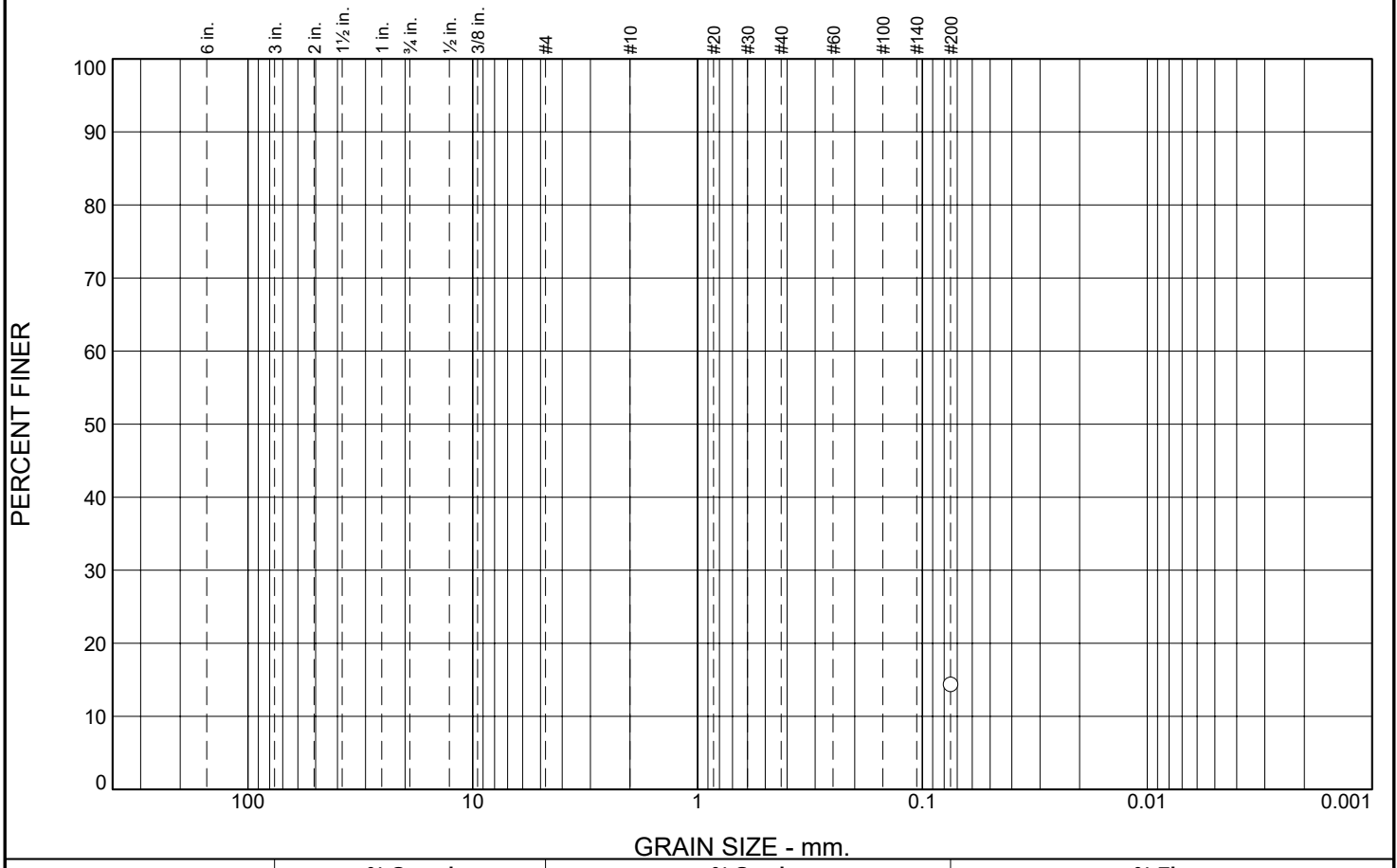
Density Factors (F)

Diameter(in)	If H = in.	If H = cm.
1.875	1.380	3.505
1.940	1.289	3.273
2.375	0.860	2.185
2.420	0.828	2.104
2.850	0.597	1.517
2.875	0.587	1.491

Density = WDS X F\ H

DESCRIPTION/VISUAL CLASSIFICATION

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						14.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	14.4		

* (no specification provided)

Soil Description

See Boring Logs

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

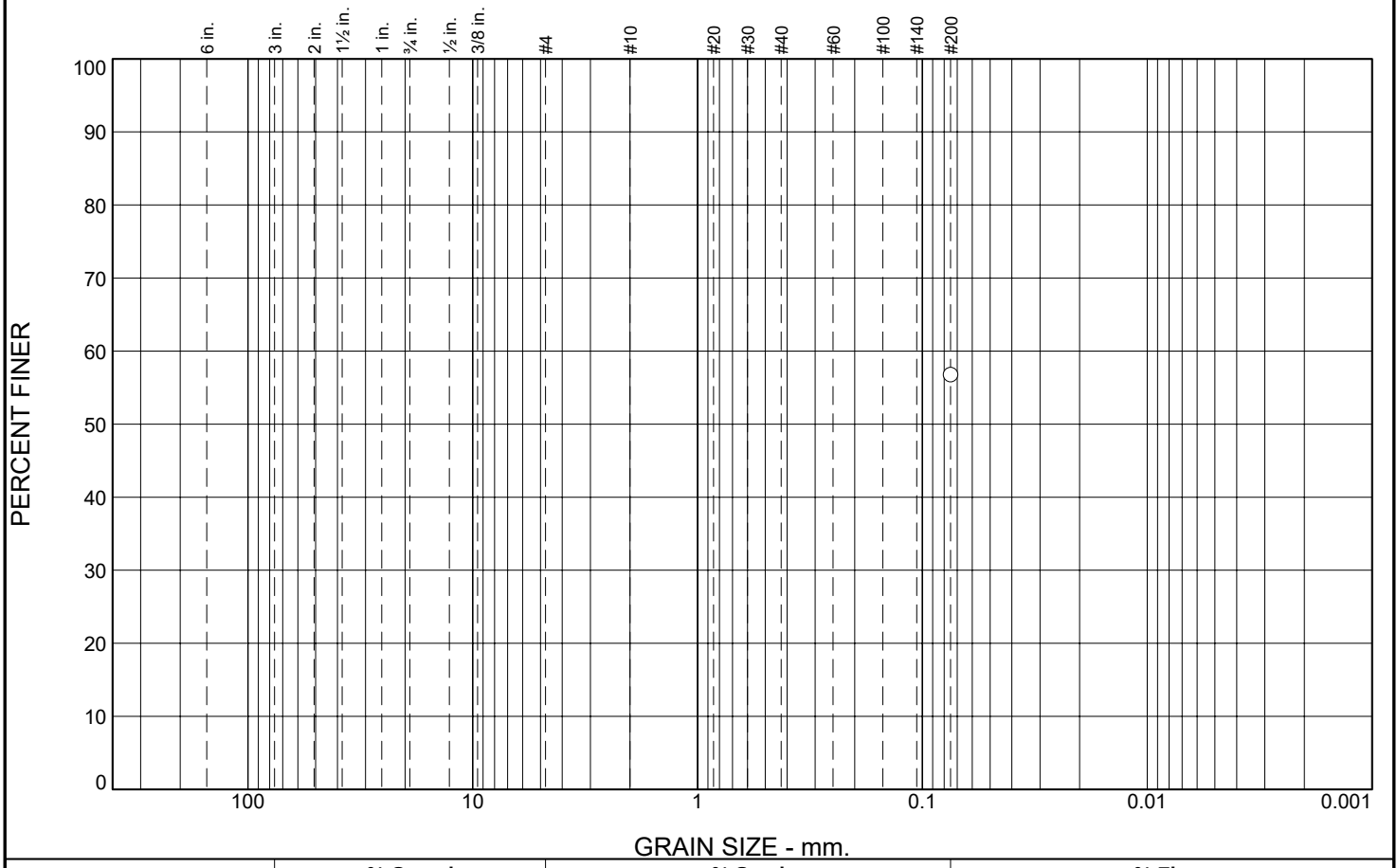
Remarks

Sample No.: 1-B1 @ 11' **Source of Sample:** **Date:** 11-19-10
Location: **Elev./Depth:**

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Garaventa Hills Estates - Livermore, CA
Project No: 9126.000.000 **Plate**

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						56.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	56.8		

* (no specification provided)

Soil Description

See Boring Logs

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

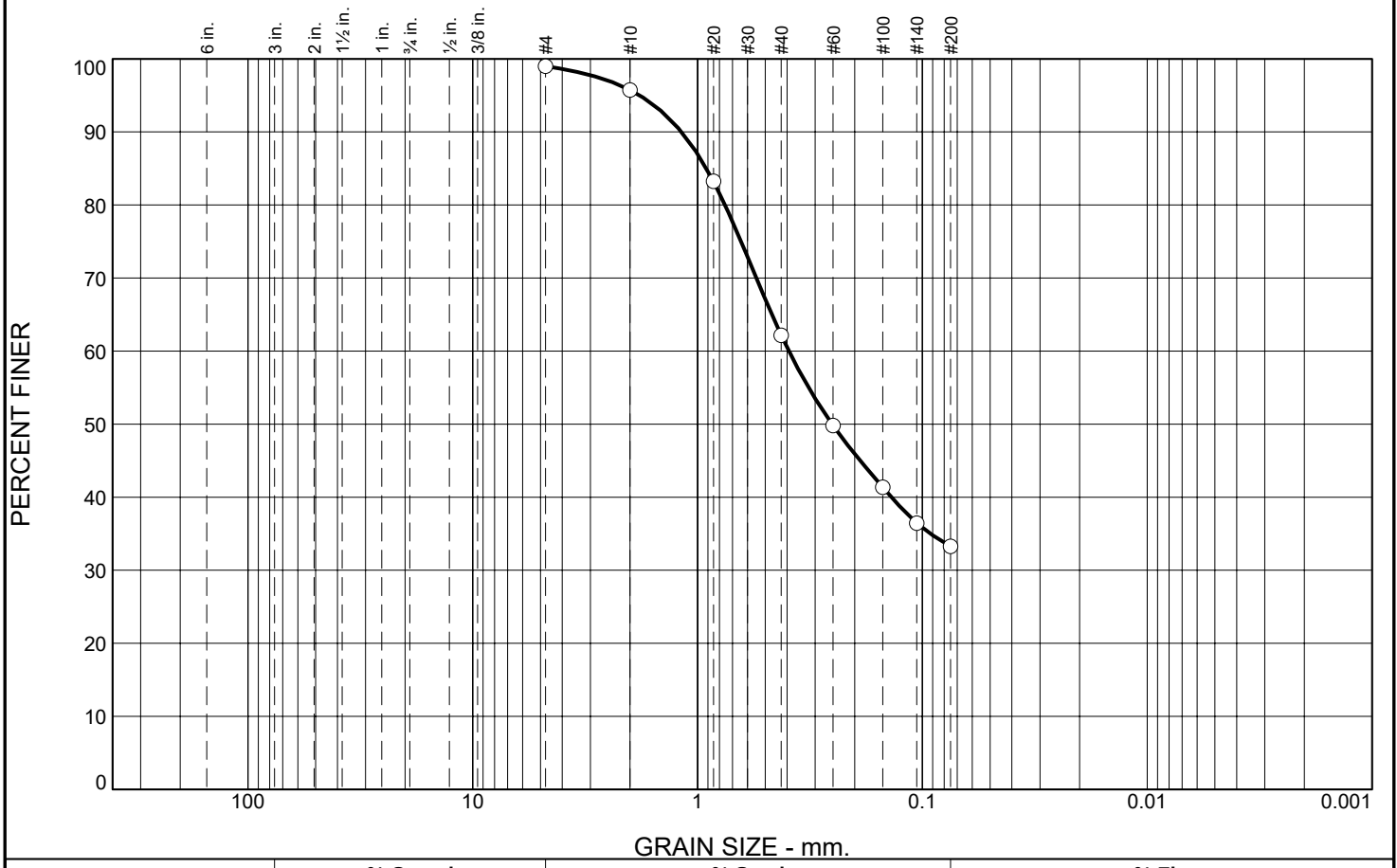
Remarks

Sample No.: 1-B1 @ 16' **Source of Sample:** **Date:** 11-19-10
Location: **Elev./Depth:**

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Garaventa Hills Estates - Livermore, CA
Project No: 9126.000.000 **Plate**

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			3.3	33.5	28.9	33.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	99.0		
#10	95.7		
#20	83.2		
#40	62.2		
#60	49.8		
#100	41.4		
#140	36.4		
#200	33.3		

* (no specification provided)

Soil Description

See Boring Logs

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.9137 D_{60}= 0.3931 D_{50}= 0.2524
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

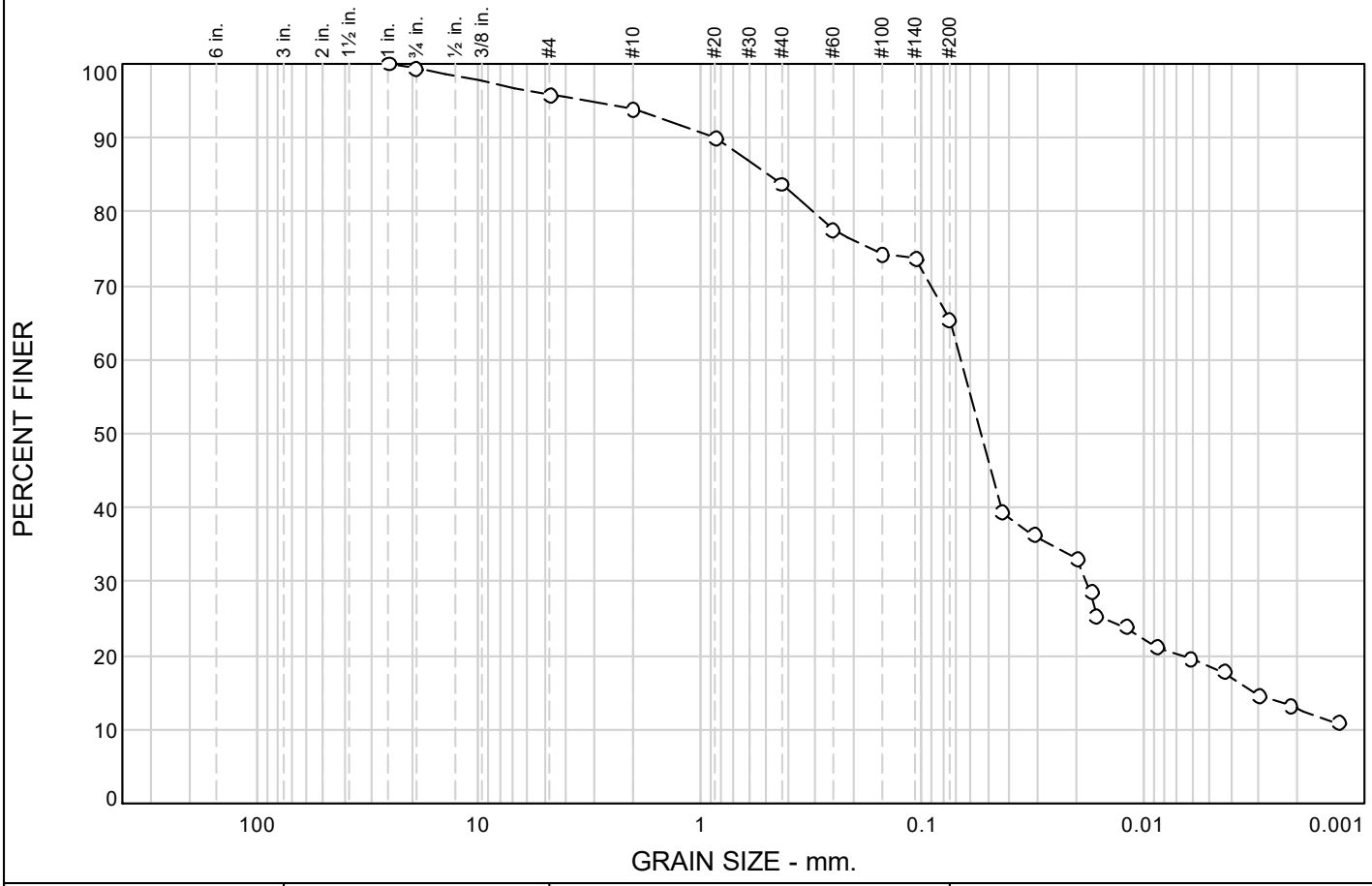
Remarks

Sample No.: 1-B3 @ 2' **Source of Sample:** **Date:** 11-19-10
Location: **Elev./Depth:**

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Garaventa Hills Estates - Livermore, CA
Project No: 9126.000.000 **Plate**

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.6	3.6	1.9	10.2	18.3	52.6	12.8

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
3/4	99.4		
#4	95.8		
#10	93.9		
#20	90.0		
#40	83.7		
#60	77.5		
#100	74.2		
#140	73.7		
#200	65.4		

* (no specification provided)

Material Description

See Boring Logs

Atterberg Limits

PL= 17 LL= 20 PI= 3

Coefficients

D_{85}= 0.4906 D_{60}= 0.0669 D_{50}= 0.0541
D_{30}= 0.0180 D_{15}= 0.0032 D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

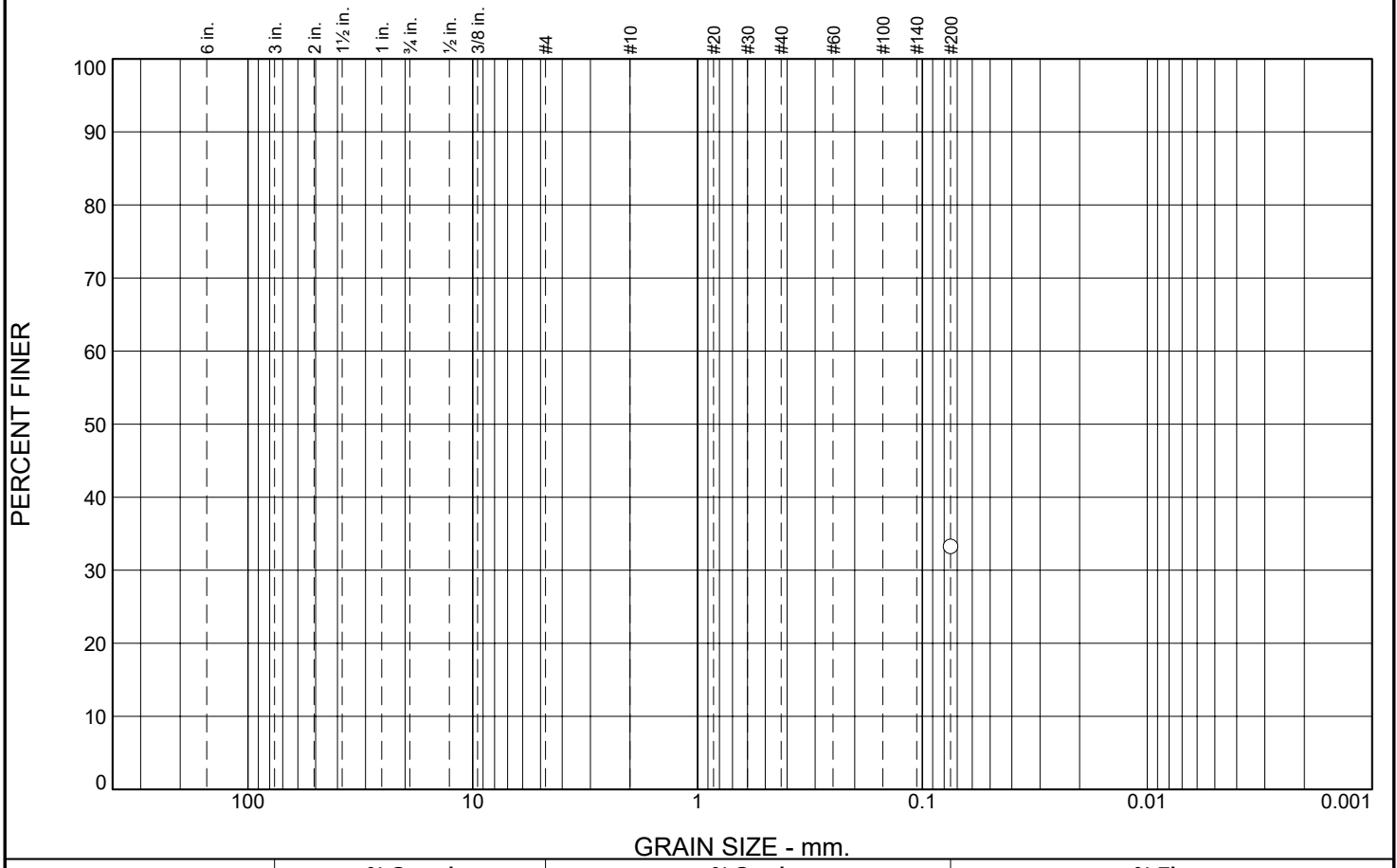
Sample Number: 1-B6 @ 0.5' **Date:** 11/19/10

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client:
Project: Garaventa Hills Estates - Livermore, CA

Project No: 9126.000.000 **Plate**

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						33.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	33.3		

* (no specification provided)

Soil Description

See Boring Logs

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample No.: 1-B7 @ 10.5' **Source of Sample:** **Date:** 11-19-10
Location: **Elev./Depth:**

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Garaventa Hills Estates - Livermore, CA
Project No: 9126.000.000 **Plate**

ENGEO Incorporated

Unconfined Compression Test Report (ASTM D2166)

Date #####

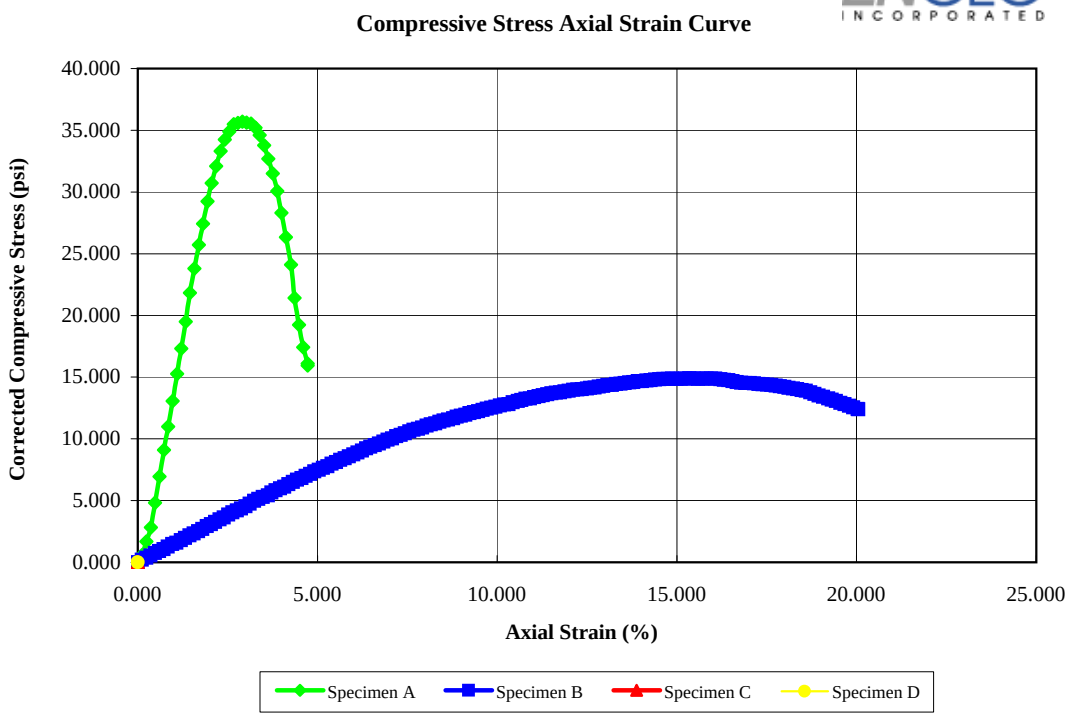
Checked By JRB

Date

Computed By DS

Date ########

Tested By DS



Before Test	Specimen A	Specimen B	Specimen C	Specimen D
Water Content (%)	11.09	17.17		
Dry Density (pcf)	119.600	113.400		
Saturation (%)	76.64	99.23		
Void Ratio	0.38	0.46		
Diameter (in)	2.420	2.420		
Height (in)	4.650	4.700		
Test Data	1-B8@5.5	1-B1@16	C	D
Unconfined Strength (psi)	35.690	14.908		
Undrained Shear Strength (tsf)	1.285	0.537		
Undrained Shear Strength (psi)	17.845	7.454		
Rate of Strain (in/min)	0.050000	0.050000		
Strain at Failure (%)	2.91	15.35		
Description				

Project Information		Specimen Description	
Project Num	9126.000.000	Specimen A	See Boring Logs
Project	Garaventa Hills Estates	Specimen B	See Boring Logs
Sampling Date		Specimen C	
Sample #	1-B8@5.5, 1-B1@16	Specimen D	
Client		**Test Variables**	
		Specific Gravity	2.65
		Liquid Limit:	
		Plastic Limit:	

Remarks

*EN*GEO Incorporated

SULFATE TEST RESULTS

CALTRANS Test Method 417

Project Name: Garaventa Hills Estates Project Number: 9126.000.000

Tested By: GC Date: 11/19/10

Sample Number	Sample Location	Matrix	Water Soluble Sulfate (SO_4) in Soil	
			mg/kg	% by Weight
1	1-B3@2'	soil	14	0.0014
2	1-B6@0.5'	soil	0	0.000

APPENDIX C

Guide Contract Specifications

APPENDIX C

GUIDE CONTRACT SPECIFICATIONS

PART I - EARTHWORK

PREFACE

These specifications are intended as a guide for the earthwork performed at the subject development project. If there is a conflict between these specifications (including the recommendations of the geotechnical report) and agency or code requirements, it should be brought to the attention of ENGEO and Owner prior to contract bidding.

PART 1 - GENERAL

1.01 WORK COVERED

A. Grading, excavating, filling and backfilling, including trenching and backfilling for utilities as necessary to complete the Project as indicated on the Drawings.

B. Subsurface drainage as indicated on the Drawings.

1.02 CODES AND STANDARDS

A. Excavating, trenching, filling, backfilling, and grading work shall meet the applicable requirements of the Uniform Building Code and the standards and ordinances of state and local governing authorities.

1.03 SUBSURFACE SOIL CONDITIONS

A. The Owners' Geotechnical Exploration report is available for inspection by bidder or Contractor. The Contractor shall refer to the findings and recommendations of the Geotechnical Exploration report in planning and executing his work.

1.04 DEFINITIONS

A. Fill: All soil, rock, or soil-rock materials placed to raise the grades of the site or to backfill excavations.

B. Backfill: All soil, rock or soil-rock material used to fill excavations and trenches.

C. On-Site Material: Soil and/or rock material which is obtained from the site.

D. Imported Material: Soil and/or rock material which is brought to the site from off-site areas.

E. Select Material: On-site and/or imported material which is approved by ENGEO as a specific-purpose fill.

F. Engineered Fill: Fill upon which ENGEO has made sufficient observations and tests to confirm that the fill has been placed and compacted in accordance with specifications and requirements.

G. Degree of Compaction or Relative Compaction: The ratio, expressed as a percentage, of the in-place dry density of the fill and backfill material as compacted in the field to the maximum dry density of the same material as determined by ASTM D-1557 or California 216 compaction test method.

H. Optimum Moisture: Water content, percentage by dry weight, corresponding to the maximum dry density as determined by ASTM D-1557.

I. ENGEO: The project geotechnical engineering consulting firm, its employees or its designated representatives.

J. Drawings: All documents, approved for construction, which describe the Work.

1.05 OBSERVATION AND TESTING

A. All site preparation, cutting and shaping, excavating, filling, and backfilling shall be carried out under the observation of ENGEO, employed and paid for by the Owners. ENGEO will perform appropriate field and laboratory tests to evaluate the suitability of fill material, the proper moisture content for compaction, and the degree of compaction achieved. Any fill that does not meet the specification requirements shall be removed and/or reworked until the requirements are satisfied.

B. Cutting and shaping, excavating, conditioning, filling, and compacting procedures require approval of ENGEO as they are performed. Any work found unsatisfactory or any work disturbed by subsequent operations before approval is granted shall be corrected in an approved manner as recommended by ENGEO.

C. Tests for compaction will be made in accordance with test procedures outlined in ASTM D-1557, as applicable. Field testing of soils or compacted fill shall conform with the applicable requirements of ASTM D-2922.

D. All authorized observation and testing will be paid for by the Owners.

1.06 SITE CONDITIONS

A. Excavating, filling, backfilling, and grading work shall not be performed during unfavorable weather conditions. When the work is interrupted by rain, excavating,

filling, backfilling, and grading work shall not be resumed until the site and soil conditions are suitable.

B. Contractor shall take the necessary measures to prevent erosion of freshly filled, backfilled, and graded areas until such time as permanent drainage and erosion control measures have been installed.

PART 2 - PRODUCTS

2.01 GENERAL

A. Contractor shall furnish all materials, tools, equipment, facilities, and services as required for performing the required excavating, filling, backfilling, and grading work, and trenching and backfilling for utilities.

2.02 SOIL MATERIALS

A. Fill

1. Material to be used for engineered fill and backfill shall be free from organic matter and other deleterious substances, and of such quality that it will compact thoroughly without excessive voids when watered and rolled. Excavated on-site material will be considered suitable for engineered fill and backfill if it contains no more than 3 percent organic matter, is free of debris and other deleterious substances and conforms to the requirements specified above. Rocks of maximum dimension in excess of two-thirds of the lift thickness shall be removed from any fill material to the satisfaction of ENGEO.

2. Excavated earth material which is suitable for engineered fill or backfill, as determined by ENGEO, shall be conditioned for reuse and properly stockpiled as required for later filling and backfilling operations. Conditioning shall consist of spreading material in layers not to exceed 8 inches and raking free of debris and rubble. Rocks and aggregate exceeding the allowed largest dimension, and deleterious material shall be removed from the site and disposed off site in a legal manner.

3. ENGEO shall be immediately notified if potential hazardous materials or suspect soils exhibiting staining or odor are encountered. Work activities shall be discontinued within the area of potentially hazardous materials. ENGEO environmental personnel will conduct an assessment of the suspect hazardous material to determine the appropriate response and mitigation. Regulatory agencies may also be contacted to request concurrence and oversight. ENGEO will rely on the Owner, or a designated Owner's representative, to make necessary *notices to the appropriate regulatory agencies. The Owner may request ENGEO's*

assistance in notifying regulatory agencies, provided ENGEO receives Owner's written authorization to expand its scope of services.

4. ENGEO shall be notified at least 48 hours prior to the start of filling and backfilling operations so that it may evaluate samples of the material intended for use as fill and backfill. All materials to be used for filling and backfilling require the approval of ENGEO.

B. Import Material: Where conditions require the importation of fill material, the material shall be an inert, nonexpansive soil or soil-rock material free of organic matter and meeting the following requirements unless otherwise approved by ENGEO.

Gradation (ASTM D-421):	Sieve Size	Percent Passing
	2-inch	100
	#200	15 - 70
Plasticity (ASTM D-4318):	Liquid Limit	Plasticity Index
	< 30	< 12
Swell Potential (ASTM D-4546B): (at optimum moisture)	Percent Heave	Swell Pressure
	< 2 percent	< 300 psf
Resistance Value (ASTM D-2844):	Minimum 25	
Organic Content (ASTM D-2974):	Less than 2 percent	

A sample of the proposed import material should be submitted to ENGEO for evaluation prior to delivery at the site.

2.03 SAND

A. Sand for sand cushion under slabs and for bedding of pipe in utility trenches shall be a clean and graded, washed sand, free from clay or organic material, suitable for the intended purpose with 90 to 100 percent passing a No. 4 U.S. Standard Sieve, not more than 5 percent passing a No. 200 U.S. Standard Sieve, and generally conforming to ASTM C33 for fine aggregate.

2.04 AGGREGATE DRAINAGE FILL

A. Aggregate drainage fill under concrete slabs and paving shall consist of broken stone, crushed or uncrushed gravel, clean quarry waste, or a combination thereof. The

aggregate shall be free from fines, vegetable matter, loam, volcanic tuff, and other deleterious substances. It shall be of such quality that the absorption of water in a saturated surface dry condition does not exceed 3 percent of the oven dry weight of the samples.

B. Aggregate drainage fill shall be of such size that the percentage composition by dry weight as determined by laboratory sieves (U. S. Series) will conform to the following grading:

Sieve Size	Percentage Passing Sieve
1½-inches	100
1-inch	90 - 100
#4	0 - 5

2.05 SUBDRAINS

A. Perforated subdrain pipe of the required diameter shall be installed as shown on the drawings. The pipe(s) shall also conform to these specifications unless otherwise specified by ENGEO in the field.

Subdrain pipe shall be manufactured in accordance with one of the following requirements:

Design depths less than 30 feet

- Perforated ABS Solid Wall SDR 35 (ASTM D-2751)
- Perforated PVC Solid Wall SDR 35 (ASTM D-3034)
- Perforated PVC A-2000 (ASTM F949)
- Perforated Corrugated HDPE double-wall (AASHTO M-252 or M-294, Caltrans Type S, 50 psi minimum stiffness)

Design depths less than 50 feet

- Perforated PVC SDR 23.5 Solid Wall (ASTM D-3034)
- Perforated Sch. 40 PVC Solid Wall (ASTM-1785)
- Perforated ABS SDR 23.5 Solid Wall (ASTM D-2751)
- Perforated ABS DWV/Sch. 40 (ASTM D-2661 and D-1527)
- Perforated Corrugated HDPE double-wall (AASHTO M-252 or M-294, Caltrans Type S, 70 psi minimum stiffness)

Design depths less than 70 feet

- Perforated ABS Solid Wall SDR 15.3 (ASTM D-2751)
- Perforated Sch. 80 PVC (ASTM D-1785)
- Perforated Corrugated Aluminum (ASTM B-745)

B. Permeable Material (Class 2): Class 2 permeable material for filling trenches under, around, and over subdrains, behind building and retaining walls, and for pervious blankets shall consist of clean, coarse sand and gravel or crushed stone, conforming to the following grading requirements:

Sieve Size	Percentage Passing Sieve
1-inch	100
¾-inch	90 - 100
⅜-inch	40 - 100
#4	25 - 40
#8	18 - 33
#30	5 - 15
#50	0 - 7
#200	0 - 3

C. Filter Fabric: All filter fabric shall meet the following Minimum Average Roll Values unless otherwise specified by ENGEO.

Grab Strength (ASTM D-4632).....180 lbs
Mass Per Unit Area (ASTM D-4751).....6 oz/yd^2
Apparent Opening Size (ASTM D-4751).....70-100 U.S. Std. Sieve
Flow Rate (ASTM D-4491).....80 gal/min/ft^2
Puncture Strength (ASTM D-4833).....80 lbs

D. Vapor Retarder: Vapor Retarders shall consist of PVC, LDPE or HDPE impermeable sheeting at least 10 mils thick.

2.06 PERMEABLE MATERIAL (Class 1; Type A)

A. Class 1 permeable material to be used in conjunction with filter fabric for backfilling of subdrain excavations shall conform to the following grading requirements:

Sieve Size	Percentage Passing Sieve
¾-inch	100
½-inch	95 - 100
⅜-inch	70 - 100
#4	0 - 55
#8	0 - 10
#200	0 - 3

PART 3 - EXECUTION

3.01 STAKING AND GRADES

A. Contractor shall lay out all his work, establish all necessary markers, bench marks, grading stakes, and other stakes as required to achieve design grades.

3.02 EXISTING UTILITIES

A. Contractor shall verify the location and depth (elevation) of all existing utilities and services before performing any excavation work.

3.03 EXCAVATION

A. Contractor shall perform excavating as indicated and required for concrete footings, drilled piers, foundations, floor slabs, concrete walks, and site leveling and grading, and provide shoring, bracing, underpinning, cribbing, pumping, and planking as required. The bottoms of excavations shall be firm undisturbed earth, clean and free from loose material, debris, and foreign matter.

B. Excavations shall be kept free from water at all times. Adequate dewatering equipment shall be maintained at the site to handle emergency situations until concrete or backfill is placed.

C. Unauthorized excavations for footings shall be filled with concrete to required elevations, unless other methods of filling are authorized by ENGEO.

D. Excavated earth material which is suitable for engineered fill or backfill, as determined by ENGEO, shall be conditioned for reuse and properly stockpiled for later filling and backfilling operations as specified under Section 2.02, "Soil Materials".

E. Abandoned sewers, piping, and other utilities encountered during excavating shall be removed and the resulting excavations shall be backfilled with engineered fill as required by ENGEO.

F. Any active utility lines encountered shall be reported immediately to the Owner's Representative and authorities involved. The Owner and proper authorities shall be permitted free access to take the measures deemed necessary to repair, relocate, or remove the obstruction as determined by the responsible authority or Owner's Representative.

3.04 SUBGRADE PREPARATION

A. All brush and other rubbish, as well as trees and root systems not marked for saving, shall be removed from the site and legally disposed of.

B. Any existing structures, foundations, underground storage tanks, or debris must be removed from the site prior to any building, grading, or fill operations. Septic tanks, including all drain fields and other lines, if encountered, must be totally removed. The resulting depressions shall be properly prepared and filled to the satisfaction of ENGEO.

C. Vegetation and organic topsoil shall be removed from the surface upon which the fill is to be placed and either removed and legally disposed of or stockpiled for later use in approved landscape areas. The surface shall then be scarified to a depth of at least eight inches until the surface is free from ruts, hummocks, or other uneven features which would tend to prevent uniform compaction by the equipment to be used.

D. After the foundation for the fill has been cleared and scarified, it shall be made uniform and free from large clods. The proper moisture content must be obtained by adding water or aerating. The foundation for the fill shall be compacted at the proper moisture content to a relative compaction as specified herein.

3.05 ENGINEERED FILL

A. Select Material: Fill material shall be "Select" or "Imported Material" as previously specified.

B. Placing and Compacting: Engineered fill shall be constructed by approved and accepted methods. Fill material shall be spread in uniform lifts not exceeding 8 inches in uncompacted thickness. Each layer shall be spread evenly, and thoroughly blade-mixed to obtain uniformity of material. Fill material which does not contain sufficient moisture as specified by ENGEO shall be sprinkled with water; if it contains excess moisture it shall be aerated or blended with drier material to achieve the proper water content. Select material and water shall then be thoroughly mixed before being compacted.

C. Unless otherwise specified in the Geotechnical Exploration report, each layer of spread select material shall be compacted to at least 90 percent relative compaction at a moisture content of at least three percentage points above the optimum moisture content. Minimum compaction in all keyways shall be a minimum of 95 percent with a minimum moisture content of at least 1 percentage point above optimum.

D. Unless otherwise specified in the Geotechnical Exploration report or otherwise required by the local authorities, the upper 6 inches of engineered fill in areas to

receive pavement shall be compacted to at least 95 percent relative compaction with a minimum moisture content of at least 3 percentage points above optimum.

E. Testing and Observation of Fill: The work shall consist of field observation and testing to determine that each layer has been compacted to the required density and that the required moisture is being obtained. Any layer or portion of a layer that does not attain the compaction required shall be reworked until the required density is obtained.

F. Compaction: Compaction shall be by sheepsfoot rollers, multiple-wheel steel or pneumatic-tired rollers or other types of acceptable compaction equipment. Rollers shall be of such design that they will be able to compact the fill to the specified compaction. Rolling shall be accomplished while the fill material is within the specified moisture content range. Rolling of each layer must be continuous so that the required compaction may be obtained uniformly throughout each layer.

G. Fill slopes shall be constructed by overfilling the design slopes and later cutting back the slopes to the design grades. No loose soil will be permitted on the faces of the finished slopes.

H. Strippings and topsoil shall be stockpiled as approved by Owner, then placed in accordance with ENGEO's recommendations to a minimum thickness of 6 inches and a maximum thickness of 12 inches over exposed open space cut slopes which are 3:1 or flatter, and track walked to the satisfaction of ENGEO.

I. Final Prepared Subgrade: Finish blading and smoothing shall be performed as necessary to produce the required density, with a uniform surface, smooth and true to grade.

3.06 BACKFILLING

A. Backfill shall not be placed against footings, building walls, or other structures until approved by ENGEO.

B. Backfill material shall be Select Material as specified for engineered fill.

C. Backfill shall be placed in 6-inch layers, leveled, rammed, and tamped in place. Each layer shall be compacted with suitable compaction equipment to 90 percent relative compaction at a moisture content of at least 3 percentage points above optimum.

3.07 TRENCHING AND BACKFILLING FOR UTILITIES

A. Trenching:

1. Trenching shall include the removal of material and obstructions, the installation and removal of sheeting and bracing and the control of water as necessary to provide the required utilities and services.

2. Trenches shall be excavated to the lines, grades, and dimensions indicated on the Drawings. Maximum allowable trench width shall be the outside diameter of the pipe plus 24 inches, inclusive of any trench bracing.

3. When the trench bottom is a soft or unstable material as determined by ENGEO, it shall be made firm and solid by removing said unstable material to a sufficient depth and replacing it with on-site material compacted to 90 percent minimum relative compaction.

4. Where water is encountered in the trench, the contractor must provide materials necessary to drain the water and stabilize the bed.

B. Backfilling:

1. Trenches must be backfilled within 2 days of excavation to minimize desiccation.

2. Bedding material shall be sand and shall not extend more than 6 inches above any utility lines.

3. Backfill material shall be select material.

4. Trenches shall be backfilled as indicated or required and compacted with suitable equipment to 90 percent minimum relative compaction at the required moisture content.

3.08 SUBDRAINS

A. Trenches for subdrain pipe shall be excavated to a minimum width equal to the outside diameter of the pipe plus at least 12 inches and to a depth of approximately 2 inches below the grade established for the invert of the pipe, or as indicated on the Drawings.

B. The space below the pipe invert shall be filled with a layer of Class 2 permeable material, upon which the pipe shall be laid with perforations down. Sections shall be joined as recommended by the pipe manufacturer.

C. Rocks, bricks, broken concrete, or other hard material shall not be used to give intermediate support to pipes. Large stones or other hard objects shall not be left in contact with the pipes.

D. Excavations for subdrains shall be filled as required to fill voids and prevent settlement without damaging the subdrain pipe. Alternatively, excavations for subdrains may be filled with Class 1 permeable material (as defined in Section 2.06) wrapped in Filter Fabric (as defined in Section 2.05).

3.09 AGGREGATE DRAINAGE FILL

A. ENGEO shall approve finished subgrades before aggregate drainage fill is installed.

B. Pipes, drains, conduits, and any other mechanical or electrical installations shall be in place before any aggregate drainage fill is placed. Backfill at walls to elevation of drainage fill shall be in place and compacted.

C. Aggregate drainage fill under slabs and concrete paving shall be the minimum uniform thickness after compaction of dimensions indicated on Drawings. Where not indicated, minimum thickness after compaction shall be 4 inches.

D. Aggregate drainage fill shall be rolled to form a well-compacted bed.

E. The finished aggregate drainage fill must be observed and approved by ENGEO before proceeding with any subsequent construction over the compacted base or fill.

3.10 SAND CUSHION

A. A sand cushion shall be placed over the vapor retarder membrane under concrete slabs on grade. Sand cushion shall be placed in uniform thickness as indicated on the Drawings. Where not indicated, the thickness shall be 2 inches.

3.11 FINISH GRADING

A. All areas must be finish graded to elevations and grades indicated on the Drawings. In areas to receive topsoil and landscape planting, finish grading shall be performed to a uniform 6 inches below the grades and elevations indicated on the Drawings, and brought to final grade with topsoil.

3.12 DISPOSAL OF WASTE MATERIALS

A. Excess earth materials and debris shall be removed from the site and disposed of in a legal manner. Location of dump site and length of haul are the Contractor's responsibility.

PART II - GEOGRID SOIL REINFORCEMENT

1. DESCRIPTION:

Work shall consist of furnishing geogrid soil reinforcement for use in construction of reinforced soil slopes and retention systems.

2. GEOGRID MATERIAL:

2.1 The specific geogrid material shall be preapproved by ENGEO.

2.2 The geogrid shall be a regular network of integrally connected polymer tensile elements with aperture geometry sufficient to permit significant mechanical interlock with the surrounding soil or rock. The geogrid structure shall be dimensionally stable and able to retain its geometry under construction stresses and shall have high resistance to damage during construction, to ultraviolet degradation, and to all forms of chemical and biological degradation encountered in the soil being reinforced.

2.3 The geogrids shall have an Allowable Strength (T_a) and Pullout Resistance, for the soil type(s) indicated, as listed in Table I.

2.4 Certifications: The Contractor shall submit a manufacturer's certification that the geogrids supplied meet the respective index criteria set when geogrid was approved by ENGEO, measured in full accordance with all test methods and standards specified. In case of dispute over validity of values, the Contractor will supply test data from an ENGEO-approved laboratory to support the certified values submitted.

3. CONSTRUCTION:

3.1 Delivery, Storage, and Handling: Contractor shall check the geogrid upon delivery to ensure that the proper material has been received. During all periods of shipment and storage, the geogrid shall be protected from temperatures greater than 140 °F, mud, dirt, dust, and debris. Manufacturer's recommendations in regard to protection from direct sunlight must also be followed. At the time of installation, the geogrid will be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacture, transportation, or storage. If approved by ENGEO, torn or punctured sections may be repaired by placing a patch over the damaged area. Any geogrid damaged during storage or installation shall be replaced by the Contractor at no additional cost to the owner.

3.2 On-Site Representative: Geogrid material suppliers shall provide a qualified and experienced representative on site at the initiation of the project, for a minimum of three days, to assist the Contractor and ENGEO personnel at the start of construction. If there is more than one slope on a project, this criterion will apply to construction of the initial slope only. The representative shall also be available on an as-needed basis, as requested by ENGEO, during construction of the remaining slope(s).

3.3 Geogrid reinforcement may be joined with mechanical connections or overlaps as recommended and approved by the Manufacturer. Joints shall not be placed within 6 feet of the slope face, within 4 feet below top of slope, nor horizontally or vertically adjacent to another joint.

3.4 Geogrid Placement: The geogrid reinforcement shall be installed in accordance with the manufacturer's recommendations. The geogrid reinforcement shall be placed within the layers of the compacted soil as shown on the plans or as directed.

The geogrid reinforcement shall be placed in continuous longitudinal strips in the direction of main reinforcement. However, if the Contractor is unable to complete a required length with a single continuous length of geogrid, a joint may be made with the Manufacturer's approval. Only one joint per length of geogrid shall be allowed. This joint shall be made for the full width of the strip by using a similar material with similar strength. Joints in geogrid reinforcement shall be pulled and held taut during fill placement.

Adjacent strips, in the case of 100 percent coverage in plan view, need not be overlapped. The minimum horizontal coverage is 50 percent, with horizontal spacings between reinforcement no greater than 40 inches. Horizontal coverage of less than 100 percent shall not be allowed unless specifically detailed in the construction drawings.

Adjacent rolls of geogrid reinforcement shall be overlapped or mechanically connected where exposed in a wrap around face system, as applicable.

The Contractor may place only that amount of geogrid reinforcement required for immediately pending work to prevent undue damage. After a layer of geogrid reinforcement has been placed, the next succeeding layer of soil shall be placed and compacted as appropriate. After the specified soil layer has been placed, the next geogrid reinforcement layer shall be installed. The process shall be repeated for each subsequent layer of geogrid reinforcement and soil.

Geogrid reinforcement shall be placed to lay flat and pulled tight prior to backfilling. After a layer of geogrid reinforcement has been placed, suitable means, such as pins or small piles of soil, shall be used to hold the geogrid reinforcement in position until the subsequent soil layer can be placed.

Under no circumstances shall a track-type vehicle be allowed on the geogrid reinforcement before at least six inches of soil have been placed. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and the geogrid reinforcement. If approved by the Manufacturer, rubber-tired equipment may pass over the geosynthetic reinforcement at slow speeds, less than 10 mph. Sudden braking and sharp turning shall be avoided.

During construction, the surface of the fill should be kept approximately horizontal. Geogrid reinforcement shall be placed directly on the compacted horizontal fill surface. Geogrid reinforcements are to be placed within three inches of the design elevations and extend the length as shown on the elevation view unless otherwise directed by ENGEO. Correct orientation of the geogrid reinforcement shall be verified by ENGEO.

Table I
Allowable Geogrid Strength
With Various Soil Types
For Geosynthetic Reinforcement In
Mechanically Stabilized Earth Slopes

(Geogrid Pullout Resistance and Allowable Strengths vary with reinforced backfill used due to soil anchorage and site damage factors. Guidelines are provided below.)

SOIL TYPE	MINIMUM ALLOWABLE STRENGTH, T_a (lb/ft)*		
	GEOGRID Type I	GEOGRID Type II	GEOGRID Type III
A. Gravels, sandy gravels, and gravel-sand-silt mixtures (GW, GP, GC, GM & SP)**	2400	4800	7200
B. Well graded sands, gravelly sands, and sand-silt mixtures (SW & SM)**	2000	4000	6000
C. Silts, very fine sands, clayey sands and clayey silts (SC & ML)**	1000	2000	3000
D. Gravelly clays, sandy clays, silty clays, and lean clays (CL)**	1600	3200	4800

* All partial Factors of Safety for reduction of design strength are included in listed values. Additional factors of safety may be required to further reduce these design strengths based on site conditions.

** Unified Soil Classifications.

PART III - GEOTEXTILE SOIL REINFORCEMENT

1. DESCRIPTION:

Work shall consist of furnishing geotextile soil reinforcement for use in construction of reinforced soil slopes.

2. GEOTEXTILE MATERIAL:

2.1 The specific geotextile material and supplier shall be preapproved by ENGEO.

2.2 The geotextile shall have a high tensile modulus and shall have high resistance to damage during construction, to ultraviolet degradation, and to all forms of chemical and biological degradation encountered in the soil being reinforced.

2.3 The geotextiles shall have an Allowable Strength (Ta) and Pullout Resistance, for the soil type(s) indicated as listed in Table II.

2.4 Certification: The Contractor shall submit a manufacturer's certification that the geotextiles supplied meet the respective index criteria set when geotextile was approved by ENGEO, measured in full accordance with all test methods and standards specified. In case of dispute over validity of values, the Contractor will supply the data from an ENGEO-approved laboratory to support the certified values submitted.

3. CONSTRUCTION:

3.1 Delivery, Storage and Handling: Contractor shall check the geotextile upon delivery to ensure that the proper material has been received. During all periods of shipment and storage, the geotextile shall be protected from temperatures greater than 140 °F, mud, dirt, dust, and debris. Manufacturer's recommendations in regard to protection from direct sunlight must also be followed. At the time of installation, the geotextile will be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacture, transportation, or storage. If approved by ENGEO, torn or punctured sections may be repaired by placing a patch over the damaged area. Any geotextile damaged during storage or installation shall be replaced by the Contractor at no additional cost to the owner.

3.2 On-Site Representative: Geotextile material suppliers shall provide a qualified and experienced representative on site at the initiation of the project, for a minimum of three days, to assist the Contractor and ENGEO personnel at the start of construction. If there is more than one slope on a project, this criterion will apply to construction of the initial slope only. The representative shall also be

available on an as-needed basis, as requested by ENGEO, during construction of the remaining slope(s).

3.3 Geotextile Placement: The geotextile reinforcement shall be installed in accordance with the manufacturer's recommendations. The geotextile reinforcement shall be placed within the layers of the compacted soil as shown on the plans or as directed.

The geotextile reinforcement shall be placed in continuous longitudinal strips in the direction of main reinforcement. Joints shall not be used with geotextiles.

Adjacent strips, in the case of 100 percent coverage in plan view, need not be overlapped. The minimum horizontal coverage is 50 percent, with horizontal spacings between reinforcement no greater than 40 inches. Horizontal coverage of less than 100 percent shall not be allowed unless specifically detailed in the construction drawings.

Adjacent rolls of geotextile reinforcement shall be overlapped or mechanically connected where exposed in a wrap around face system, as applicable.

The Contractor may place only that amount of geotextile reinforcement required for immediately pending work to prevent undue damage. After a layer of geotextile reinforcement has been placed, the succeeding layer of soil shall be placed and compacted as appropriate. After the specified soil layer has been placed, the next geotextile reinforcement layer shall be installed. The process shall be repeated for each subsequent layer of geotextile reinforcement and soil.

Geosynthetic reinforcement shall be placed to lay flat and be pulled tight prior to backfilling. After a layer of geotextile reinforcement has been placed, suitable means, such as pins or small piles of soil, shall be used to hold the geotextile reinforcement in position until the subsequent soil layer can be placed.

Under no circumstances shall a track-type vehicle be allowed on the geotextile reinforcement before at least six inches of soil has been placed. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and the geotextile reinforcement. If approved by the Manufacturer, rubber-tired equipment may pass over the geotextile reinforcement as slow speeds, less than 10 mph. Sudden braking and sharp turning shall be avoided.

During construction, the surface of the fill should be kept approximately horizontal. Geotextile reinforcement shall be placed directly on the compacted horizontal fill surface. Geotextile reinforcements are to be placed within three inches of the design elevations and extend the length as shown on the elevation view unless otherwise directed by ENGEO. Correct orientation of the geotextile reinforcement shall be verified by ENGEO.

Table II
Allowable Geotextile Strength
With Various Soil Types
For Geosynthetic Reinforcement In
Mechanically Stabilized Earth Slopes

(Geotextile Pullout Resistance and Allowable Strengths vary with reinforced backfill used due to soil anchorage and site damage factors. Guidelines are provided below.)

SOIL TYPE	MINIMUM ALLOWABLE STRENGTH, Ta (lb/ft)*		
	GEOTEXTILE Type I	GEOTEXTILE Type II	GEOTEXTILE Type III
A. Gravels, sandy gravels, and gravel-sand-silt mixtures (GW, GP, GC, GM & SP)**	2400	4800	7200
B. Well graded sands, gravelly sands, and sand-silt mixtures (SW & SM)**	2000	4000	6000
C. Silts, very fine sands, clayey sands and clayey silts (SC & ML)**	1000	2000	3000
D. Gravelly clays, sandy clays, silty clays, and lean clays (CL)**	1600	3200	4800

*All partial Factors of Safety for reduction of design strength are included in listed values. Additional factors of safety may be required to further reduce these design strengths based on site conditions.
**Unified Soil Classifications.

PART IV - EROSION CONTROL MAT OR BLANKET

1. DESCRIPTION:

Work shall consist of furnishing and placing a synthetic erosion control mat and/or degradable erosion control blanket for slope face protection and lining of runoff channels.

2. EROSION CONTROL MATERIALS:

2.1 The specific erosion control material and supplier shall be pre-approved by ENGEO.

2.2 Certification: The Contractor shall submit a manufacturer's certification that the erosion mat/blanket supplied meets the criteria specified when the material was approved by ENGEO. The manufacturer's certification shall include a submittal package of documented test results that confirm the property values. In case of a dispute over validity of values, the Contractor will supply property test data from an ENGEO-approved laboratory, to support the certified values submitted. Minimum average roll values, per ASTM D 4759, shall be used for conformance determinations.

3. CONSTRUCTION:

3.1 Delivery, Storage, and Handling: Contractor shall check the erosion control material upon delivery to ensure that the proper material has been received. During all periods of shipment and storage, the erosion mat shall be protected from temperatures greater than 140 °F, mud, dirt, and debris. Manufacturer's recommendations in regard to protection from direct sunlight must also be followed. At the time of installation, the erosion mat/blanket shall be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacture, transportation, or storage. If approved by ENGEO, torn or punctured sections may be removed by cutting OUT a section of the mat. The remaining ends should be overlapped and secured with ground anchors. Any erosion mat/blanket damaged during storage or installation shall be replaced by the Contractor at no additional cost to the Owner.

3.2 On-Site Representative: Erosion control material suppliers shall provide a qualified and experienced representative on site, for a minimum of one day, to assist the Contractor and ENGEO personnel at the start of construction. If there is more than one slope on a project, this criteria will apply to construction of the initial slope only. The representative shall be available on an as-needed basis, as requested by ENGEO, during construction of the remaining slope(s).

3.3 Placement: The erosion control material shall be placed and anchored on a smooth graded, firm surface approved by the Engineer. Anchoring terminal ends of the erosion control material shall be accomplished through use of key trenches. The material in the trenches shall be anchored to the soil on maximum 1½ foot centers. Topsoil, if required by construction drawings, placed over final grade prior to installation of the erosion control material shall be limited to a depth not exceeding 3 inches.

3.4 Erosion control material shall be anchored, overlapped, and otherwise constructed to ensure performance until vegetation is well established. Anchors shall be as designated on the construction drawings, with a minimum of 12 inches length, and shall be spaced as designated on the construction drawings, with a maximum spacing of 4 feet.

3.5 Soil Filling: If noted on the construction drawings, the erosion control mat shall be filled with a fine grained topsoil, as recommended by the manufacturer. Soil shall be lightly raked or brushed on/into the mat to fill the mat voids or to a maximum depth of 1 inch.

PART V - GEOSYNTHETIC DRAINAGE COMPOSITE

1. DESCRIPTION:

   Work shall consist of furnishing and placing a geosynthetic drainage system as a subsurface drainage medium for reinforced soil slopes.

2. DRAINAGE COMPOSITE MATERIALS:

   2.1 The specific drainage composite material and supplier shall be preapproved by ENGEO.

   2.2 The drain shall be of composite construction consisting of a supporting structure or drainage core material surrounded by a geotextile. The geotextile shall encapsulate the drainage core and prevent random soil intrusion into the drainage structure. The drainage core material shall consist of a three dimensional polymeric material with a structure that permits flow along the core laterally. The core structure shall also be constructed to permit flow regardless of the water inlet surface. The drainage core shall provide support to the geotextile. The fabric shall meet the minimum property requirements for filter fabric listed in Section 2.05C of the Guide Earthwork Specifications.

   2.3 A geotextile flap shall be provided along all drainage core edges. This flap shall be of sufficient width for sealing the geotextile to the adjacent drainage structure edge to prevent soil intrusion into the structure during and after installation. The geotextile shall cover the full length of the core.

   2.4 The geocomposite core shall be furnished with an approved method of constructing and connecting with outlet pipes or weepholes as shown on the plans. Any fittings shall allow entry of water from the core but prevent intrusion of backfill material into the core material.

   2.5 Certification and Acceptance: The Contractor shall submit a manufacturer's certification that the geosynthetic drainage composite meets the design properties and respective index criteria measured in full accordance with all test methods and standards specified. The manufacturer's certification shall include a submittal package of documented test results that confirm the design values. In case of dispute over validity of design values, the Contractor will supply design property test data from an ENGEO-approved laboratory, to support the certified values submitted. Minimum average roll values, per ASTM D 4759, shall be used for determining conformance.

3. CONSTRUCTION:

3.1 Delivery, Storage, and Handling: Contractor shall check the geosynthetic drainage composite upon delivery to ensure that the proper material has been received. During all periods of shipment and storage, the geosynthetic drainage composite shall be protected from temperatures greater than 140 °F, mud, dirt, and debris. Manufacturer's recommendations in regards to protection from direct sunlight must also be followed. At the time of installation, the geosynthetic drainage composite shall be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacture, transportation, or storage. If approved by ENGEO, torn or punctured sections may be removed or repaired. Any geosynthetic drainage composite damaged during storage or installation shall be replaced by the Contractor at no additional cost to the Owner.

3.2 On-Site Representative: Geosynthetic drainage composite material suppliers shall provide a qualified and experienced representative on site, for a minimum of one half day, to assist the Contractor and ENGEO personnel at the start of construction with directions on the use of drainage composite. If there is more than one application on a project, this criterion will apply to construction of the initial application only. The representative shall also be available on an as-needed basis, as requested by ENGEO, during construction of the remaining applications.

3.3 Placement: The soil surface against which the geosynthetic drainage composite is to be placed shall be free of debris and inordinate irregularities that will prevent intimate contact between the soil surface and the drain.

3.4 Seams: Edge seams shall be formed by utilizing the flap of the geotextile extending from the geocomposite's edge and lapping over the top of the fabric of the adjacent course. The fabric flap shall be securely fastened to the adjacent fabric by means of plastic tape or non-water-soluble construction adhesive, as recommended by the supplier. Where vertical splices are necessary at the end of a geocomposite roll or panel, an 8-inch-wide continuous strip of geotextile may be placed, centering over the seam and continuously fastened on both sides with plastic tape or non-water-soluble construction adhesive. As an alternative, rolls of geocomposite drain material may be joined together by turning back the fabric at the roll edges and interlocking the cuspidations approximately 2 inches. For overlapping in this manner, the fabric shall be lapped and tightly taped beyond the seam with tape or adhesive. Interlocking of the core shall always be made with the upstream edge on top in the direction of water flow. To prevent soil intrusion, all exposed edges of the geocomposite drainage core edge must be covered. Alternatively, a 12-inch-wide strip of fabric may be utilized in the same manner, fastening it to the exposed fabric 8 inches in from the edge and folding the remaining flap over the core edge.

3.5 Soil Fill Placement: Structural backfill shall be placed immediately over the geocomposite drain. Care shall be taken during the backfill operation not to damage the geotextile surface of the drain. Care shall also be taken to avoid excessive settlement of the backfill material. The geocomposite drain, once installed, shall not be exposed for more than seven days prior to backfilling.

FAULT RUPTURE HAZARD STUDY

PROPOSED GARAVENTA HILLS ESTATES
LIVERMORE, CALIFORNIA

Submitted to:

Mr. Scott Roylance
RL Communities
San Ramon, CA 94583

Prepared by:

ENGEO, Incorporated

December 22, 2010
Project No. 9126.000.000

.

Copyright © 2009 By ENGEO Incorporated. This Document May Not Be Reproduced In Whole Or In Part By Any Means Whatsoever, Nor May It Be Quoted Or Excerpted Without The Express Written Consent Of ENGEO Incorporated

- Expect Excellence -

Project No.
9126.000.000

December 22, 2010

Mr. Scott Roylance
RL Communities
5000 Executive Parkway, Suite 530
San Ramon, CA 94583

Subject: Proposed Garaventa Hills Estates
APN 099B-5300-010
Livermore, California

FAULT RUPTURE HAZARD STUDY

Dear Mr. Roylance:

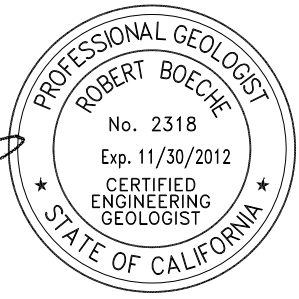
With your authorization, we have prepared this report describing the results of our fault rupture hazard study for your proposed Garaventa Hills Estates project in Livermore, California as outlined in our agreement dated December 15, 2010. This study was completed in general conformance with the California Geological Survey (CGS) Note 49 Guidelines for Evaluating the Hazards of Surface Rupture (CGS, 2008).

If you have any questions or comments regarding this report, please contact us at your convenience, and we will be glad to discuss them with you.

Sincerely,

ENGEO Incorporated

Riley C. Gerbrandt, PE



Robert H. Boeche, CEG

rcg/rhb/dh

cc: 1 – Pat Toohey, RL Communities

TABLE OF CONTENTS

Letter of Transmittal

1.0 INTRODUCTION 1

1.1 PURPOSE AND SCOPE 1
1.2 SITE LOCATION AND DESCRIPTION 1
1.3 PROPOSED DEVELOPMENT 2

2.0 GEOLOGY AND SEISMICITY 2

2.1 GEOLOGIC SETTING 2
2.2 FAULTING AND SEISMICITY 2
2.3 MAPPED FAULT LOCATIONS 3

3.0 SITE CONDITIONS 4

3.1 GEOMORPHOLOGY 4
3.2 SUMMARY OF PREVIOUS INVESTIGATIONS 4
3.2.1 Consultant Studies 4

4.0 CONCLUSIONS 7

5.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS 7

SELECTED REFERENCES
FIGURES

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

The purpose of this investigation was to evaluate surface fault rupture hazards and to provide recommendations regarding the appropriateness of the current development plan for the proposed residential development, known as the proposed Garaventa Hills Estates, in Livermore, California. RL Communities authorized ENGEO to conduct the proposed scope of services, which included the following:

- Review of available literature including geologic maps and historical geotechnical reports pertinent to the site
- Preparation of a site-specific fault setback map
- Report preparation of our findings and recommendations

For our use, we received the following:

- A preliminary site plan entitled *Garaventa Hills* provided to us during a consultation meeting via email on December 14, 2010

This report was prepared for the exclusive use of our client and their consultants for design of this project. In the event that any changes are made in the character, design or layout of the development, we must be contacted to review the conclusions and recommendations contained in this report to determine whether modifications are necessary. This document may not be reproduced in completely or in part by any means whatsoever, nor may it be quoted or excerpted without our express written consent.

1.2 SITE LOCATION AND DESCRIPTION

The proposed site is located approximately ¼ mile east of Vasco Road and directly west of Bear Creek Road in Livermore, California as shown on the Vicinity Map, Figure 1. The Property measures approximately 31.7 acres in area and is identified with Assessor's Parcel Number 099B-5300-10. See the Site Plan, Figure 2 for a detailed view of the site as well as for relevant historical geologic exploration information pertinent to this study.

Existing residential developments are located to the south, southeast, and northeast of the subject site; an unnamed creek is located immediately south of the property boundary of the site. The project site varies in elevation between approximately 537 and 607 feet above mean sea level, with topography consisting of gentle hills, ridges, rock outcrops, and drainage swales.

1.3 PROPOSED DEVELOPMENT

The current preliminary site plan for the project (Ruggeri-Jensen-Azar, 2010) includes excavating into and grading the side slopes of the existing two hills to construct approximately 3:1 (horizontal:vertical) slopes, placement of fill across the majority of the site, construction of up to 30-foot-high and 3:1 fill slopes along the property boundaries, preparation of approximately 76 residential lots of approximately 6,000 square feet in size, and construction of associated roadways and utilities. Figure 2 includes a reproduction of the site plan by Ruggeri-Jensen-Azar overlain on an aerial photograph of the project site. We understand the proposed residential structures will be relatively lightweight, timber-framed single-family units supported by a shallow foundation system.

Proposed site grading includes maximum cut depths of approximately 20 feet and maximum fill thicknesses of approximately 30 feet. In general, cut and fill slopes over 10 feet high are proposed at a slope gradient of 3:1 (horizontal:vertical).

2.0 GEOLOGY AND SEISMICITY

2.1 GEOLOGIC SETTING

The study area is located in the Coast Ranges geomorphic province of California. The Coast Ranges are characterized by a series of northwest-trending valleys and mountain ranges. The bedrock in this region has been folded and faulted in a tectonic setting that is experiencing translational and compressional deformations of the Earth's crust.

In this part of the San Francisco Bay Area, the bedrock units include a series of Pliocene non-marine sedimentary rock, Miocene-age marine sedimentary rock and Miocene-age Briones sandstone. See Regional Geologic Map, Figure 3 for a depiction of the geologic environment in the vicinity of the project site.

2.2 FAULTING AND SEISMICITY

The Greenville fault, which the CGS classifies as a Holocene-active feature (CDMG, 1982), is mapped along the northeastern portion of the site. The mapped locations of the Greenville fault and of other significant active faults in the vicinity of the San Francisco Bay Area are shown on Regional Faulting and Seismicity, Figure 4. The northeastern portion of the site is located within a State of California Earthquake Fault Zone for the Greenville fault. The approximate limits of the Earthquake Fault Zone are depicted on Earthquake Fault Zone Map, Figure 5.

The Greenville fault is a right-lateral strike-slip fault that is the eastern limit of the San Andreas fault system. Recent work by Sawyer and Unruh determined that the slip rate on the main trace of the Greenville fault to be 4.1 +/- 1.8 mm/yr (Sawyer and Unruh, 2002).

The Working Group on California Earthquake Probabilities (WGEP) evaluated the 30-year probability of a M6.7 or greater earthquake occurring on the known active fault systems in the

Bay Area, including the Greenville fault. The WGEP calculated an overall probability of 63 percent for the Bay Area as whole, and a probability of 3 percent for the Greenville fault (WGEP, 2008).

State law requires the CGS to establish regulatory zones (known as Earthquake Fault Zones) around the surface traces of active faults and to issue appropriate maps. An *active fault* is defined by the State Mining and Geology Board as one that has "had surface displacement within Holocene time (about the last 11,000 years)" (CGS, 2008). State law prohibits the construction of habitable structures across active fault traces. The active fault traces mapped by the State and the Earthquake Fault Zones are depicted on Figure 5. As shown in Figure 5, the northeastern one-third of the proposed Garaventa Hills Estates project is located within the State Earthquake fault zone.

2.3 MAPPED FAULT LOCATIONS

Two traces of the Greenville fault are mapped near the proposed Garavaenta Hills Estates project site on the Earthquake Fault Zones official map (CDMG, 1982). One of these mapped traces is located immediately northeast of the project site, while the other mapped trace is located southeast of the project site, and this trace is projected into the northeastern quarter of the project site (CDMG, 1982). Two other traces are mapped nearby the project site (CDMG, 1982), but their mapped locations are approximately 500 to 1200 feet northeast of the northeast corner of the project site.

In his earlier map, dated 1980, Dibblee plots the Greenville fault trace that is located immediately northeast of the project site (Dibble, 1980). Furthermore, he plots two fault traces on this map that are located in or project into the northeastern corner of the project site (Dibblee, 1980). However, in his later map, dated 2006, Dibble only plots the fault trace that is located immediately northeast of the project site, and this is indicated as a concealed trace (Dibblee, 2006).

Crane also published a geologic map of this area (Crane, 1993). On this map, there are neither fault traces mapped immediately northeast of the project site nor that are located on or project into the project site (Crane, 1993). In his geologic map, Crane maps a thrust fault approximately 100 feet south of the project site. Crane maps this fault extending west of the project site (Crane, 1993).

Published geologic maps typically are interpreted from aerial photographs and topographic maps. Geologic features on such maps are inferred from lineaments that are visible from aerial photographs and topographic maps. Site specific studies are typically required to authenticate mapped geologic features.

3.0 SITE CONDITIONS

3.1 GEOMORPHOLOGY

The site is generally hilly with a northwest trending ridgeline and downslopes that radiate from the hilltops within the approximate center of the site. The core of these hills consists of Briones of Ciebro Sandstone mantled by thin colluvial and/or residual soil deposits, while lower-lying areas include accumulations of alluvial soil material deposits. In general, project site elevations range from approximately 607 feet at the top of the southeastern hill to approximately 539 feet at the southwestern corner of the property (ENGEO, 2010). The majority of the property is vegetated by seasonal grasses and weeds.

A seasonal drainage swale is located in the southern portion of the site. The length of this swale extends from the ridge at approximately the center of the site to the southern property boundary. This seasonal drainage swale connects with the channel of an unnamed creek, which is located immediately south of the property boundary of the site.

The axis of an anticline, whose strike trends from the southeast portion of the site to the northwest portion of the site, exists at approximately the center of the property. The hilltops are approximately located on this axis. Several rock outcrops were observed along this axis on the hilltops and ridges (ENGEO, 2010).

An active fault trace of the Greenville fault zone is mapped near the northeastern property corner of the site (CDMG, 1982). The Greenville fault zone includes a portion of the northeastern quarter of the property. There is no well-defined surface expression of active faulting where the mapped trace of the Greenville fault is located immediately northeast of the project site. However, in addition to a northwest trending photo lineament that is recognizable in current and historical aerial photos, a local depression is recognizable at this location.

Farther northeast of the project site, what is considered to be the main traces of the Greenville fault zone are located along Laughlin Road and along the base of the Altamont Hills of the Diablo Range of the California Coast Ranges. A topographical depression, known as Frick Lake, is inferred to have formed in this area due to relative extensional tectonic stresses “distributed over a wide zone between right stepping (en-echelon) traces of the Greenville fault” (Berlogar Geotechnical Consultants, 2000).

3.2 SUMMARY OF PREVIOUS INVESTIGATIONS

3.2.1 Consultant Studies

Several subsurface investigations have been completed in the general vicinity of the project site in order to evaluate proposed developments with respect to local geotechnical and geologic conditions. Four such studies were determined to be relevant to the proposed development at the project site:

- *Geologic and Seismic Hazards Investigation for East County Investors, 32.8 Acre Property Laughlin Road, Livermore, California* (BSK and Associates, February 1989).

- *Geologic and Seismic Hazards Investigation, 48.5 Acre Property Laughlin Road, Livermore, California* (BSK and Associates, April 17, 1989).

- *Geologic and Seismic Hazards Investigation and Preliminary Soils Investigation for Quint Investment Associates, 40 Acre Property, Laughlin Road, Livermore, California* (BSK and Associates, May 1989).

- *Preliminary Geotechnical Investigation, The DeSilva Group Master Plan of Vasco–Laughlin Specific Plan Areas, Livermore, California* (Berlogar Geotechnical Consultants, 2000).

These studies included fault trenching across portions of the Earthquake Fault Zone. The approximate locations of exploratory trenches and magnetometer surveys described in these reports are depicted on Site Plan, Figure 2. The findings and conclusions of these studies are summarized in the following sections:

BSK and Associates, February 1989

In February 1989, BSK and Associates (BSK) studied the property immediately northeast of the proposed Garaventa Hills Estates project site by excavating three trenches that totaled approximately 1,280 linear feet in length. The trenches were reported as T-1 through T-3. One of these trenches, T-2, crossed a possible fault trace that is depicted on the Earthquake Fault Zones Map (CDMG, 1993) and that is located immediately northeast of the proposed Garaventa Hills Estates project site.

No evidence of active faulting was reported in T-2 (p. 24). “A zone of near-surface soil fractures” were observed by BSK “throughout the western end of Trench T-2”, however, these were attributed to “soft sediment deformation from earthquake-induced ground shaking” (p. 19).

BSK and Associates, April 1989

In January 1989, BSK studied the property immediately east of the proposed Garaventa Hills Estates project site by excavating four trenches and two test pits that totaled approximately 1,812 linear feet in length. The report for this study was revised in April 1989. The trenches were reported as T-1 through T-4, and the test pits were reported as TP-1 and TP-2. Two of these trenches crossed a possible fault trace that is depicted on the Earthquake Fault Zones Map (CDMG, 1982) and that is located immediately northeast of the proposed Garaventa Hills Estates project site. One trench was excavated to the edge of the Earthquake Fault Zone boundary, while the fourth trench and the two test pits crossed an interpreted fault feature mapped by BSK during this study.

BSK interpreted fault features in trenches T-1, T-2, and T-4 as well as test pits TP-1 and TP-2. These features were described as discontinuous soil interfaces , as containing “zones of disrupted

soils", and as containing "clay and/or gouge zones parallel to the fault trace" (pp. 11-12). These features were associated with a fault that was interpreted to wrap around a hill in the southwestern portion of the studied property (pp. 11-12).

However, no faulting was reported in T-3, and BSK did not find "conclusive evidence of faulting" (p. 25) in T-1 along the mapped trace on the Earthquake Fault Zone Map (CDMG, 1982) that is located immediately northeast of the proposed Garaventa Hills Estates project site.

BSK and Associates, May 1989

In May 1989, BSK studied the property immediately north of the proposed Garaventa Hills Estates project site by excavating six trenches that totaled approximately 1,870 linear feet in length. These trenches were reported as T-1 through T-6 and are of particular interest to the proposed Garaventa Hills Estates project site because they are located on the property immediately north of the project site.

No faulting was reported in T-3, however, "evidence of previous liquefaction was observed throughout Trench T-3" (pp. 16-31). BSK observed what they interpreted as older than Pleistocene-age fault features within the western one-third of T-2 and within T-4 (p. 16). However, BSK interprets these fault features to not have occurred within the last 40,000 years (p. 29), and they are, therefore, not considered active fault features. The features observed within T-2 would intersect the northern property boundary of the proposed Garaventa Hills Estates project site approximately 300 to 500 feet west of the northeastern property corner.

BSK also observed what it interpreted as "extensional and compressional deformation of [Quaternary] sediments" in T-1 (p. 16). Trenches T-5 and T-6 were excavated south and north, respectively, of T-1 in order to determine whether or not these features were isolated to the location of T-1. Based on their observations within T-5 and T-6, BSK concluded that the above-noted features in T-1 showed no direct evidence for continuation of faulting to the southeastern portion of the site (p. 29) and "could be the result of ductile soft sediment deformation or brittle deformation due to ground shaking and may not be indicative of recent faulting" (BSK, p. 17, May 1989).

Berlogar Geotechnical Consultants, 2000

In 2000, Berlogar Geotechnical Consultants (BGC) studied approximately 439 acres that encompassed six then privately-owned properties to the north and northwest of the project site. In particular interest to the proposed Garaventa Hills Estates development are the studies performed by BGC on what was known in 2000 as the Valliani, Frick, and Cornett properties, which are immediately north and northwest of the project site.

The 2000 study by BGC included approximately 12,000 linear feet of fault exploration trenches as well as a magnetometer survey. Seven trenches of interest to the proposed Garaventa Hills Estates project site were excavated in the vicinity of two fault traces shown on the Earthquake Fault Zone Map (CDMG, 1982) and the linear depression immediately northeast of the project site; these are reported as T-2 through T-5, T-7, T-11, and T-13 on the *Site Plan* (BGC, 2000).

The "magnetometer survey lines" conducted as part of the BGC study "did not exhibit magnetic anomalies other than those associated with fences or power lines" (p. 9) and "exhibited no magnetic anomolies that could be associated with faulting" (p. 19).

The trenches excavated as part of the BGC study were "generally placed perpendicular to regional geologic-structural trends" and, where necessary, "were staggered and overlapped to 'shadow' the area of possible faulting" (p. 9). In the portions of these trenches that shadow the proposed Garaventa Hills Estates project site and nearby vicinities, no features suggestive of faulting were observed (pp. 11-14). In general, alluvial deposits and residual soils were observed to overlie Miocene marine bedrock (pp. 11-14). Discontinuous shear planes were observed in portions of the Miocene marine bedrock, but they did not extend into the alluvial deposits (pp. 11-14). Where applicable, trenching was conducted near previous trenches excavated by BSK in order to examine features that were interpreted by BSK as evidence of faulting; BGC interpreted these features as primarily depositional features, and "no offset beds, shearing, clay gouge, or other features suggestive of faulting were encountered" (p. 13).

Based on their review of the available geotechnical and/or geologic studies, their magnetometer survey results, as well as their own field exploration, BGC concluded that active faulting was not observed on the properties that they studied in the vicinity of the proposed Garaventa Hills Estates project site (p. 19).

4.0 CONCLUSIONS

Although BSK interpreted features observed during their studies of the properties neighboring the project site to the east, northeast, and north to be fault related (BSK, February 1989, April 1989, May 1989), these same reports suggested that these fault-related features were either not continuous, through-going features (BSK, p. 24, February 1989; BSK, p. 25, April 1989; BSK, pp. 16-31, May 1989) or had not occurred within the last 40,000 years (BSK, pp. 16-31, May 1989). Furthermore, the more recent work performed by BGC that shadows the project site indicates a lack any evidence in support of active through-going faulting (BCG, 2000) at the project site.

Therefore, based on our review of the previous explorations adjacent to the project site, we conclude that Holocene surface rupture has not occurred at or in the vicinity of the project site, and that the risk of future surface rupture at the project site is low. Furthermore, since the results of this study indicate that the potential for future surface rupture at the project site is low, we recommend that the proposed project may be planned without fault setbacks. Due to these conclusions, this map type for Figure 2 has been altered from a site-specific fault setback map to a site plan that includes site-specific faulting information.

5.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

This report presents the results of our Fault Rupture Hazard Study for the proposed Garaventa Hills Estates in Livermore, California. If changes occur in the nature or design of the project, we should be allowed to review this report and provide additional recommendations, if any. It is the

responsibility of the owner to transmit the information and recommendations of this report to the appropriate organizations or people involved in design of the project, including, but not limited to, developers, owners, buyers, architects, engineers, and designers. The conclusions and recommendations contained in this report are solely professional opinions.

We strived to perform our professional services in accordance with generally accepted geotechnical engineering principles and practices currently employed in the area; no warranty is expressed or implied. There are risks of earth movement and property damages inherent in building on or with earth materials. We are unable to eliminate all risks or provide insurance; therefore, we are unable to guarantee or warrant the results of our services.

This report is based upon field and other conditions discovered at the time of report preparation. We developed this report through review of previous geotechnical and geologic reports and field explorations of the areas in the vicinity of the project site. We assume that the reviewed subsurface exploration data is representative of the actual subsurface conditions across the project site. If unexpected conditions are encountered, notify ENGEO immediately to review these conditions and to provide additional and/or modified recommendations, as necessary.

This document must not be subject to unauthorized reuse; that is, reusing without written authorization of ENGEO. Such authorization is essential because it requires ENGEO to evaluate the document's applicability given new circumstances, not the least of which is passage of time.

Actual field or other conditions will necessitate clarifications, adjustments, modifications or other changes to ENGEO's documents. Therefore, ENGEO must be engaged to prepare the necessary clarifications, adjustments, modifications or other changes before construction activities commence or further activity proceeds. If ENGEO's scope of services does not include on-site construction observation, or if other persons or entities are retained to provide such services, ENGEO cannot be held responsible for any or all claims arising from or resulting from the performance of such services by other persons or entities, and from any or all claims arising from or resulting from clarifications, adjustments, modifications, discrepancies or other changes necessary to reflect changed field or other conditions.

SELECTED REFERENCES

Berlogar Geotechnical Consultants. Preliminary Geotechnical Investigation, The DeSilva Group Master Plan of Vasco – Laughlin Specific Plan Areas, Livermore, California. Job No. 2311.100. December 26, 2000.

BSK and Associates. Geologic and Seismic Hazards Investigation, 48.5 Acre Property, Laughlin Road, Livermore, California. BSK and Associates Job P88138. January 18, 1989. Revised April 17, 1989.

BSK and Associates. Geologic and Seismic Hazards Investigation and Preliminary Soils Investigation for Quint Investment Associates, 40 Acre Property, Laughlin Road, Livermore, California. BSK and Associates Job P89006. May 8, 1989.

BSK and Associates. Geologic and Seismic Hazards Investigation for East County Investors, 32.8 Acre Property, Laughlin Road, Livermore, California. BSK and Associates Job P88153. February 9, 1989.

California Division of Mines and Geology. Alquist-Priolo Earthquake Fault Zone Map of the Altamont Quadrangle. 1982.

California Geological Survey. Guidelines for Evaluation and Mitigating Seismic Hazards in California, Special Publication 117. 2000. Last Updated September 11, 2008.

Crane, Ron. Geologic Map of the Altamont Quadrangle. 1993.

Dibblee, Thomas W., Jr. Preliminary Geologic Map of the Altamont Quadrangle, Alameda County, California. United States Geological Survey Open-File Report. 1980.

Dibblee, Thomas W., Jr. Geologic Map of the Altamont Quadrangle, Alameda County, California. Dibblee Geologic Center Map # DF-197. Santa Barbara Museum of Natural History. February 2006.

ENGEO, Preliminary Geotechnical Report, Proposed Garaventa Hills Estates, Livermore, California. Project No. 9126.000.000. November 30, 2010.

Ruggeri-Jenzen-Azar, Engineers Planners Surveyors. Garaventa Hills. Site Plan. Job No. 101094. Sheet 1 of 1. Graphic Scale 1 inch equals 100 feet. December 9, 2010.

Sawyer, Thomas L. and Unruh, Jeffery R. Paleoseismic Investigation of the Holocene Slip Rate on the Greenville Fault, Eastern San Francisco Bay Area, California. Final Technical Report. United States Geological Survey, National Earthquake Hazards Reduction Program, Award Number 00HQGR0055. February 2002.

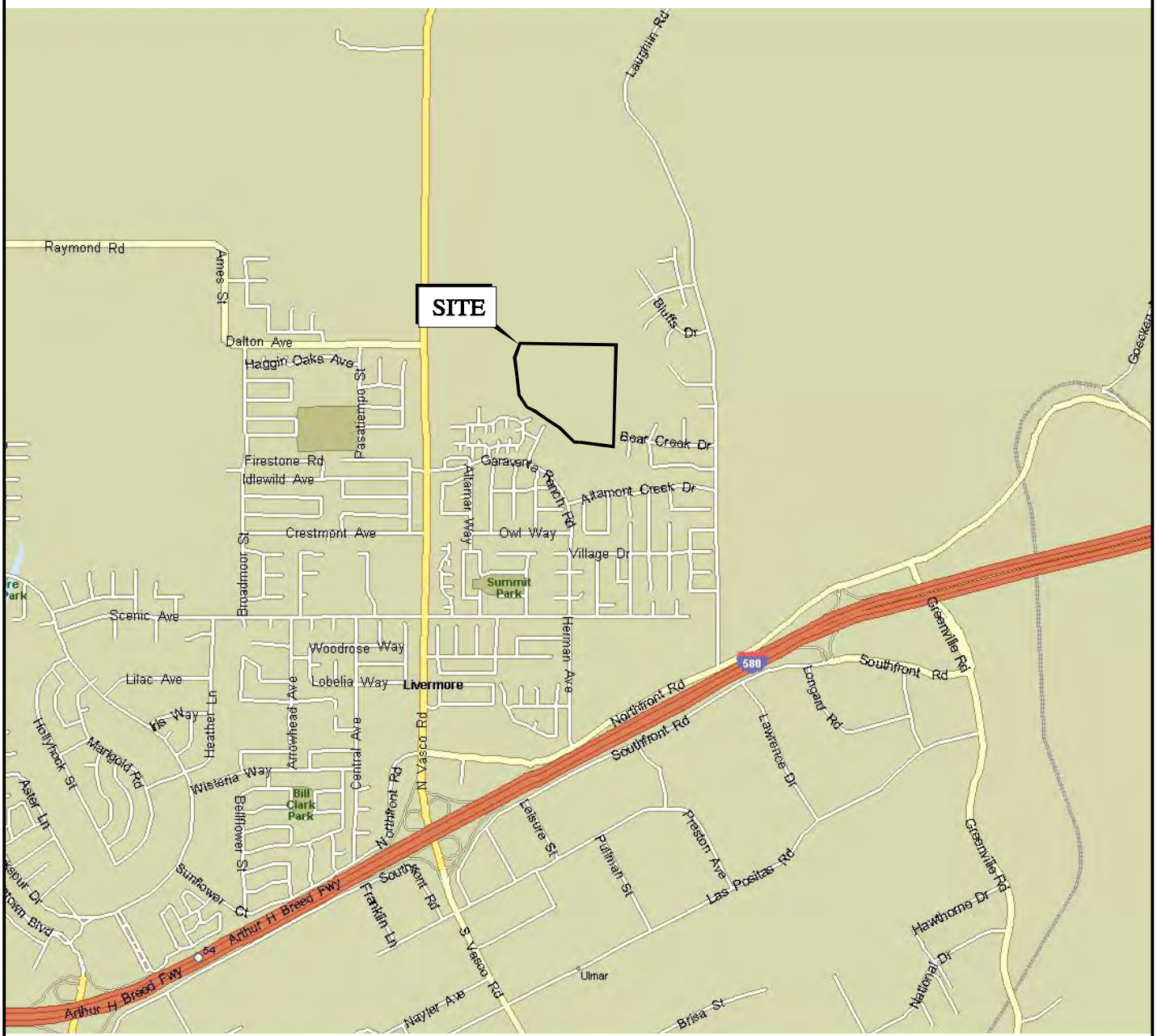
Working Group on California Earthquake Probabilities (WGEP). The Uniform California Earthquake Rupture Forecast. Version 2. UCERF 2. USGS Open File Report 2007-1437. 2008.

FIGURES

Figure 1	Vicinity Map
Figure 2	Site Plan
Figure 3	Regional Geologic Map
Figure 4	Regional Faulting and Seismicity Map
Figure 5	Earthquake Fault Zone Map

FIGURES

COPYRIGHT © 2010 BY ENGEO INCORPORATED. THIS DOCUMENT MAY NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER, NOR MAY IT BE QUOTED OR EXCERPTED WITHOUT THE EXPRESS WRITTEN CONSENT OF ENGEO INCORPORATED.



N

0 FEET 2000

0 METERS 1000

BASE MAP SOURCE: BASE MAP SOURCE: MS STREETS AND TRIPS

ENGEO Expect Excellence

VICINITY MAP

GARAVENTA HILLS ESTATES

LIVERMORE, CALIFORNIA

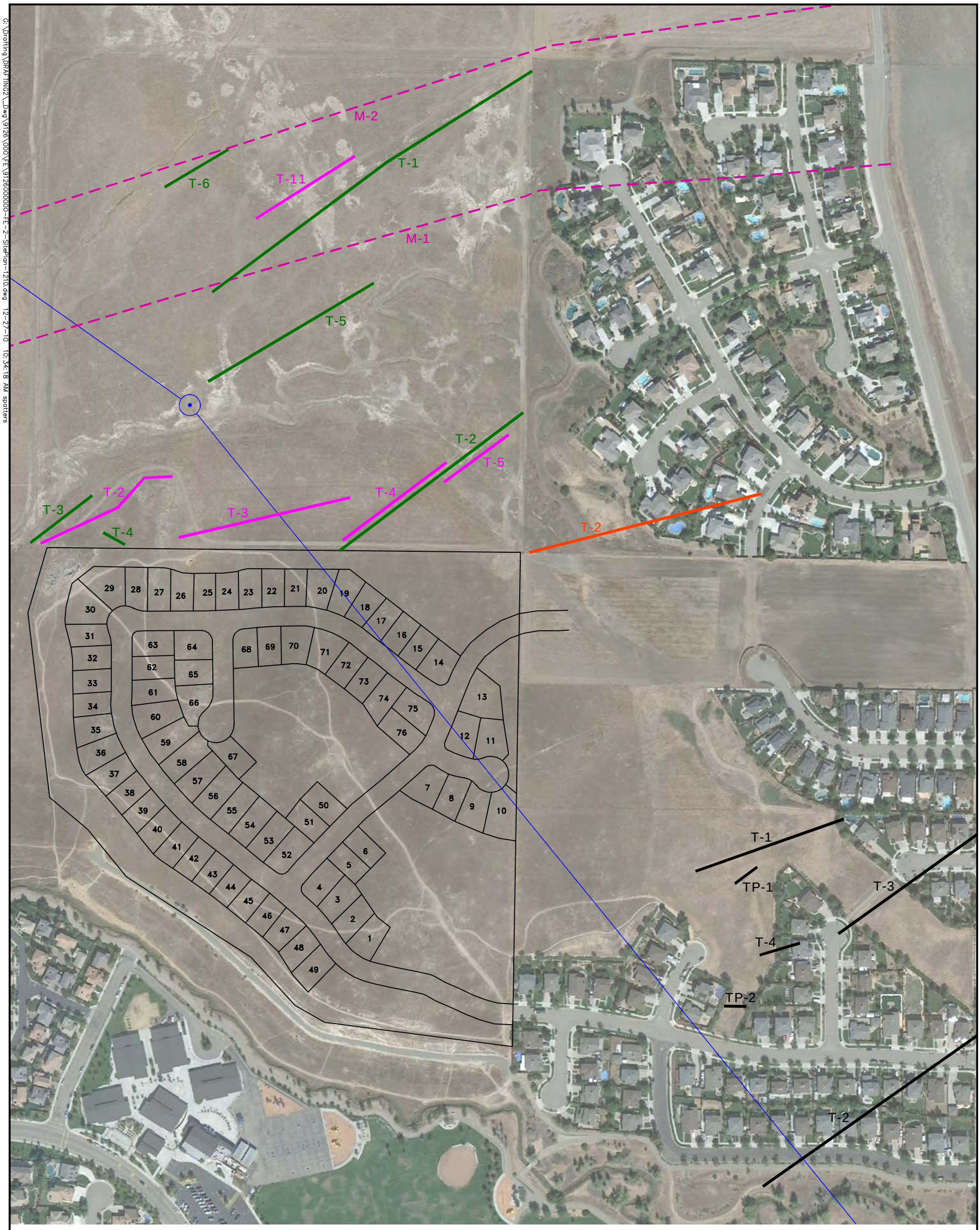
PROJECT NO.: 9126.000.000	FIGURE NO. 1
DATE: DECEMBER 2010	
DRAWN BY: DLB	CHECKED BY: DSH

C:\Drafting\DRAFTING2_Dwg\9126\000\FE\9126000000-FE-1-VicinityMap-1210.dwg 12-27-10 10:32:56 AM spotters

ORIGINAL FIGURE PRINTED IN COLOR

COPYRIGHT © 2010 BY ENGEO INCORPORATED. THIS DOCUMENT MAY NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER, NOR MAY IT BE QUOTED OR EXCERPTED WITHOUT THE EXPRESS WRITTEN CONSENT OF ENGEO INCORPORATED.

G:\Drafting\DRAFTING2_Dwg\9126\000\FE\9126000000-FE-2-SitePlan-1210.dwg 12-27-10 10:34:18 AM spatters



N

0 FEET 250

0 METERS 125

EXPLANATION

- T-11 — APPROXIMATE LOCATION OF TEST TRENCH (BGC, 12/2000)
- T-6 — APPROXIMATE LOCATION OF TEST TRENCH (BSK, 5/1989)
- T-4 — APPROXIMATE LOCATION OF TEST TRENCH/TEST PIT (BSK, 4/1989)
- T-2 — APPROXIMATE LOCATION OF TEST TRENCH (BSK, 2/1989)
- M-2 — APPROXIMATE LOCATION OF MAGNETOMETER SURVEY LINE (BGC, 12/2000)
- ALIQUIST-PRIOLO EARTHQUAKE FAULT ZONE - WESTERN BOUNDARY

BASE MAP SOURCE: GOOGLE EARTH

ENGEO Expect Excellence

SITE PLAN

GARAVENTA HILLS ESTATES

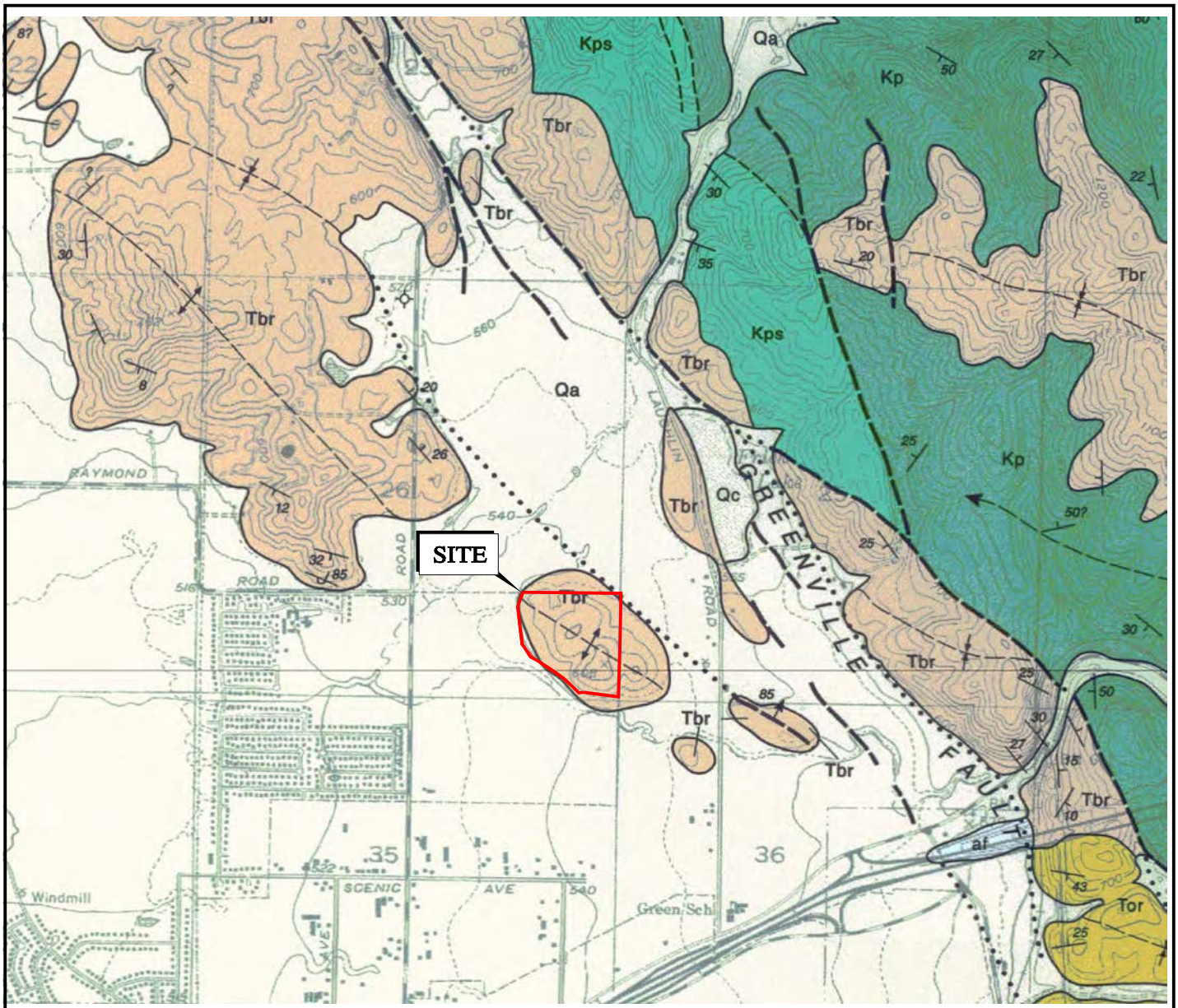
LIVERMORE, CALIFORNIA

PROJECT NO.:	9126.000.000
DATE:	DECEMBER 2010
DRAWN BY: DLB	CHECKED BY: DSH

FIGURE NO. 2

ORIGINAL FIGURE PRINTED IN COLOR

© 2010 BY ENGEO INCORPORATED. THIS DOCUMENT MAY NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER, NOR MAY IT BE QUOTED OR EXCERPTED WITHOUT THE EXPRESS WRITTEN CONSENT OF ENGEO INCORPORATED.



EXPLANATION

- **Qa** ALLUVIAL PEBBLE GRAVEL
- **Tor** ORINDIA FORMATION
- **Tbr** BRIONES OF CIERBO SANDSTONE
- **Kps** PANOCHE FLORMATION - SANDSTONE
- **Kp** PANOCHE FORMATION - SHALE OR CLAYSTONE

- ANTICLINE
- SYNCLINE
- STRIKE AND DIP OF BEDDING
- STRIKE AND DIRECTION OF DIP
- STRIKE AND DIP OF OVERTURNED BEDDING
- FAULT: DASHED WHERE INDEFINITE OR INFERRED, DOTTED WHERE CONCEALED, QUERIED WHERE EXISTENCE IS DOUBTFUL. PARALLEL VERTICAL MOVEMENT IS SHOWN BY U/D (U= UPTHROWN SIDE, D= DOWNTHROWN SIDE). SHORT ARROW INDICATES DIP OF FAULT PLANE. SAWTEETH ARE ON UPPER PLATE OF LOW ANGLE THRUST FAULT.

N

0 FEET 2000
0 METERS 1000

BASE MAP SOURCE: DIBBLEE, 2006

ENGEO Expect Excellence

REGIONAL GEOLOGIC MAP

GARAVENTA HILLS ESTATES

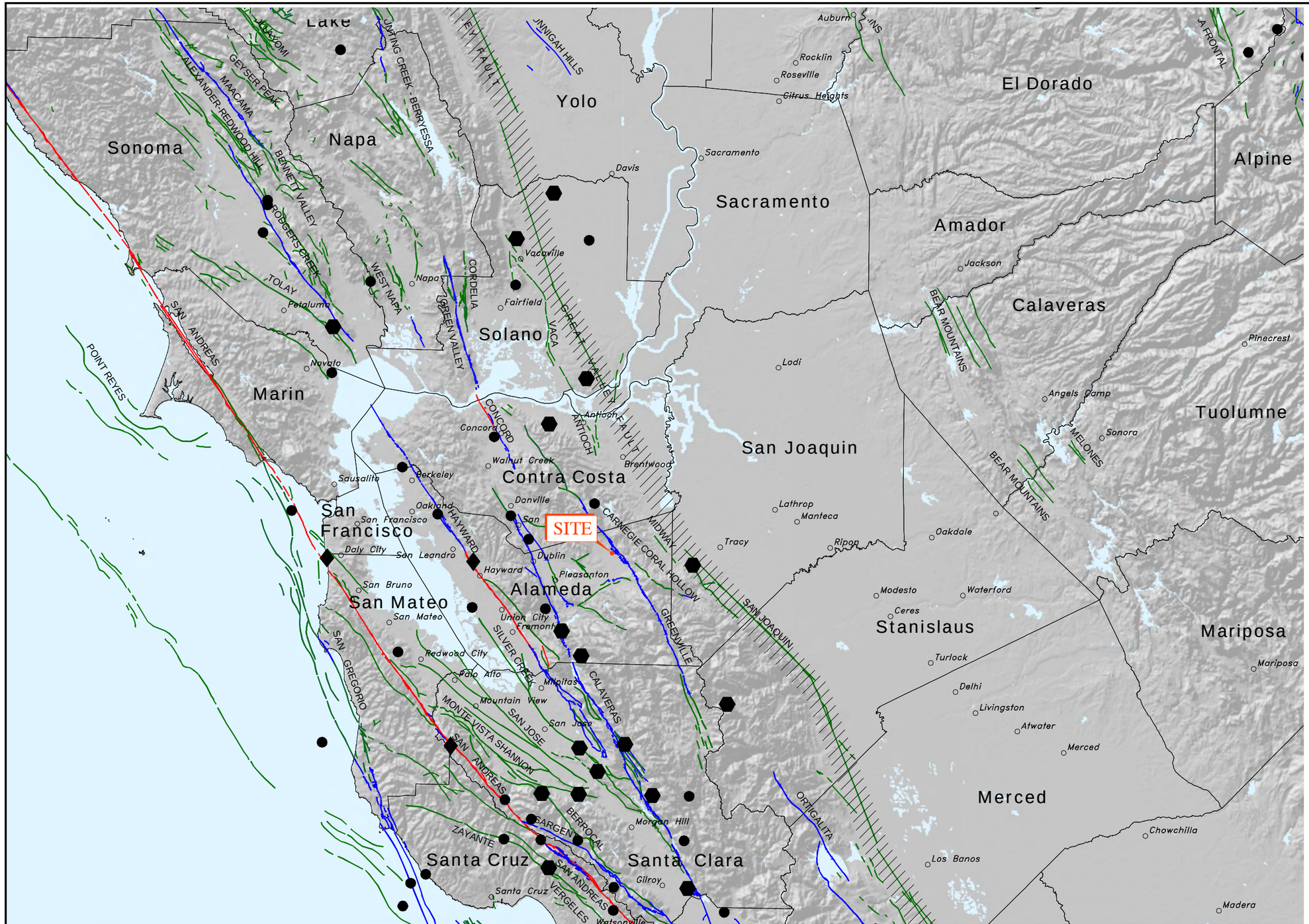
LIVERMORE, CALIFORNIA

PROJECT NO.: 9126.000.000		FIGURE NO. 3
DATE: DECEMBER 2010		
DRAWN BY: DLB	CHECKED BY: DSH	

G:\Drafting\DRAFTING2_Dwg\9126\000\FE\9126000000-FE-3-RegionalGeologicMap-1210.dwg 12-27-10 10:38:35 AM spatters

ORIGINAL FIGURE PRINTED IN COLOR

COPYRIGHT © 2010 BY ENGEO INCORPORATED. THIS DOCUMENT MAY NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER, NOR MAY IT BE QUOTED OR EXCERPTED WITHOUT THE EXPRESS WRITTEN CONSENT OF ENGEO INCORPORATED.



EXPLANATION

- MAGNITUDE 7+
- MAGNITUDE 6-7
- MAGNITUDE 5-6
- HISTORIC FAULT
- HOLOCENE FAULT
- QUATERNARY FAULT
- HISTORIC BLIND THRUST FAULT ZONE

BASE MAP SOURCE:
U.S.G.S. 1-ARC SECOND S.R.T.M. DATABASE
U.S.G.S. QUATERNARY FAULT DATABASE, MARCH, 2006
U.S.G.S. HISTORIC EARTHQUAKE DATABASE (1800-2000)

ENGEO Expect Excellence

REGIONAL FAULTING AND SEISMICITY

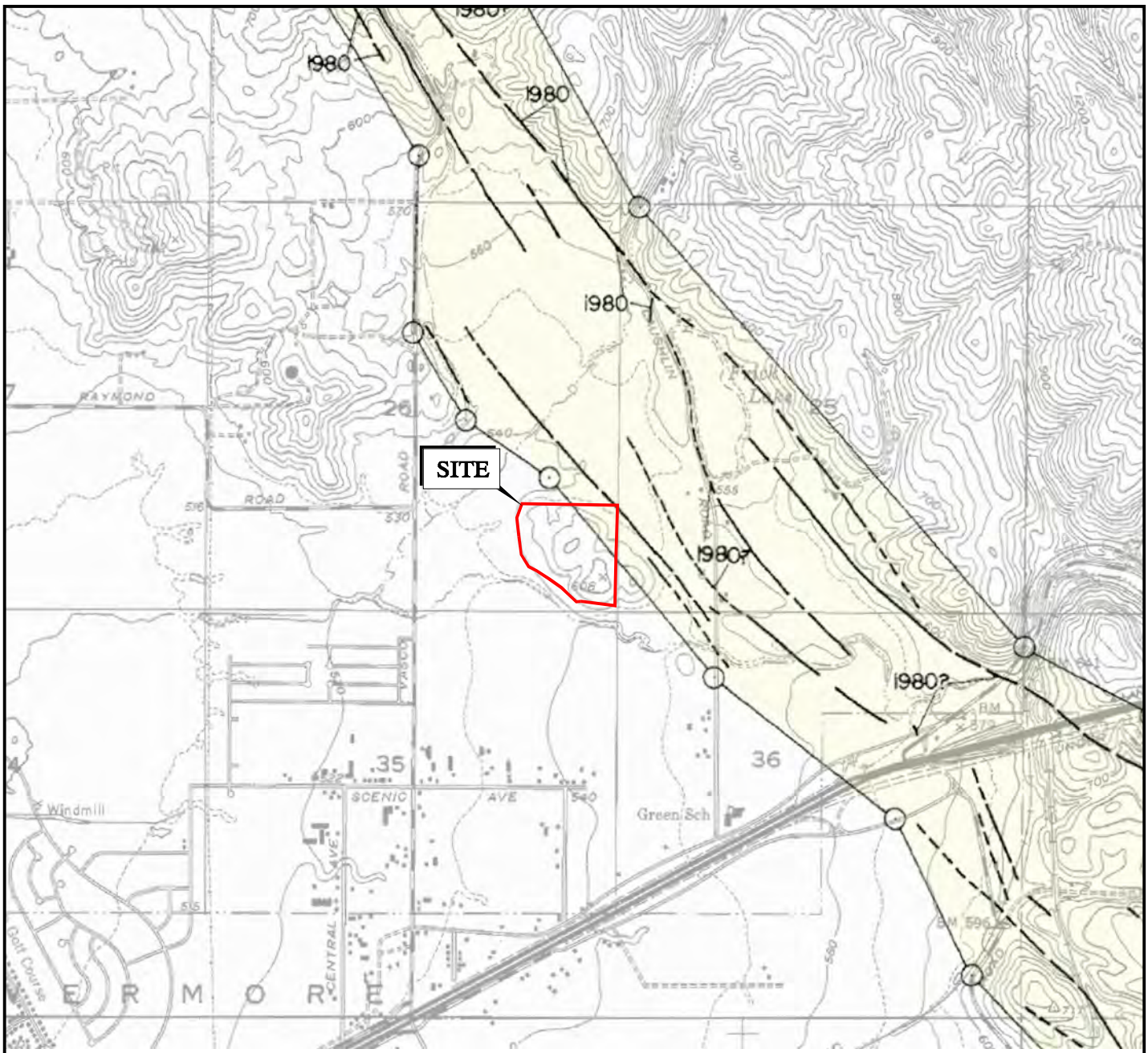
GARAVENTA HILLS ESTATES

LIVERMORE, CALIFORNIA

PROJECT NO.: 9126.000.000		FIGURE NO. 4
DATE: DECEMBER 2010		
DRAWN BY: DLB	CHECKED BY: DSH	

ORIGINAL FIGURE PRINTED IN COLOR

G:\Drafting\DRAFTING2_Dwg\9126\000\FE\9126000000-FE-4-RegionalFaultingAndSeismicity-1210.dwg 12-27-10 10:42:16 AM



EXPLANATION

1906 C / ? — FAULTS CONSIDERED TO HAVE BEEN ACTIVE DURING HOLOCENE TIME AND TO HAVE A RELATIVELY HIGH POTENTIAL FOR SURFACE RUPTURE; SOLID LINE WHERE ACCURATELY LOCATED, LONG DASH WHERE APPROXIMATELY LOCATED, SHORT DASH WHERE INFERRED, DOTTED WHERE CONCEALED; QUERY (?) INDICATES ADDITIONAL UNCERTAINTY. EVIDENCE OF HISTORIC OFFSET INDICATED BY YEAR OF EARTHQUAKE-ASSOCIATED EVENT OR C FOR DISPLACEMENT CAUSED BY CREEP OR POSSIBLE CREEP

EARTHQUAKE FAULT ZONE BOUNDARIES; DELINEATED AS STRAIGHT-LINE SEGMENTS THAT CONNECT ENCIRCLED TURNING POINTS SO AS TO DEFINE EARTHQUAKE FAULT ZONE SEGMENTS

N

0 FEET 2000

0 METERS 1000

BASE MAP SOURCE: CDMG, 1993

ENGEO Expect Excellence

EARTHQUAKE FAULT ZONE MAP

GARAVENTA HILLS ESTATES

LIVERMORE, CALIFORNIA

PROJECT NO.: 9126.000.000		FIGURE NO. 5
DATE: DECEMBER 2010		
DRAWN BY: DLB	CHECKED BY: DSH	

G:\Drafting\DRAFTING2_Dwg\9126\000\FE\9126000000-FE-5-EarthquakeFaultZonesMap-1210.dwg 12-27-10 10:43:47 AM spatters

ORIGINAL FIGURE PRINTED IN COLOR

COPYRIGHT © 2010 BY ENGEO INCORPORATED. THIS DOCUMENT MAY NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER, NOR MAY IT BE QUOTED OR EXCERPTED WITHOUT THE EXPRESS WRITTEN CONSENT OF ENGEO INCORPORATED.

Appendix F:

Technical Memos Regarding Near-Surface Oil and Phase I Environmental Site Assessment

Project No.
9126.000.000

May 7, 2012

Scott Roylance
RL Communities
5000 Executive Parkway, Suite 530
San Ramon, CA 94593

Subject: Garaventa Hills Estates
Livermore, California

GEOLOGIC REVIEW AND RECONNAISSANCE REGARDING OILS NATURALLY OCCURRING NEAR SURFACE HYDROCARBONS

Dear Mr. Roylance:

At your request, we have conducted review and reconnaissance with regard to potential impacts from documented natural oil seeps located just southeast of the subject Garaventa Hills Estates project site in Livermore, California. The Garaventa Hills Estates project site is located approximately ¼ mile east of Vasco Road just west of Bear Creek Road. The project site varies in elevation between approximately 537 and 607 feet above mean sea level, with topography consisting of gentle hills, ridges, rock outcrops, and drainage swales. Existing residential developments are located to the south and southeast of the subject site; an unnamed creek is located immediately south of the property boundary of the site.

The purpose of our review and reconnaissance was to provide a preliminary characterization of the geologic structure in the vicinity of the Garaventa Hills project site and its relation to the nature and extent of the observed oil seeps within the Bear Creek Development located just southeast of the subject site. Our scope included the following:

1. Review of available geologic maps, aerial photographs, plans, and literature relevant to the site, including a 2009 Geosyntec report on the oils seeps located southeast of the subject site.

2. A site reconnaissance to observe site conditions and map bedding within exposed rock outcrops and present this on a site plan.

3. Prepare a cross section across the site and through the area of observed oil seeps on the adjacent development.

4. Preparation of this letter summarizing the findings of our review and site reconnaissance, and provide recommendations for mitigation of oil seeps, if necessary.

DOCUMENT REVIEW

In 2009, Geosyntec conducted a study to understand the nature and extent of the natural oil seeps beneath the adjacent Bear Creek Development and their potential impact to human health and the environment. According to the Geosyntec assessment the oil bearing geologic unit located beneath the Bear Creek site comprises the Greenville Sands member of the Cierbo Formation (2009). The Greenville Sands are folded into an anticline with an axis that trends towards the Livermore oil field approximately 3 miles to the southeast where they have been encountered at a depth of approximately 2000 feet (Geosyntec, 2009). According to the Geosyntec report analysis of the physical and chemical properties of the oil found at the Livermore Oil Field and that found at the Bear Creek Site suggests that the oil originates from the same or a similar stratigraphic unit.

According to Geosyntec's conceptual site model the oil seeps present at the Bear Creek Project site are related to the interaction between the movement of the naturally-occurring oil deposits in the geologic strata and the seasonally-fluctuating groundwater table beneath the site (2009). This interaction causes the oil, which is lighter than water to be pushed up by seasonally rising groundwater levels. Groundwater at the Bear Creek Site has been reported between 7 and 17 feet below the ground surface (Geosyntec, 2009).

According to published geologic maps the bedrock underlying the Garaventa Hills Estates site comprises the Miocene Cierbo Formation. The Cierbo formation has been described as a light gray, medium grained, arkosic sandstone. According to some published maps bedding at the subject site dips at approximately 60 degrees towards the south or southeast (Graymer, 1996; Crane, 1988). The geologic structure has been mapped as the southernmost extent of a southeast trending anticline that is truncated towards the southeast by the Greennville fault. The dominant structural geologic feature in the vicinity is the active Greenville fault located approximately 100 to 1500 feet to the northeast. Geosyntec (2009), postulated that a splay of the Greenville fault may play a role in the presence of the oil seeps at the Bear Creek Development.

Historic aerial photographs covering the site from the years between 1949 and 2010 were reviewed for geologic features. Additionally, we reviewed a January 1989 BSK Geologic Hazard and Seismic Investigation report for the property that includes the Bear Creek Development. Figure 2 of their report documents the approximate location of observed near surface hydrocarbons. We have outlined this location on Figure 1 of this report. We also reviewed a 2000 Berlogar Geotechnical (BGC) exploration covering the site just north of the Garaventa site, in which several exploratory trenches were excavated across the site to the north. No oil seeps or evidence of near surface hydrocarbons were reported from the BGC report on the property to the north.

ENGEO published a 2010 geotechnical recommendations report for the subject site. Ten subsurface borings were drilled at the site as part of the exploration. No evidence of hydrocarbons was detected in the borings drilled at the site. Additionally, ENGEO recently conducted a geotechnical exploration for the Hawk Street Bridge. Four borings were advanced during this recent exploration and no evidence of hydrocarbons was detected in the borings for this exploration.

SITE RECONNAISSANCE

On May 2, 2012 an ENGEO Certified Engineering Geologist visited the site to map bedding on bedrock outcrops at the site and to look for any signs of present or past oil seeps at the subject site. Several bedrock outcrops are present in the northwest and central portions of the site. The bedrock exposed at the site generally comprised light gray to gray, medium grained, medium strong to strong, thin to thick bedded, sandstone and conglomerate. Ten bedding attitudes were measured and recorded from six areas of the site (Figure 1). Bedding attitudes generally dip 20 to 40 degrees towards the west, with northwesterly to northeasterly strikes. The actual bedding attitudes measured at the sight contrast with the published mapping, which show bedding dipping steeply towards the south. During our site reconnaissance no oil seeps, oil staining, or hydrocarbon odors were observed or detected.

COMPILATION OF MAPS, PLANS AND REPORTS

Using AutoCAD we compiled plans, aerial photography, geologic mapping and the areas of reported near-surface hydrocarbons, and oil seeps. Using the compiled information we constructed a site plan (Figure 1) and cross section (Figure 2) across the geologic structure of the site, the area where the near surface hydrocarbons are present, and the approximate extent of oil bearing strata. According to information provided in the 2009 Geosyntec report and information on bedding from the 1989 BSK report, the approximate extent of oil bearing strata represents the location where southeast dipping beds within the Greenville sands project to the surface. We have depicted this on our cross section (Figure 2). In addition, on our cross section we have depicted the approximate apparent dips of bedding across the Garaventa site based on our recent field mapping. The cross section clearly shows the structural discordance between the west dipping beds at the north and the south dipping beds where the oil bearing strata is located to the south (Figure 2).

DISCUSSION AND RECOMMENDATIONS

The current information with regard to the presence of near surface hydrocarbons at the Bear Creek Development located just south of the subject site indicates that the hydrocarbons are derived from the oil bearing Greenville Sands member of the Cierbo Formation that is mapped as dipping towards the southeast under the Bear Creek site. Recent mapping by ENGEO indicates that bedding within the Cierbo formation dips towards the west at the Garaventa site. This structural discordance appears to indicate that the geologic structure reflected in the bedding is not continuous from the Bear Creek site towards the north to the Garaventa Hills site. Because of this, it is unlikely that the oil bearing Greenville Sands are present at the near surface below the Garaventa Hills site. This is supported by the lack of evidence for naturally occurring near surface hydrocarbons during the two ENGEO subsurface explorations conducted at the site, our recent reconnaissance mapping at the site and the work performed by BGC on the site located to the north.

In our opinion it is unlikely that naturally occurring near surface hydrocarbons will be encountered at the Garaventa Hills site. The absence of naturally occurring hydrocarbons should be confirmed during grading of the site. If encountered during grading the following mitigation measures should be implemented:

- We recommend that the area where naturally occurring near surface hydrocarbons are encountered be overexcavated a minimum of 10 feet below proposed finish grade and replaced with engineered fill. This will provide a low permeable fill cap to prevent the upward migration of hydrocarbons.

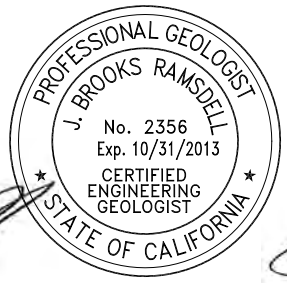
- Where proposed storm drain lines cross areas where naturally occurring near surface hydrocarbons are encountered we recommend that the area be overexcavated a minimum of 5 feet beyond the outside diameter of the proposed storm drain line. The excavation should be backfilled with engineered fill and the storm drain line trenched through the fill. The storm drain trench within the previously overexcavated and backfilled area should be lined with 20 mil visqueen prior to placement of shading and the storm drain line.

The conclusions and recommendations contained in this report are solely professional opinions. The professional staff of ENGEO Incorporated strives to perform its services in a proper and professional manner with reasonable care and competence but is not infallible. This report is based upon the review of published geologic information, and documents made available by RL Communities, field and other conditions discovered at the time of preparation of ENGEO's report.

We are pleased to provide our services to you on this project and look forward to consulting further with you in the future.

Sincerely,

ENGEO Incorporated



J. Brooks Ramsdell, CEG
Associate

Shawn Munger, CHG
Principal

Attachments: Selected References
Figure 1 – Site Plan
Figure 2 – Cross Sections

SELECTED REFERENCES

Berlogar Geotechnical Consultants. Preliminary Geotechnical Investigation, The DeSilva Group Master Plan of Vasco – Laughlin Specific Plan Areas, Livermore, California. Job No. 2311.100. December 26, 2000.

Blake, R.G., 2009, Altamont Creek Neighborhood, Bear Creek Drive Oil Seep Project, Livermore, California, April 22, 2009

BSK and Associates. Geologic and Seismic Hazards Investigation, 48.5 Acre Property, Laughlin Road, Livermore, California. BSK and Associates Job P88138. January 18, 1989.

BSK and Associates. Geologic and Seismic Hazards Investigation and Preliminary Soils Investigation for Quint Investment Associates, 40 Acre Property, Laughlin Road, Livermore, California. BSK and Associates Job P89006. May 8, 1989.

BSK and Associates. Geologic and Seismic Hazards Investigation for East County Investors, 32.8 Acre Property, Laughlin Road, Livermore, California.

BSK and Associates Job P88153. February 9, 1989. BSK and Associates, 1989, Geologic and Seismic Hazards Investigation, 48.5 Acre Property, Laughlin Road, Livermore, California, P88138, January 18, 1989.

Crane, R., 1988, Geologic Map of the Altamont Quadrangle, Geology of the Mount Diablo Region, in Guidebook for 1988 Pacific Section NCGS Convention.

Dibblee, T. W., Jr., 2006, Geologic Map of the Altamont Quadrangle, Alameda and Contra Costa Counties, DF-197.

ENGEO, Incorporated, 2010, Preliminary Geotechnical Recommendations Report, Proposed Garaventa Hills Estates, Livermore, California, Project No. 9126.000.000, November 30, 2010.

ENGEO, Incorporated, 2012, Geotechnical Exploration, Hawk Street Bridge, Livermore, California, In preparation

Geosyntec Consultants, 2009, Assessment of Natural Oil Seeps, Bear Creek Drive Storm Drain Protection, Bear Creek Development, Livermore, California, Project No. WR1218, August 26, 2009.

Google Earth, historic aerial photo imagery available for site spanning from the year 1993 to 2011.

Graymer, R.W., et al.; 1996, Preliminary Geologic Map Emphasizing Bedrock in Alameda County, California, USGS, Open File Report 96-252.

Historic Aerials by NETR, Livermore, California, 1949, 1959, 1966, 1979, 1987, 2002, 2005, http://www.historicaerials.com/.

Jennings, C. W.; 2010 Fault Activity Map of California, California Division of Mines and Geology, Map No. 6.

COPYRIGHT © 2012 BY ENGEO INCORPORATED. THIS DOCUMENT MAY NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER, NOR MAY IT BE QUOTED OR EXCERPTED WITHOUT THE EXPRESS WRITTEN CONSENT OF ENGEO INCORPORATED.

EXPLANATION

- APPROXIMATE LOCATION OF OIL SEEP (GEOSYNTEC, 2009)
- APPROXIMATE LOCATION OF STORM DRAIN IMPACTED BY NATURALLY OCCURRING HYDROCARBONS (GEOSYNTEC, 2009)
- APPROXIMATE LOCATION OF LIMITS OF OIL BEARING STRATA EXPOSED NEAR GROUND SURFACE (GEOSYNTEC, 2009)
- 40 — STRIKE AND DIP OF BEDDING
- 30 — STRIKE AND DIP OF BEDDING (BSK, 1989)
- Tc — CIERBO FORMATION
- 1 — 1' — APPROXIMATE LOCATION OF CROSS SECTION

N

0 FEET 100

0 METERS 50

BASE MAP SOURCE: UNKNOWN

ENGEO Expect Excellence

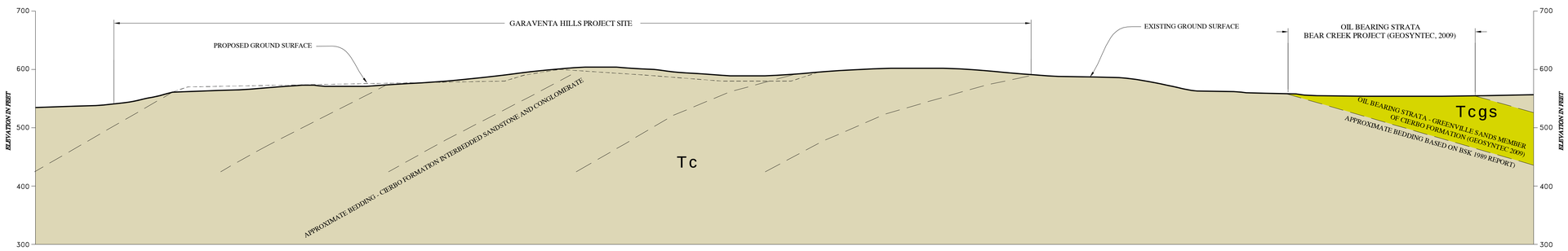
SITE PLAN
GARAVENTA HILLS ESTATES
LIVERMORE, CALIFORNIA

PROJECT NO.: 9126.000.000
SCALE: AS SHOWN
DRAWN BY: SRP
CHECKED BY: BB

FIGURE NO. 1

ORIGINAL FIGURE PRINTED IN COLOR

G:\Drafting\DRAFTING2_Dwg\9126\000\GEO-REVIEW\9126000000-1-SitePlan-0512.dwg Plot Date:5-07-12 spatters



EXPLANATION

Tc	CIERBO FORMATION
Tcgs	GREENVILLE SANDS MEMBER OF CIERBO FORMATION

ENGEO Expect Excellence

CROSS SECTION 1-1'
GARAVENTA HILLS ESTATES
LIVERMORE, CALIFORNIA

PROJECT NO.: 9126.000.000
SCALE: AS SHOWN
DRAWN BY: SRP
CHECKED BY: BB
FIGURE NO: 2

COPYRIGHT © 2013 BY ENGEO INCORPORATED. THIS DOCUMENT MAY NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER, NOR MAY IT BE QUOTED OR EXCERPTED WITHOUT THE EXPRESS WRITTEN CONSENT OF ENGEO INCORPORATED.

Project No.
9126.000.000

June 28, 2012

Mr. Pat Toohey
RL Communities
5000 Executive Parkway, Suite 530
San Ramon, CA 94593

Subject: Garaventa Hills Estates
Livermore, California

RESPONSE TO COMMENTS REGARDING
NATURALLY OCCURRING NEAR-SURFACE HYDROCARBONS

Dear Mr. Toohey:

This letter presents our response to the technical opinion letter by the City of Livermore peer review consultant, Geosyntec Consultants presented in Reference 3. ENGEO previously conducted a review and reconnaissance regarding naturally occurring near-surface hydrocarbons for the proposed Garaventa Hills Estates project in Livermore, California.

Geosyntec (Reference 3), concluded that "*The preliminary geotechnical investigation conducted by ENGEO is sufficient to verify that naturally occurring oil bearing sand units do not exist at the surface or shallow depths near surface (less than 26-1/2 feet bgs). However, oil-bearing strata could exist at greater depths beneath the proposed Development. If present, the oil could become exposed at the surface as a result of deep excavations associated with mass grading of the Development or through future seismic activity that creates a new conduit or pathway for deep oil to migrate to the surface". To provide a more definitive conclusion of the possibility for oil to become exposed at the ground surface as a result of either of these events, we would recommend an additional subsurface exploration program consisting of drilling exploratory borings to a minimum depth of 50 feet bgs at three (3) to four (4) locations around the proposed Development."*

We concur with most of the above conclusion, however, do not believe there is a need to drill additional borings and would like to add the following additions and clarifications.

ENGEO recently completed a foundation exploration for the proposed Hawk Street Bridge project across the Altamont Creek and Alameda County Flood Control Facilities in Livermore, California. This bridge will provide access to the proposed Garaventa Hills Estates Development. The foundation exploration for the proposed bridge included the drilling of four borings. Table 1 below summarizes the exploration locations, elevations and depths. Locations of the borings are presented graphically on Figure 1, and the boring logs are included as an appendix to this letter.

TABLE 1
Summary of Exploration Locations

Exploration Location	Date Sampled	Top Elevation (NGVD 29) (feet)	Bottom Elevation (NGVD 29) (feet)	Total Depth (feet)
B-1	5/2/2012	536.0	491.0	45.0
B-2	5/1/2012	534.0	490.0	44.0
B-3	5/1/2012	535.0	491.0	44.0
B-4	4/30/2012	536.0	474.0	62.0

As shown on the table above, borings for the recent bridge exploration ranged in depth from 44 to 62 feet below the ground surface. These borings were located on the southwestern flank of the topographic high that is near previous Boring 1-B5, an area where Geosyntec recommends an additional 50-foot-deep boring (Figure 1). No evidence of hydrocarbons was detected in the borings to a depth of 62 feet drilled at this location.

It should also be noted that proposed grading at the site includes cuts with a maximum depth of 20 feet and fills up to 30 feet thick. The majority of these cuts are on the central portion of the existing knoll and not on the perimeter of the site where Geosyntec postulates that the oil-bearing strata trend as they wrap around the southwestern and northeastern sides of the topographic high. It is generally on the flanks of the topographic high where the oil-bearing strata are postulated to trend and it is in these areas where fills are generally proposed.

For clarification, it should be noted that the strike and dip measurements from Huey (1948) plotted on Figure 2 of the Geosyntec letter (Reference 3) appear to be incorrectly located. Three of the bedding attitudes from Huey (with dip angles of 12, 32 and 40 degrees) are from an area located roughly 2,000 feet northwest of the Garaventa Hills Estates site. The remaining attitude from Huey (60 degree southeasterly dip) is located in the northwestern portion of the Garaventa Hills Estates site and, based on our field mapping, was incorrectly mapped. Bedding attitudes in that area are clearly dipping gently towards the west. The presence of a southeast-plunging anticline below the subject site is questionable, and consequently, the projection of the oil-bearing strata around the southwestern and northeastern sides of the topographic high is questionable.

DISCUSSION AND RECOMMENDATIONS

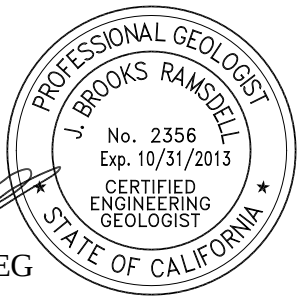
It is our opinion that additional borings are unnecessary. In comparison to exposure that would be provided by the suggested borings, the exposures that will be created during mass grading of the site will provide a far more extensive view of the lithology and bedrock structure underlying the site. We recommend that observations be made during mass grading of the site to confirm the absence of naturally occurring hydrocarbons. If encountered during grading, mitigation measures as provided in our May 7, 2012, letter should be implemented.

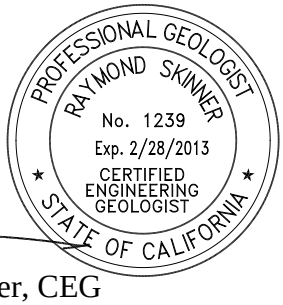
The conclusions and recommendations contained in this report are solely professional opinions. The professional staff of ENGEO Incorporated strives to perform its services in a proper and professional manner with reasonable care and competence but is not infallible. This letter is based upon the review of published geologic information, and documents made available by RL Communities, field and other conditions discovered at the time of preparation of ENGEO's letter.

We are pleased to provide our services to you on this project and look forward to consulting further with you in the future.

Sincerely,

ENGEO Incorporated





J. Brooks Ramsdell, CEG Raymond P. Skinner, CEG

jbr/rps/jf

Attachments: Selected References
Figure 1 – Site Plan
Appendix – Borelogs – Hawk Street Bridge Exploration (ENGEO 2012)

SELECTED REFERENCES

ENGEO, 2010, Preliminary Geotechnical Recommendations Report, Proposed Garaventa Hills Estates, Livermore, California, Project No. 9126.000.000, November 30, 2010.

ENGEO, 2012, Geotechnical Exploration, Hawk Street Bridge, Livermore, California, (in preparation).

Geosyntec Consultants, 2012, Review of Impacts from Naturally Occurring Oil Seeps on the Proposed Garaventa Hills Estates Development, Livermore, California, Project No. WR1627, June 11, 2012.

Geosyntec Consultants, 2009, Assessment of Natural Oil Seeps, Bear Creek Drive Storm Drain Protection, Bear Creek Development, Livermore, California, Project No. WR1218, August 26, 2009.

Huey, A. S., 1948, Geology of the Tesla quadrangle, California: California Division of Mines, Bulletin 140, 75 p., scale 1:62,500

COPYRIGHT © 2012 BY ENGEO INCORPORATED. THIS DOCUMENT MAY NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER, NOR MAY IT BE QUOTED OR EXCERPTED WITHOUT THE EXPRESS WRITTEN CONSENT OF ENGEO INCORPORATED.

WESTERN TITLE INSURANCE COMPANY

TRACT 6696

LOT C

HOM & LAI

LIVERMORE AREA RECREATION & PARKS DISTRICT

CITY OF LIVERMORE

LOT A

LOT B

LOT C

LOT D
DETENTION BASIN

ALAMEDA COUNTY
FLOOD CONTROL

ALTAMONT CREEK

LINDQUIST

BEAR CREEK DRIVE

NICELEY

NEELY

BLACKOAK COURT

Tc

1-B1
1-B2
1-B3
1-B4
1-B5
1-B6
1-B7
1-B8
1-B9
1-B10
B-1
B-2
B-3
B-4

N

0 FEET 100
0 METERS 50

EXPLANATION

- B4 — APPROXIMATE LOCATION OF BORING (ENGEO, 2012)
- 1-B10 — APPROXIMATE LOCATION OF BORING (ENGEO, 2010)
- APPROXIMATE LOCATION OF OIL SEEP (GEOSYNTEC, 2009)
- APPROXIMATE LOCATION OF STORM DRAIN IMPACTED BY NATURALLY OCCURRING HYDROCARBONS (GEOSYNTEC, 2009)
- APPROXIMATE LOCATION OF LIMITS OF OIL BEARING STRATA EXPOSED NEAR GROUND SURFACE (GEOSYNTEC, 2009)
- 40 — STRIKE AND DIP OF BEDDING
- 30 — STRIKE AND DIP OF BEDDING (BSK, 1989)
- 60 — STRIKE AND DIP OF BEDDING (HUEY, 1948)
- Tc — CIERBO FORMATION

BASE MAP SOURCE: UNKNOWN

ENGEO Expect Excellence

SITE PLAN
GARAVENTA HILLS ESTATES
LIVERMORE, CALIFORNIA

PROJECT NO.: 9126.000.000
SCALE: AS SHOWN
DRAWN BY: JBR CHECKED BY: DLB

FIGURE NO. 1

G:\Drafting\DRAFTING2_Dwg\9126\000\GEO-REVIEW\9126000000-1-SitePlan-0612.dwg Plot Date:6-28-12 dborde

ORIGINAL FIGURE PRINTED IN COLOR

APPENDIX

Borelogs (ENGEO, 2012)
Hawk Street Bridge Exploration

KEY TO BORING LOGS

MAJOR TYPES			DESCRIPTION
COARSE-GRAINED SOILS MORE THAN HALF OF MAT'L LARGER THAN #200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LESS THAN 5% FINES	GW - Well graded gravels or gravel-sand mixtures GP - Poorly graded gravels or gravel-sand mixtures
		GRAVELS WITH OVER 12 % FINES	GM - Silty gravels, gravel-sand and silt mixtures GC - Clayey gravels, gravel-sand and clay mixtures
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LESS THAN 5% FINES	SW - Well graded sands, or gravelly sand mixtures SP - Poorly graded sands or gravelly sand mixtures
		SANDS WITH OVER 12 % FINES	SM - Silty sand, sand-silt mixtures SC - Clayey sand, sand-clay mixtures
FINE-GRAINED SOILS MORE THAN HALF OF MAT'L SMALLER THAN #200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50 % OR LESS		ML - Inorganic silt with low to medium plasticity CL - Inorganic clay with low to medium plasticity OL - Low plasticity organic silts and clays
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50 %		MH - Elastic silt with high plasticity CH - Fat clay with high plasticity OH - Highly plastic organic silts and clays
	HIGHLY ORGANIC SOILS		PT - Peat and other highly organic soils

For fine-grained soils with 15 to 29% retained on the #200 sieve, the words "with sand" or "with gravel" (whichever is predominant) are added to the group name.

For fine-grained soil with >30% retained on the #200 sieve, the words "sandy" or "gravelly" (whichever is predominant) are added to the group name.

GRAIN SIZES

U.S. STANDARD SERIES SIEVE SIZE					CLEAR SQUARE SIEVE OPENINGS			
200	40	10	4	3/4 "	3"	12"		
SILTS AND CLAYS	SAND			GRAVEL			COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE			

RELATIVE DENSITY

SANDS AND GRAVELS	BLOWS/FOOT (S.P.T.)
VERY LOOSE	0-4
LOOSE	4-10
MEDIUM DENSE	10-30
DENSE	30-50
VERY DENSE	OVER 50

CONSISTENCY

SILTS AND CLAYS	STRENGTH*
VERY SOFT	0-1/4
SOFT	1/4-1/2
MEDIUM STIFF	1/2-1
STIFF	1-2
VERY STIFF	2-4
HARD	OVER 4

SAMPLER SYMBOLS

- Modified California (3" O.D.) sampler
- California (2.5" O.D.) sampler
- S.P.T. - Split spoon sampler
- Shelby Tube
- Continuous Core
- Bag Samples
- Grab Samples
- NR No Recovery

MOISTURE CONDITION

DRY	Dusty, dry to touch
MOIST	Damp but no visible water
WET	Visible freewater

LINE TYPES

- ———— Solid - Layer Break
- – – – – – Dashed - Gradational or approximate layer break

GROUND-WATER SYMBOLS

- Groundwater level during drilling
- Stabilized groundwater level

(S.P.T.) Number of blows of 140 lb. hammer falling 30" to drive a 2-inch O.D. (1-3/8 inch I.D.) sampler

* Unconfined compressive strength in tons/sq. ft., asterisk on log means determined by pocket penetrometer

ENGEO INCORPORATED

LOG OF BORING B-1

ENGEO INCORPORATED

Geotechnical Exploration
Hawk Street Bridge
Livermore/Alameda County, CA
9475.000.000

DATE DRILLED: 5/2/2012
HOLE DEPTH: Approx. 45½ ft.
HOLE DIAMETER: 8.0 in.
SURF ELEV: Approx. 536 ft. (NGVD 29)

LOGGED / REVIEWED BY: J. White / TPB
DRILLING CONTRACTOR: Britton Exploration
DRILLING METHOD: Hollow Stem Auger
HAMMER TYPE: 140 lb. Auto Trip

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			Run 1 from 0 to 4 feet, Recovery = 4 feet SILTY CLAY (CL); stiff, very dark brown; moist; with fine gravel										
	1												
5			SANDY lean CLAY (CL); very stiff, brown, moist, with fine gravel and sand			18	32	12	20		18.1	110.9	2.5*
	2		Run 2 from 5.5 to 10 feet, Recovery = 4.5 feet										
					▽								
10	3		SILTY SAND (SM); medium dense; reddish brown; wet; fine to medium sand			13	27	16	11		22.3		
			Run 3 from 11.5 to 15 feet, Recovery = 3.5 feet										
	4												
15			CLAYEY SAND (SC); dense; greenish gray; moist; with fine to coarse gravel.			42				45	17.5 16	110.6	3.1
	5		Run 4 from 16.5 to 20 feet, Recovery = 3.5 feet										
20	6		SANDY lean CLAY (CL); very stiff; greenish gray; moist; few fine gravels.			13	64	15	49		25		3.0*
			Run 5 from 21.5 to 25 feet, Recovery = 3.5 feet										
	7												
25													

LOG OF BORING B-1

ENGEO INCORPORATED

Geotechnical Exploration
Hawk Street Bridge
Livermore/Alameda County, CA
9475.000.000

DATE DRILLED: 5/2/2012
HOLE DEPTH: Approx. 45½ ft.
HOLE DIAMETER: 8.0 in.
SURF ELEV: Approx. 536 ft. (NGVD 29)

LOGGED / REVIEWED BY: J. White / TPB
DRILLING CONTRACTOR: Britton Exploration
DRILLING METHOD: Hollow Stem Auger
HAMMER TYPE: 140 lb. Auto Trip

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
	8		SEDIMENTARY ROCK (SANDSTONE), coarse-grained, fresh, extremely weak, very intensely fractured, poorly cemented. Run 6 from 25.5 to 30 feet, Recovery = 4.5 feet, RQD = 0%			50/2"							
			Greenish gray										
	9												
30						50/1"							
			Run 7 from 30.5 to 35 feet, Recovery = 4.5 feet, RQD = 60%										
	10												
			Poorly cemented, few fine gravels, weak										
35						50/3"							
			Run 8 from 35.5 to 40 feet, Recovery = 4.5 feet, RQD = 60%										
	11												
	12												
40						50/2"							
	13												
45						50/4"							
			Bottom of boring at 45.5 feet, groundwater encountered at 9 feet.										

LOG OF BORING B-2

ENGEO INCORPORATED

Geotechnical Exploration
Hawk Street Bridge
Livermore/Alameda County, CA
9475.000.000

DATE DRILLED: 5/1/2012
HOLE DEPTH: Approx. 44½ ft.
HOLE DIAMETER: 8.0 in.
SURF ELEV: Approx. 535 ft.(NGVD 29)

LOGGED / REVIEWED BY: J. White / TPB
DRILLING CONTRACTOR: Britton Exploration
DRILLING METHOD: Hollow Stem Auger
HAMMER TYPE: 140 lb. Auto Trip

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			SILTY lean CLAY (CL); dark reddish brown; very stiff; moist; with fine sand; few fine to coarse gravels.			17					21.3	105.3	2.5*
	1		Some iron staining										
5						18					11.1		2.5*
	2												
			CLAYEY SAND (SC); dense; greenish gray; moist; fine grained sand.			36	25	12	13	45	14.7	117.6	
10	3												
	4												
15						34					13.6		
	5												
			SEDIMENTARY ROCK (SANDSTONE), coarse-grained, fresh, extremely weak, very intensely fractured, poorly cemented.			50/4"							
20	6				▽								
	7					50/5"							
25													

LOG - GEOTECHNICAL 9475 GINT STD.GPJ ENGEO INC.GDT 5/11/12

LOG OF BORING B-2

ENGEO INCORPORATED

Geotechnical Exploration
Hawk Street Bridge
Livermore/Alameda County, CA
9475.000.000

DATE DRILLED: 5/1/2012
HOLE DEPTH: Approx. 44½ ft.
HOLE DIAMETER: 8.0 in.
SURF ELEV: Approx. 535 ft. (NGVD 29)

LOGGED / REVIEWED BY: J. White / TPB
DRILLING CONTRACTOR: Britton Exploration
DRILLING METHOD: Hollow Stem Auger
HAMMER TYPE: 140 lb. Auto Trip

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
	8		SEDIMENTARY ROCK (SANDSTONE), coarse-grained, fresh, extremely weak, very intensely fractured, poorly cemented.										
						50/6"							
30	9												
			Minor rig chatter, gravel beds.										
	10												
						50/4"							
35													
	11												
	12					50/3"							
40													
	13												
						50/2"							
			Bottom of boring at 44.5 feet, groundwater encountered at 21 feet.										

LOG OF BORING B-3

Geotechnical Exploration
Hawk Street Bridge
Livermore/Alameda County, CA
9475.000.000

DATE DRILLED: 4/30/2012
HOLE DEPTH: Approx. 44 ft.
HOLE DIAMETER: 8.0 in.
SURF ELEV: Approx. 534 ft. (NGVD 29)

LOGGED / REVIEWED BY: J. White / TPB
DRILLING CONTRACTOR: Britton Exploration
DRILLING METHOD: HSA, Switch to Mud
HAMMER TYPE: 140 lb. Auto Trip

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			CLAYEY SAND (SC); dense; yellowish brown; moist; medium grained sand, few gravels, iron staining			25					19.2	106	
	1		Increasing clay content, medium dense										
5						15					18		
	2												
			SANDY lean CLAY (CL); very stiff; greenish gray; moist; medium grained sand, few fine gravels.			32					22.16	101.84	3.0*
10	3												
	4		CLAYEY SAND (SC); dense; greenish gray; moist; fine grained sand.			27	42	17	25	26	23.5		
15													
	5												
					▽	48					25.6		
20	6												
	7		SEDIMENTARY ROCK (SANDSTONE), coarse-grained, fresh, extremely weak, very intensely fractured, poorly cemented.			50/3"							
25													

LOG OF BORING B-3

Geotechnical Exploration
Hawk Street Bridge
Livermore/Alameda County, CA
9475.000.000

DATE DRILLED: 4/30/2012
HOLE DEPTH: Approx. 44 ft.
HOLE DIAMETER: 8.0 in.
SURF ELEV: Approx. 534 ft. (NGVD 29)

LOGGED / REVIEWED BY: J. White / TPB
DRILLING CONTRACTOR: Britton Exploration
DRILLING METHOD: HSA, Switch to Mud
HAMMER TYPE: 140 lb. Auto Trip

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
	8												
	9					50/5"							
30													
	10												
			Start HQ Coring at 34 feet. Run 1 from 34 to 39 feet, Recovery = 2 inches, RQD = 0%										
35													
	11		Rig chatter, gravel beds.										
			Run 2 from 39 to 44 feet, Recovery = 2 inches, RQD = 0% Very poorly cemented with gravel.										
	12												
40													
			Rig chatter.										
	13												
			Bottom of boring at 44 feet, perched groundwater at 30 feet.										

LOG OF BORING B-4

ENGEO INCORPORATED

Geotechnical Exploration
Hawk Street Bridge
Livermore/Alameda County, CA
9475.000.000

DATE DRILLED: 4/30/2012
HOLE DEPTH: Approx. 62 ft.
HOLE DIAMETER: 8.0 in.
SURF ELEV: Approx. 536 ft. (NGVD 29)

LOGGED / REVIEWED BY: J. White / TPB
DRILLING CONTRACTOR: Britton Exploration
DRILLING METHOD: HSA, Switch to Mud
HAMMER TYPE: 140 lb. Auto Trip

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			Asphalt										
	1		CLAYEY SAND (SC); dense; yellowish brown; moist; medium grained sand, some iron staining.			21					24.5	97	
5	2		Fine grained, medium dense.			22					18.5		
10	3		Light greenish gray; with gravel up to 1/2-inches, partially cemented.			33					23.3	101.1	
15	5		SANDY CLAY (CL); very stiff; yellowish brown; moist; medium grained sand.			28	45	19	26	60	17.8		
			SEDIMENTARY ROCK (SANDSTONE), coarse-grained, fresh, extremely weak, very intensely fractured, poorly cemented.		▽								
20	6					50/3"							
	7												
25													

LOG OF BORING B-4

ENGEO INCORPORATED

Geotechnical Exploration
Hawk Street Bridge
Livermore/Alameda County, CA
9475.000.000

DATE DRILLED: 4/30/2012
HOLE DEPTH: Approx. 62 ft.
HOLE DIAMETER: 8.0 in.
SURF ELEV: Approx. 536 ft. (NGVD 29)

LOGGED / REVIEWED BY: J. White / TPB
DRILLING CONTRACTOR: Britton Exploration
DRILLING METHOD: HSA, Switch to Mud
HAMMER TYPE: 140 lb. Auto Trip

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
	8		SEDIMENTARY ROCK (SANDSTONE), coarse-grained, fresh, extremely weak, very intensely fractured, poorly cemented. Fine grained			29							
	9												
30						50/1"							
	10		Start HQ Coring at 32 feet. Run 1 from 32 to 37 feet, Recovery = 3.5 feet, RQD = 53%										
35			Yellowish brown and gray; coarse grained; weak; moderately weathered; thickly bedded, some red staining.										
	11												
			Run 2 from 37 to 42 feet, Recovery = 0, RQD = 0%										
	12												
40			Conglomerate beds.										
			Run 3 from 42 to 47 feet, Recovery = 1.5 feet, RQD = 20%										
	13												
45													
	14		Loose gravel 1/4 to 2 inch in sample.										
			Run 4 from 47 to 52 feet, Recovery = 1.5 feet, RQD = 13% Moderately strong; well cemented.										
	15												
50													

LOG OF BORING B-4

Geotechnical Exploration
Hawk Street Bridge
Livermore/Alameda County, CA
9475.000.000

DATE DRILLED: 4/30/2012
HOLE DEPTH: Approx. 62 ft.
HOLE DIAMETER: 8.0 in.
SURF ELEV: Approx. 536 ft. (NGVD 29)

LOGGED / REVIEWED BY: J. White / TPB
DRILLING CONTRACTOR: Britton Exploration
DRILLING METHOD: HSA, Switch to Mud
HAMMER TYPE: 140 lb. Auto Trip

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			SEDIMENTARY ROCK (SANDSTONE), coarse-grained, fresh, extremely weak, very intensely fractured, poorly cemented.										
	16		Run 5 from 52 to 57 feet, Recovery = 1 feet, RQD = 13%										
			Siltstone interbed, gray, very weak.										
55			Rig chatter from 52 to 62 feet, gravel beds.										
	17		Run 6 from 57 to 62 feet, Recovery = 0, RQD = 0										
	18												
60			Bottom of boring at 62 feet, no groundwater encountered.										

PHASE I ENVIRONMENTAL SITE ASSESSMENT REPORT

PROPOSED GARAVENTA HILLS ESTATES
LIVERMORE, CALIFORNIA

Submitted to:

Mr. Scott Roylance
RL Communities
San Ramon, CA 94583

Prepared by:
ENGEO Incorporated

November 24, 2010
Project No. 9126.000.000

Copyright © 2010 By ENGEO Incorporated. This Document May Not Be Reproduced In Whole Or In Part By Any Means Whatsoever, Nor May It Be Quoted Or Excerpted Without The Express Written Consent Of ENGEO Incorporated

- Expect Excellence -

Project No.
9126.000.000

November 24, 2010

Mr. Scott Roylance
RL Communities
5000 Executive Parkway, Suite 530
San Ramon, CA 94583

Subject: Proposed Garaventa Hills Estates
APN 099B-5300-010
Livermore, California

PHASE I ENVIRONMENTAL SITE ASSESSMENT

Dear Mr. Roylance:

ENGEO is pleased to present our phase I environmental site assessment of the subject property (Property), which is located in Livermore, California. The attached report includes a description of the site assessment activities, along with ENGEO's findings, opinions, and conclusions regarding the Property.

ENGEO has the specific qualifications based on education, training, and experience to assess the nature, history, and setting of the Property, and has developed and performed all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312. We declare that, to the best of our professional knowledge and belief, the responsible charge for this study meets the definition of Environmental Professional as defined in Section 312.10 of 40 CFR 312 and ASTM 1527-05.

We are pleased to be of service to you on this project. If you have any questions concerning the contents of our report, please contact us.

Sincerely,

ENGEO Incorporated

Richard Gandolfo
rg/sm/dt:esa

Shawn Munger, CHG, REAII

TABLE OF CONTENTS

Letter of Transmittal

Page

EXECUTIVE SUMMARY 1

1.0 INTRODUCTION 2

1.1 PURPOSE OF PHASE I ENVIRONMENTAL SITE ASSESSMENT 2
1.2 DETAILED SCOPE OF SERVICES 2
1.3 LIMITATIONS AND EXCEPTIONS OF ASSESSMENT 2
1.4 SPECIAL TERMS AND CONDITIONS 3

2.0 PROPERTY INFORMATION 4

2.1 SITE LOCATION 4
2.2 SITE AND VICINITY CHARACTERISTICS 4
2.3 CURRENT USE OF PROPERTY/DESCRIPTION OF SITE IMPROVEMENTS 4
2.4 CURRENT USE OF ADJOINING PROPERTIES 4

3.0 RECORDS REVIEW 5

3.1 PROPERTY RECORDS 5
3.1.1 Title Report/Ownership 5
3.2 HISTORICAL RECORD SOURCES 5
3.2.1 Historical Topographic Maps 5
3.2.2 Aerial Photographs 6
3.2.3 Fire Insurance Maps 7
3.2.4 City Directory 7
3.2.5 Government Agencies 7
3.2.6 Previous Reports 7
3.3 ENVIRONMENTAL RECORD SOURCES 7
3.3.1 Federal ASTM Standard/Supplemental Sources 8
3.3.1.1 Subject Property 8
3.3.1.2 Other Properties 8
3.3.2 State ASTM Standard/Supplemental Sources 8
3.3.2.1 Subject Property 8
3.3.2.2 Other Properties 8
3.3.3 Local ASTM Supplemental Sources 8
3.3.3.1 Subject Property 8
3.3.3.2 Other Properties 9
3.3.4 EDR Summary 9

4.0 SITE RECONNAISSANCE 9

4.1 METHODOLOGY 9

TABLE OF CONTENTS (Continued)

4.2 GENERAL SITE SETTING....9
4.3 EXTERIOR OBSERVATIONS....9
4.4 ASBESTOS-CONTAINING MATERIALS (ACM) AND LEAD-BASED PAINT (LBP)....10
4.5 INDOOR AIR QUALITY....10

5.0 INTERVIEWS....11

6.0 FINDINGS....11

7.0 OPINIONS AND DATA GAPS....11

8.0 CONCLUSIONS....11

REFERENCES
FIGURES
APPENDIX A – Environmental Data Resources, Inc., Radius Map Report
APPENDIX B – First American Title Company, Preliminary Title Report
APPENDIX C – Environmental Data Resources, Inc., Historical Topographic Map Report
APPENDIX D – Environmental Data Resources, Inc., Aerial Photo Decade Package
APPENDIX E – Environmental Data Resources, Inc., Sanborn Map Report
APPENDIX F – Environmental Data Resources, Inc., City Directory Abstract
APPENDIX G – Environmental Site Assessment Questionnaire
APPENDIX H – Qualification of Environmental Professional

EXECUTIVE SUMMARY

ENGEO conducted a phase I environmental site assessment for the subject property (Property) located west of Vasco Road in Livermore, California. The Property measures approximately 31.67 acres in area and is identified with Assessor's Parcel Number 99B-5300-10.

Review of historical records indicates that the Property, which consists of fallow land, has been undeveloped since at least 1940. It is our understanding that the Property will be the site of a proposed residential development.

This assessment included a review of local, state, tribal, and federal environmental record sources, standard historical sources, aerial photographs, fire insurance maps and physical setting sources. A reconnaissance of the Property was conducted to review site use and current conditions to check for the storage, use, production, or disposal of hazardous or potentially hazardous materials. An interview was also conducted with persons knowledgeable about current and past site use of the Property.

The site reconnaissance and records review did not find documentation or physical evidence of soil or groundwater impairments associated with the current or past use of the Property. A review of regulatory databases maintained by county, state, tribal and federal agencies found no documentation of hazardous materials violations or discharge on the Property. The assessment did not identify contaminated facilities within the appropriate American Society for Testing and Materials (ASTM) search distances that would reasonably be expected to impact the Property.

Based on the findings of this assessment, neither Recognized Environmental Conditions (RECs) nor historical RECs were identified for the Property.

ENGEO has performed a phase I environmental site assessment of the Property in general conformance with the scope and limitations of ASTM E 1527-05 "Standard Practice for Environmental Site Assessments" and USEPA "Standards and Practices for All Appropriate Inquires", 40 CFR Part 312. Based on the findings of this assessment, no further environmental studies are recommended at this time.

1.0 INTRODUCTION

ENGEO conducted a phase I environmental site assessment for the subject property (Property) located east of Vasco Road in Livermore, California (Figure 1). The Property measures approximately 31.67 acres in area and is identified with Assessor's Parcel Number 99B-5300-10 (Figure 2).

1.1 PURPOSE OF PHASE I ENVIRONMENTAL SITE ASSESSMENT

This assessment was performed at the request of RL Communities, for the purpose of environmental due diligence during property transaction. The objective of this phase I environmental site assessment is to identify recognized environmental conditions associated with the Property. As defined in the ASTM Standard Practice E 1527-05, a REC is "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property."

1.2 DETAILED SCOPE OF SERVICES

The scope of services performed included the following:

- A review of publicly available and practically reviewable standard local, state, tribal and federal environmental record sources.
- A review of publicly available and practically reviewable standard historical sources, aerial photographs, fire insurance maps and physical setting sources.
- A reconnaissance of the Property to review site use and current conditions. The reconnaissance was conducted to check for the storage, use, production, or disposal of hazardous or potentially hazardous materials.
- Interviews with owners/occupants and public sector officials.
- Preparation of this report with our findings, opinions and conclusions.

1.3 LIMITATIONS AND EXCEPTIONS OF ASSESSMENT

The professional staff at ENGEO strives to perform its services in a proper and professional manner with reasonable care and competence but is not infallible. The recommendations and conclusions presented in this report were based on the findings of our study, which were developed solely from the contracted services. The findings of the report are based in part on contracted database research, out-of-house reports and personal communications. The opinions formed by ENGEO are based on the assumed accuracy of the relied upon data in conjunction

with our relevant professional experience related to such data interpretation. ENGEO assumes no liability for the validity of the materials relied upon in the preparation of this report.

This document must not be subject to unauthorized reuse; that is, reuse without written authorization of ENGEO. Such authorization is essential because it requires ENGEO to evaluate the document's applicability given new circumstances, not the least of which is passage of time under ASTM 1527-05 standards.

This phase I environmental site assessment is not intended to represent a complete soil or groundwater characterization, nor define the depth or extent of soil or groundwater contamination. It is intended to provide an evaluation of potential environmental concerns associated with the use of the Property. A more extensive assessment that would include a subsurface exploration with laboratory testing of soil, soil vapor, and/or groundwater samples could provide more definitive information concerning site-specific conditions. If additional assessment activities are considered for the Property and if other entities are retained to provide such services, ENGEO cannot be held responsible for any and all claims arising from or resulting from the performance of such services by other persons or entities. ENGEO can also not be held responsible from any and all claims arising or resulting from clarifications, adjustments, modifications, discrepancies or other changes necessary to reflect changed field or other conditions.

1.4 SPECIAL TERMS AND CONDITIONS

ENGEO has prepared this report for the exclusive use of our client, RL Communities. It is recognized and agreed that ENGEO has assumed responsibility only for undertaking the study for the client. The responsibility for disclosures or reports to a third party and for remedial or mitigative action shall be solely that of the Client.

The assessment did not include an asbestos survey, an evaluation of lead-based paint, an inspection of light ballasts for polychlorinated biphenyls (PCBs), a radon evaluation, or a mold survey.

This report is based upon field and other conditions discovered at the time of preparation of ENGEO's assessment. Visual observations referenced in this report are intended only to represent conditions at the time of the reconnaissance. ENGEO would not be aware of site contamination, such as dumping and/or accidental spillage that occurred subsequent to the reconnaissance conducted by ENGEO personnel.

2.0 PROPERTY INFORMATION

2.1 SITE LOCATION

The Property is located approximately ¼ mile east of Vasco Road and directly west of Bear Creek Road in Livermore, California (Figure 1). The Property measures approximately 31.67 acres in area and is identified with Assessor's Parcel Number 99B-5300-10 (Figure 2).

2.2 SITE AND VICINITY CHARACTERISTICS

The Property ranges in elevation from approximately 540 feet above mean sea level (msl) along the southwest portion of the Property to approximately 608 feet above msl at the central portion of the Property. Review of the Wagner Geologic Map of California found that the Property is underlain by Alluvium (Qa), which generally consists of marine sandstone and interbedded layers of silty sands and clays, as well as poorly graded gravels and the San Pablo Group (Msp), which consists of Marine sandstone.

Geocheck – Physical Setting Source Summary of the Environmental Resources Data (EDR) report (Appendix A) indicated there are two United States Geological Service (USGS) wells and two abandoned oil/gas wells located approximately 0.80 and 0.89 miles west and northwest of the Property, respectively.

We reviewed the Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) web site and map database (Region 6, Map #608) to determine if any historic oil and/or gas wells were located within the Property. Two abandoned/plugged oil/gas wells were mapped within one mile of the Property. The wells were reportedly abandoned in 1958 and 1968.

The site-specific depth to groundwater and direction of groundwater flow was not determined as part of this assessment. However, information viewed on the RWQCB indicates groundwater ranges approximately 15 to 45 feet below the ground surface in the vicinity of the Property. Fluctuations in groundwater levels may occur seasonally and over a period of years due to variations in precipitation, temperature, and irrigation practices.

2.3 CURRENT USE OF PROPERTY/DESCRIPTION OF SITE IMPROVEMENTS

The Property currently consists of undeveloped fallow land.

2.4 CURRENT USE OF ADJOINING PROPERTIES

The parcels to the north and west of the Property consist of undeveloped land, the parcels to the east consist of undeveloped land and residential houses, and the parcels to the south consist of undeveloped land and Altamont Creek Elementary School.

3.0 RECORDS REVIEW

3.1 PROPERTY RECORDS

3.1.1 Title Report/Ownership

The Title Report lists recorded land title detail, ownership fees, leases, land contracts, easements, liens, deficiencies, and other encumbrances attached to or recorded against a subject property. Laws and regulations pertaining to land trusts vary from state to state and the detail of information presented in a Title Report can vary greatly by jurisdiction. As a result, ENGEO utilizes a Title Report, when provided to us, as a supplement to other historical record sources.

The Preliminary Title Report, prepared by First American Title Company, dated August 13, 2010, indicates the Property is vested in the following.

- Alwin Robert Garaventa, Trustee, Garaventa Trust, dated July 24, 2009, as to an undivided 50% interest; and Sharon Lee Albright, Trustee of the third amended & restated Sharon Lee Albright revocable trust dated August 29, 2006, and Karen Jean Red Elk, Trustee of the Karen Jean Red Elk Revocable Trust, dated August 29, 2006, each as to an undivided one-half interest as tenants in common, as to an undivided 50% interest, as to parcel one; and

- Alwin Robert Garaventa, Trustee, Garaventa Trust, dated July 24, 2009, as to an undivided ½ interest and Sharon Lee Albright, Trustee of the second amended & restated Sharon Lee Albright Revocable Trust, dated September 15, 2004, and Karen Jean Red Elk, an unmarried woman, as to an undivided ½ interest, as to parcels two and three.

The Preliminary Title Report is provided in Appendix B. The Title Report did not contain language regarding the existence of any environmental liens or other environmental conditions and/or restrictions associated with the Property.

3.2 HISTORICAL RECORD SOURCES

The purpose of the historical record review is to develop a history of the previous uses or occupancies of the Property and surrounding area in order to identify those uses or occupancies that are likely to have led to recognized environmental conditions on the Property.

3.2.1 Historical Topographic Maps

Historical USGS topographic maps were reviewed to determine if discernible changes in topography or improvements pertaining to the Property had been recorded. The following maps were provided to us through an EDR Historical Topographic Map Report, presented in Appendix C.

Quad	Year	Series	Scale
Tesla	1907	15	1:62500
Altamont	1953	7.5	1:24000
Altamont	1968	7.5	1:24000
Altamont	1981	7.5	1:24000

1907 through 1981 Maps – The 1907 through 1981 topographic maps show the Property as undeveloped. The elevation is mapped as ranging between approximately 540 feet above mean sea level (msl) in the east to approximately 608 feet above msl in the central portion of the Property. Unnamed roads are mapped in the approximate current locations of Laughlin, Vasco, and Raymond Roads. Sporadic structures are depicted adjacent to the approximate current locations of Laughlin, Vasco, and Raymond Road in each map set. An unnamed creek is mapped south of the Property.

3.2.2 Aerial Photographs

The following aerial photographs, provided by EDR, were reviewed for information regarding past conditions and land use at the Property and in the immediate vicinity. These photographs are presented in Appendix D.

Flyer	Year	Scale
Fairchild	1940	1”=555’
Cartwright	1958	1”=555’
Cartwright	1965	1”=333’
NASA	1974	1”=601’
USGS	1982	1”=690’
USGS	1993	1”=666’
USGS	1998	1”=666’
EDR	2005	1”=604’

1940 through 2005 Photographs – The 1940 through 2005 photographs show the Property as undeveloped. Sporadic rural residential parcels are shown adjacent to a road in the approximate current location of Laughlin Road, and residential homes are shown in the 1998 through 2005 maps. Interstate 580 is shown south of the Property in the 1958 through 2005 maps.

3.2.3 Fire Insurance Maps

The Property was reported as "Unmapped" by EDR; therefore, no Sanborn Fire Insurance Maps were available. The Sanborn Map Report is presented in Appendix E.

3.2.4 City Directory

City Directories, published since the 18th century for major towns and cities, lists the name of the resident or business associated with each address. An accurate city directory search could not be conducted by EDR because the Property does not posses a physical address. The City Directory Abstract for "Vasco Road" is presented in Appendix F.

3.2.5 Government Agencies

The following agencies were contacted and/or databases were reviewed, for information pertaining to possible past development and/or activity at the Property.

- Alameda County Department of Environmental Health
- Alameda County Assessor's Office
- City of Livermore Community Development Department- Building Division
- Livermore-Pleasanton Fire Department
- State Water Quality Control Board (SWQCB-Region 2)
- Department of Toxic and Substance Control (DTSC)

Representatives from the City of Livermore (Building Division) indicated that they would not have files from 1907, which would potentially identify the structure shown on the Property in the 1907 topographical map. No other environmentally related information was received from the remaining above-mentioned agencies that would indicate an environmental concern for the Property.

3.2.6 Previous Reports

No previous environmental reports were provided for our review.

3.3 ENVIRONMENTAL RECORD SOURCES

EDR performed a search of federal, tribal, state, and local databases regarding the Property and nearby properties. Details regarding the databases searched by EDR are provided in Appendix A. A list of the facilities documented by EDR within the approximate minimum search distance of the Property is provided below:

3.3.1 Federal ASTM Standard/Supplemental Sources

3.3.1.1 Subject Property

The Property is not listed on Federal ASTM Standard or supplemental sources.

3.3.1.2 Other Properties

No facilities in the vicinity of the Property were listed within the appropriate ASTM search distances on Federal ASTM Standard or supplemental sources.

3.3.2 State ASTM Standard/Supplemental Sources

3.3.2.1 Subject Property

The Property is not listed on State ASTM Standard or supplemental sources.

3.3.2.2 Other Properties

The following databases include facilities listed within the appropriate ASTM search distances of the Property on State ASTM Standard or supplemental sources:

- ENVIROSTOR – EnviroStor Database – Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database.

  There are two ENVIROSTOR sites within 1½ miles of the Property:

  Equal/Higher Elevation

  Formfactor Inc. — *501 Lawrence Drive*
  Status: Refer: RCRA

  Formfactor Inc. — *7545 Longard Avenue*
  Status: Inactive- Action Required

3.3.3 Local ASTM Supplemental Sources

3.3.3.1 Subject Property

The Property is not listed on Local ASTM Standard or supplemental sources.

3.3.3.2 Other Properties

No facilities in the vicinity of the Property were listed within the appropriate ASTM search distances on Local ASTM Standard or supplemental sources.

3.3.4 EDR Summary

Based on the distances to the above database sites listed in the EDR findings, it is unlikely that the site presents an environmental risk to the Property. The properties listed on the "Orphan Summary" list appear to be located beyond the ASTM recommended radius search criteria.

4.0 SITE RECONNAISSANCE

4.1 METHODOLOGY

ENGEO conducted a reconnaissance of the Property on November 5, 2010. The Property was viewed for hazardous materials storage, surface staining or discoloration, debris, stressed vegetation, or other conditions that may be indicative of potential sources of soil or groundwater contamination. The site was also checked for evidence of fill/ventilation pipes, ground subsidence, or other evidence of existing or preexisting underground storage tanks. Photographs taken during the site reconnaissance are presented in Figure 3.

4.2 GENERAL SITE SETTING

The Property, which generally slopes down toward the west, consists of undeveloped land.

4.3 EXTERIOR OBSERVATIONS

Structures. No permanent structures were observed on the Property during the site reconnaissance.

Hazardous Substances and Petroleum Products in Connection with Identified Uses. No hazardous substances were observed on the Property at the time of our reconnaissance.

Storage Tanks. No storage tanks were observed on the Property at the time of our reconnaissance.

Odors. No odors were encountered on the Property at the time of our reconnaissance.

Pools of Potentially Hazardous Liquid. No pools of potentially hazardous liquid were observed on the Property at the time of our reconnaissance.

Drums. No drums were observed on the Property at the time of our reconnaissance.

Hazardous Substance and Petroleum Product Containers. No other hazardous substances were observed on the Property at the time of our reconnaissance.

Polychlorinated Biphenyls (PCBs). No power poles or overhead transformers were observed on the Property during our site reconnaissance.

Pits, Ponds and Lagoons. Two pits, each approximately 5 feet long by 3 to 4 feet wide by 1 to 2 feet deep, were observed in the northern portion of the Property. No ponds or lagoons were observed on the Property at the time of our reconnaissance.

Stained Soil/Pavement. No stained soil or pavement was observed on the Property at the time of our reconnaissance.

Stressed Vegetation. No signs of stressed vegetation were observed on the Property at the time of our reconnaissance.

Solid Waste/Debris. Other than sporadic household type refuse (plastic soda bottles, beer bottles, candy wrappers, etc…), no other solid waste or debris was observed on the Property at the time of our reconnaissance.

Wastewater. No wastewater conveyance systems were observed on the Property during the reconnaissance.

Wells. No wells were observed on the Property during the reconnaissance.

Septic Systems. No septic systems were found on the Property during our site reconnaissance.

4.4 ASBESTOS-CONTAINING MATERIALS (ACM) AND LEAD-BASED PAINT (LBP)

No permanent structures are located on the Property; therefore, ACM and LBP are not considered environmental concerns.

4.5 INDOOR AIR QUALITY

An evaluation of indoor air quality, mold, or radon was not included as part of the contracted scope of services. The California Department of Health Services has conducted studies of radon risks throughout the state, sorted by zip code or County. Results of the studies indicate that five tests were conducted within the Property zip code, with no tests meeting or exceeding the current EPA action level of 4 picocuries per liter [pCi/L][1]).

[1] California Department of Health Services – Division of Drinking Water and Environmental Management – Radon (http://www.cdph.ca.gov/HealthInfo/environhealth/Documents/Radon/CaliforniaRadonDatabase.pdf).

5.0 INTERVIEWS

Mr. Scott Roylance, a representative of RL Communities (client), completed an environmental site assessment questionnaire for the client on November 4, 2010. In the questionnaire, Mr. Roylance indicated he was not aware of any environmentally related issues pertaining to the Property.

6.0 FINDINGS

The reconnaissance and records research did not find documentation or physical evidence of soil or groundwater impairments associated with the current or past use of the Property. A review of regulatory databases maintained by county, state and federal agencies found no documentation of hazardous materials violations or discharge on the Property. No documented soil and groundwater contamination associated with parcels near the Property was found from the records research.

7.0 OPINIONS AND DATA GAPS

It is our opinion that the findings of this study are based on a sufficient level of information obtained during our contracted scope of services to render a conclusion as to whether additional appropriate investigation is required to identify the presence or likely presence of a REC.

The data gaps identified during this process, if any, do not affect the conclusions as to the presence or lack of presence of RECs at the Property. The following data gap was identified for the Property:

1. A completed environmental site assessment questionnaire was not received from the key site manager of the Property.

8.0 CONCLUSIONS

The study included a review of local, state, and federal environmental record sources; a review of standard historical sources, aerial photographs, and physical setting sources; a reconnaissance of the Property to review site use and current conditions to check for the storage, use, production, or disposal of hazardous or potentially hazardous materials; and interviews with persons knowledgeable about current and past site use.

The site reconnaissance and records review did not find documentation or physical evidence of soil or groundwater impairments associated with the use of the Property. A review of regulatory databases maintained by county, state, and federal agencies found no documentation of hazardous materials violations or discharge on the Property. A review of regulatory agency records and available databases did not identify contaminated facilities within the appropriate ASTM search distances that would be expected to impact the Property.

ENGEO has performed a phase I environmental site assessment of the Property in general conformance with the scope and limitations of ASTM E 1527-05 “Standard Practice for Environmental Site Assessments” and USEPA “Standards and Practices for All Appropriate Inquires”, 40 CFR Part 312. Based on the findings of this assessment, no further environmental studies are recommended at this time.

SELECTED REFERENCES

1. California Department of Conservation (www.maps.conservation.ca.gov).

2. California Department of Water Resources (www.wdl.water.ca.gov).

3. City of Livermore, California (www.ci.livermore.ca.us).

4. State Regional Water Quality Control Board (www.swrcb.ca.gov).

5. Alameda County, California (www.acgov.org).

6. Google Maps (www.maps.google.com).

7. United States Environmental Protection Agency Indoor Air Quality Website (www.dhs.ca.gov/ps/ddwem/environmental/radon/PDFs/california%20radon%20data%20base%209.16.2005.pdf).

8. United States Geological Survey, 15 Minute Tesla Quadrangle, dated 1907.

9. United States Geological Survey, 7.5 Minute Altamont Quadrangles, dated 1953, 1968 and 1981.

FIGURES

LIST OF FIGURES

Figure 1	**Vicinity Map**
Figure 2	**Assessor's Parcel Map**
Figure 3	**Site Photographs**

© 2011 BY ENGEO INCORPORATED. THIS DOCUMENT MAY NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER, NOR MAY IT BE QUOTED OR EXCERPTED WITHOUT THE EXPRESS WRITTEN CONSENT OF ENGEO INCORPORATED.

N

0 FEET 2000

0 METERS 1000

BASE MAP SOURCE: BASE MAP SOURCE: MS STREETS AND TRIPS

ENGEO Expect Excellence

VICINITY MAP

GARAVENTA HILLS ESTATES

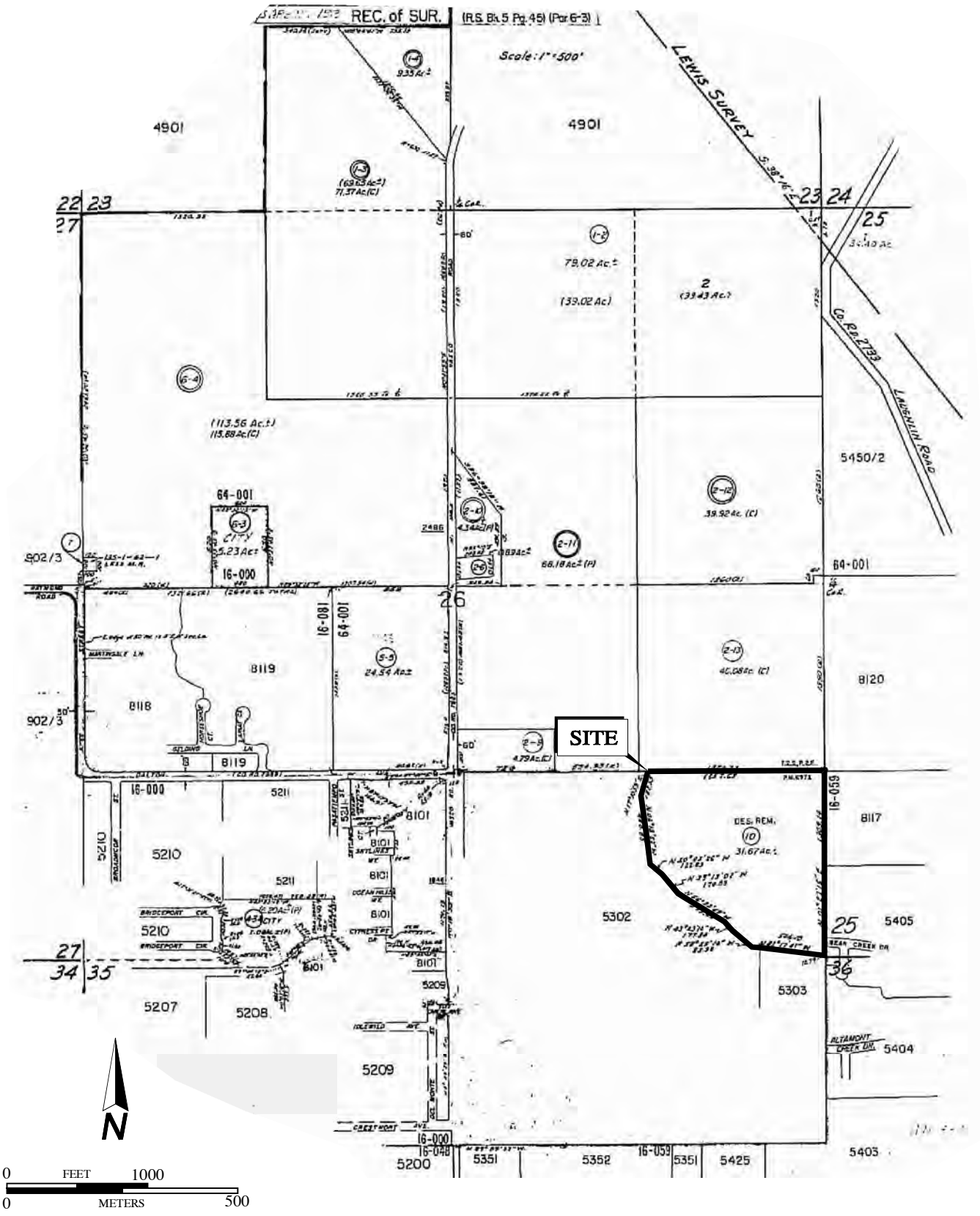
LIVERMORE, CALIFORNIA

PROJECT NO.: 9126.000.000		FIGURE NO. 1
DATE: JANUARY 2011		
DRAWN BY: SRP	CHECKED BY: DSH	

G:\Drafting\DRAFTING2_Dwg\9126\000\ESA\9126000000-ESA-1-VicinityMap-0111.dwg 1-24-11 02:02:25 PM spatters

ORIGINAL FIGURE PRINTED IN COLOR

COPYRIGHT © 2011 BY ENGEO INCORPORATED. THIS DOCUMENT MAY NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER, NOR MAY IT BE QUOTED OR EXCERPTED WITHOUT THE EXPRESS WRITTEN CONSENT OF ENGEO INCORPORATED.



BASE MAP SOURCE: ALAMEDA COUNTY

ENGEO Expect Excellence

ASSESSOR'S PARCEL MAP

GARAVENTA HILLS ESTATES

LIVERMORE, CALIFORNIA

PROJECT NO.: 9126.000.000			FIGURE NO. 2
DATE: JANUARY 2011			
DRAWN BY: SRP	CHECKED BY: DSH		

G:\Drafting\DRAFTING2_Dwg\9126\000\ESA\9126000000-ESA-2-+ParcelMap-0111.dwg 1-24-11 02:04:04 PM spotters

ORIGINAL FIGURE PRINTED IN COLOR

COPYRIGHT © 2011 BY ENGEO INCORPORATED. THIS DOCUMENT MAY NOT BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WHATSOEVER, NOR MAY IT BE QUOTED OR EXCERPTED WITHOUT THE EXPRESS WRITTEN CONSENT OF ENGEO INCORPORATED.

LOOKING NORTH FROM THE EASTERN PORTION OF THE PROPERTY

LOOKING SOUTH FROM THE EASTERN PORTION OF THE PROPERTY

LOOKING SOUTH FROM THE NORTHWESTERN CORNER OF THE PROPERTY

LOOKING EAST FROM THE SOUTHWESTERN CORNER OF THE PROPERTY

LOOKING NORTH FROM THE CENTER OF THE PROPERTY

PIT LOCATED IN THE NORTHERN PORTION OF THE PROPERTY

ENGEO Expect Excellence

SITE PHOTOGRAPHS

GARAVENTA HILLS ESTATES

LIVERMORE, CALIFORNIA

PROJECT NO.: 9126.000.000		FIGURE NO. 3
DATE: JANUARY 2011		
DRAWN BY: SRP	CHECKED BY: DSH	

G:\Drafting\DRAFTING2_Dwg\9126\000\ESA\9126000000-ESA-3-SitePhotos-0111.dwg 1-24-11 02:05:53 PM spatters

ORIGINAL FIGURE PRINTED IN COLOR

APPENDIX A

ENVIRONMENTAL DATA RESOURCES, INC.

Radius Map Report

APPENDIX A

Garaventa Hills
Vasco Road
Livermore, CA 94551

Inquiry Number: 2914012.2s
November 05, 2010

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION	PAGE
Executive Summary	ES1
Overview Map	2
Detail Map	3
Map Findings Summary	4
Map Findings	8
Orphan Summary	21
Government Records Searched/Data Currency Tracking	GR-1

GEOCHECK ADDENDUM

Physical Setting Source Addendum	A-1
Physical Setting Source Summary	A-2
Physical Setting SSURGO Soil Map	A-5
Physical Setting Source Map	A-9
Physical Setting Source Map Findings	A-11
Physical Setting Source Records Searched	A-15

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Disclaimer - Copyright and Trademark Notice

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. **NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OF DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT.** Purchaser accepts this Report "AS IS". Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction or forecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report is not to be construed as legal advice.

Copyright 2010 by Environmental Data Resources, Inc. All rights reserved. Reproduction in any media or format, in whole or in part, of any report or map of Environmental Data Resources, Inc., or its affiliates, is prohibited without prior written permission.

EDR and its logos (including Sanborn and Sanborn Map) are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

VASCO ROAD
LIVERMORE, CA 94551

COORDINATES

Latitude (North):	37.724900 - 37° 43' 29.6''
Longitude (West):	121.716000 - 121° 42' 57.6''
Universal Tranverse Mercator:	Zone 10
UTM X (Meters):	613156.8
UTM Y (Meters):	4175863.8
Elevation:	606 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	37121-F6 ALTAMONT, CA
Most Recent Revision:	1981

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	2006, 2005
Source:	USDA

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL ---------- National Priority List

EXECUTIVE SUMMARY

Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ---------- National Priority List Deletions

Federal CERCLIS list

CERCLIS ---------- Comprehensive Environmental Response, Compensation, and Liability Information System
FEDERAL FACILITY ---------- Federal Facility Site Information listing

Federal CERCLIS NFRAP site List

CERC-NFRAP ---------- CERCLIS No Further Remedial Action Planned

Federal RCRA CORRACTS facilities list

CORRACTS ---------- Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-SQG ---------- RCRA - Small Quantity Generators
RCRA-CESQG ---------- RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

US ENG CONTROLS ---------- Engineering Controls Sites List
US INST CONTROL ---------- Sites with Institutional Controls

Federal ERNS list

ERNS ---------- Emergency Response Notification System

State- and tribal - equivalent NPL

RESPONSE ---------- State Response Sites

State and tribal landfill and/or solid waste disposal site lists

SWF/LF ---------- Solid Waste Information System

State and tribal leaking storage tank lists

LUST ---------- Geotracker's Leaking Underground Fuel Tank Report
SLIC ---------- Statewide SLIC Cases
Alameda County CS ---------- Contaminated Sites
INDIAN LUST ---------- Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

UST ---------- Active UST Facilities

AST ---- Aboveground Petroleum Storage Tank Facilities
INDIAN UST ---- Underground Storage Tanks on Indian Land
FEMA UST ---- Underground Storage Tank Listing

State and tribal voluntary cleanup sites

INDIAN VCP ---- Voluntary Cleanup Priority Listing
VCP ---- Voluntary Cleanup Program Properties

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ---- A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

DEBRIS REGION 9 ---- Torres Martinez Reservation Illegal Dump Site Locations
ODI ---- Open Dump Inventory
WMUDS/SWAT ---- Waste Management Unit Database
SWRCY ---- Recycler Database
HAULERS ---- Registered Waste Tire Haulers Listing
INDIAN ODI ---- Report on the Status of Open Dumps on Indian Lands

Local Lists of Hazardous waste / Contaminated Sites

US CDL ---- Clandestine Drug Labs
HIST Cal-Sites ---- Historical Calsites Database
SCH ---- School Property Evaluation Program
Toxic Pits ---- Toxic Pits Cleanup Act Sites
CDL ---- Clandestine Drug Labs
US HIST CDL ---- National Clandestine Laboratory Register

Local Lists of Registered Storage Tanks

CA FID UST ---- Facility Inventory Database
HIST UST ---- Hazardous Substance Storage Container Database
SWEEPS UST ---- SWEEPS UST Listing

Local Land Records

LIENS 2 ---- CERCLA Lien Information
LUCIS ---- Land Use Control Information System
LIENS ---- Environmental Liens Listing
DEED ---- Deed Restriction Listing

Records of Emergency Release Reports

HMIRS ---- Hazardous Materials Information Reporting System
CHMIRS ---- California Hazardous Material Incident Report System
LDS ---- Land Disposal Sites Listing
MCS ---- Military Cleanup Sites Listing

Other Ascertainable Records

RCRA-NonGen ---- RCRA - Non Generators

DOT OPS	Incident and Accident Data
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
FINDS	Facility Index System/Facility Registry System
RAATS	RCRA Administrative Action Tracking System
CA BOND EXP. PLAN	Bond Expenditure Plan
WDS	Waste Discharge System
NPDES	NPDES Permits Listing
Cortese	"Cortese" Hazardous Waste & Substances Sites List
HIST CORTESE	Hazardous Waste & Substance Site List
Notify 65	Proposition 65 Records
DRYCLEANERS	Cleaner Facilities
WIP	Well Investigation Program Case List
HAZNET	Facility and Manifest Data
EMI	Emissions Inventory Data
INDIAN RESERV	Indian Reservations
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
PROC	Certified Processors Database
MWMP	Medical Waste Management Program Listing
COAL ASH DOE	Sleam-Electric Plan Operation Data
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
HWT	Registered Hazardous Waste Transporter Database
HWP	EnviroStor Permitted Facilities Listing
FINANCIAL ASSURANCE	Financial Assurance Information Listing
PCB TRANSFORMER	PCB Transformer Registration Database

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Manufactured Gas Plants	EDR Proprietary Manufactured Gas Plants
EDR Historical Auto Stations	EDR Proprietary Historic Gas Stations
EDR Historical Cleaners	EDR Proprietary Historic Dry Cleaners

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

STANDARD ENVIRONMENTAL RECORDS

State- and tribal - equivalent CERCLIS

ENVIROSTOR: The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

A review of the ENVIROSTOR list, as provided by EDR, and dated 08/18/2010 has revealed that there are 2 ENVIROSTOR sites within approximately 1.125 miles of the target property.

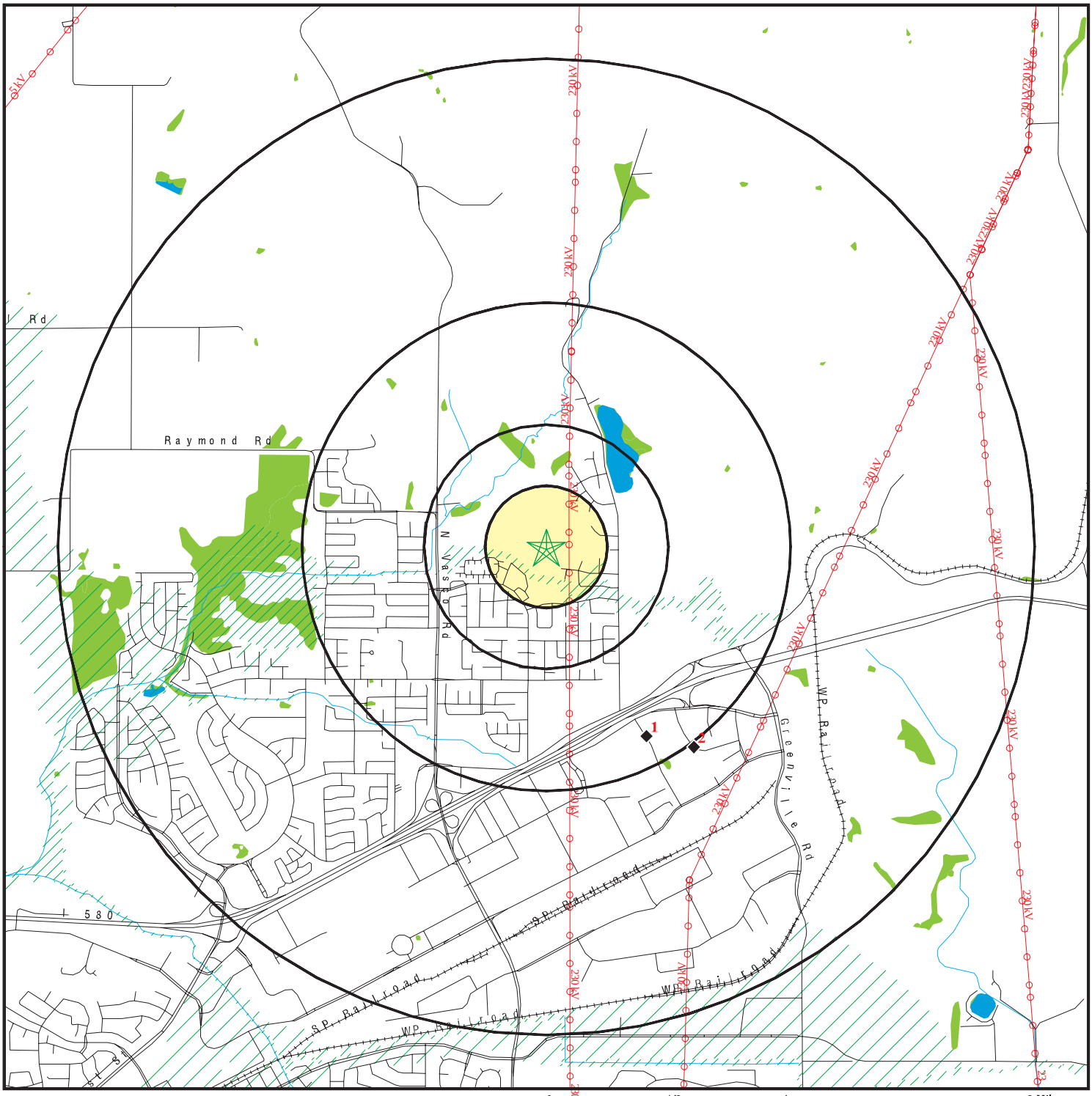
Lower Elevation	Address	Direction / Distance	Map ID	Page
FORMFACTOR, INC.	***501 LAWRENCE DR.***	***SSE 1/2 - 1 (0.877 mi.)***	***1***	***8***
FORM FACTOR, INC.	7545 LONGARD AVENUE	SE 1 - 2 (1.019 mi.)	2	19

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Database(s)
WDR-LAWRENCE LIVERMORE NT	HIST CORTESE
CLUB MOTO	NPDES, HAZNET
WATER CONSERVATION TEST BED PROJEC	NPDES
OAKS BUSINESS PARK	NPDES
KITTY HAWK	NPDES
VASCO ACE PARKING LOT CITY PROJECT	NPDES
SOUZA RANCH	NPDES
RELOCATION OF VASCO RD	NPDES
GRADING WORK FOR RELOCATION OF PG&	NPDES
DE PAOLI EQUIPMENT	Alameda County CS
REGENCY COURT	Alameda County CS
SAN ANTONE VALLEY RANCH CORP.	SWEEPS UST
CALAVERAS RD/MI MARKER 5.70 @	CDL
847 / 863 NORTH VASCO RD	CDL
PG&E GAS PLANT LIVERMORE	CERC-NFRAP
CALIFORNIA WATER SERV WELL #10-01	CERC-NFRAP
JESS RANCH SEWAGE SLUDGE LANDSPREA	SWF/LF
LIVERMORE SANITATION RECY. MATERIA	SWF/LF
CSAA	AST
CALTRANS D-4/CONSTRUCTION/EA04-290	HAZNET
CALTRANS DIST 4/CONSTR/EA04-2A6904	HAZNET
CALTRANS DIST 4/CONSTR/EA04-272614	HAZNET
CON-WAY WESTERN EXPRESS INC	HAZNET
7-ELEVEN STORE #33005	HAZNET
ENXCO INC	HAZNET
HOWDEN WIND PARK	HAZNET
ENXCO INC	HAZNET
ENXCO INC-TRES VAQUEROS	HAZNET
QUIK STOP MARKET #157	HAZNET
PG & E	HAZNET
FOLEY RANCH	HAZNET
5771 RUNNING HILLS	ERNS
REGENCY COURT	SLIC
CAL DEPT OF TRANS- STATE RTE 4	WDS
TESLA NEWARK RECONDUCTORING PR	WDS
VERIZON WIRELESS/VASCO RD NORTH	CONTRA COSTA CO. SITE LIST
NEXTEL OF CALIFORNIA INC SITE	EMI
VERIZON WIRELESS (WINDFARM)	EMI
DE PAOLI EQUIPMENT COMPANY	EMI

OVERVIEW MAP - 2914012.2s



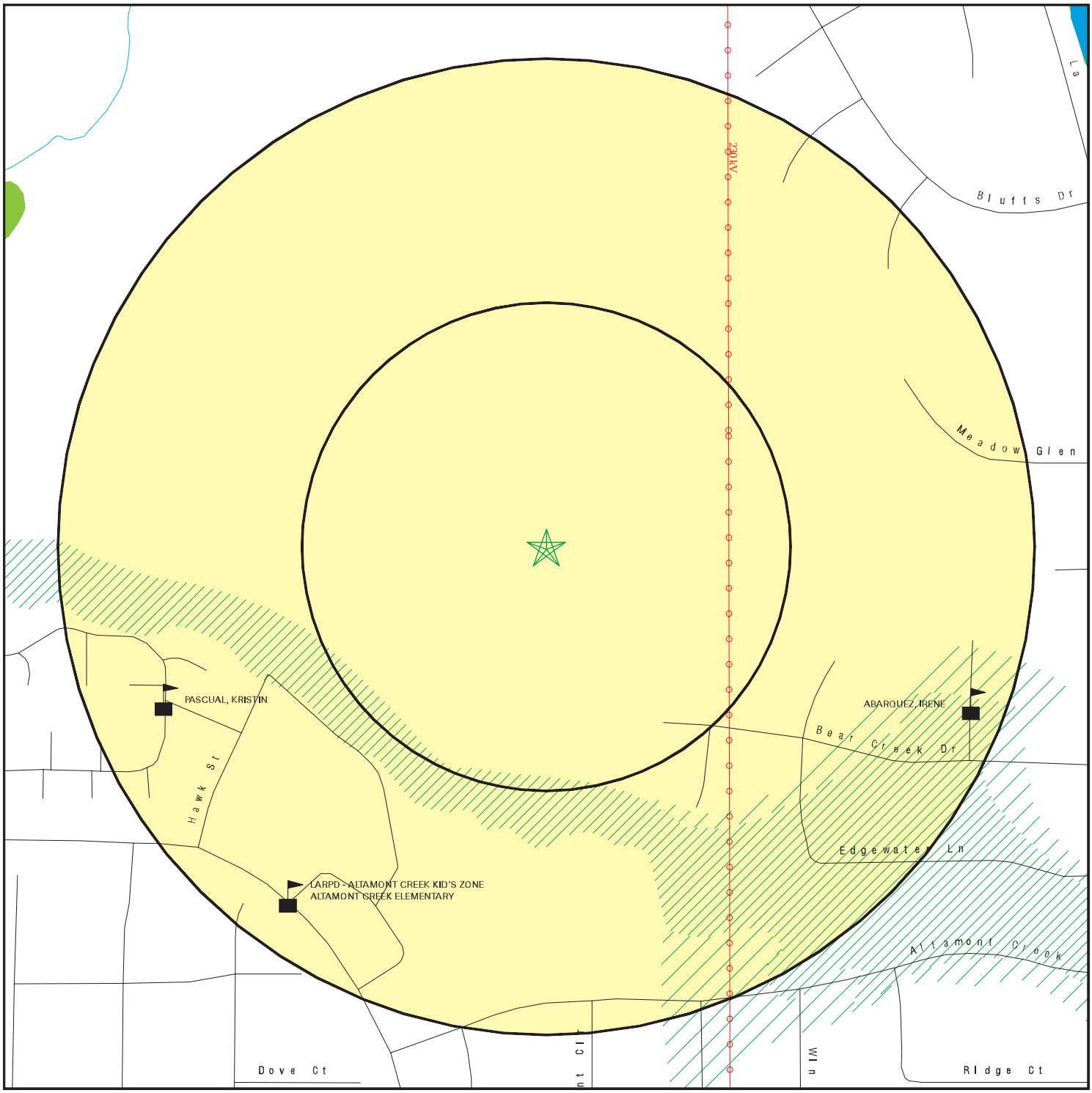
- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Garaventa Hills ADDRESS: Vasco Road Livermore CA 94551 LAT/LONG: 37.7249 / 121.7160	CLIENT: Engeo Inc. CONTACT: Richard Gandolfo INQUIRY #: 2914012.2s DATE: November 05, 2010 12:48 pm

Copyright © 2010 EDR, Inc. © 2010 Tele Atlas Rel. 07/2009.

DETAIL MAP - 2914012.2s



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Garaventa Hills ADDRESS: Vasco Road Livermore CA 94551 LAT/LONG: 37.7249 / 121.7160	CLIENT: Engeo Inc. CONTACT: Richard Gandolfo INQUIRY #: 2914012.2s DATE: November 05, 2010 12:49 pm

Copyright © 2010 EDR, Inc. © 2010 Tele Atlas Rel. 07/2009.

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL		1.125	0	0	0	0	0	0
Proposed NPL		1.125	0	0	0	0	0	0
NPL LIENS		0.125	0	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL		1.125	0	0	0	0	0	0
Federal CERCLIS list								
CERCLIS		0.625	0	0	0	0	NR	0
FEDERAL FACILITY		1.125	0	0	0	0	0	0
Federal CERCLIS NFRAP site List								
CERC-NFRAP		0.625	0	0	0	0	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS		1.125	0	0	0	0	0	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF		0.625	0	0	0	0	NR	0
Federal RCRA generators list								
RCRA-LQG		0.375	0	0	0	NR	NR	0
RCRA-SQG		0.375	0	0	0	NR	NR	0
RCRA-CESQG		0.375	0	0	0	NR	NR	0
Federal institutional controls / engineering controls registries								
US ENG CONTROLS		0.625	0	0	0	0	NR	0
US INST CONTROL		0.625	0	0	0	0	NR	0
Federal ERNS list								
ERNS		0.125	0	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
RESPONSE		1.125	0	0	0	0	0	0
State- and tribal - equivalent CERCLIS								
ENVIROSTOR		1.125	0	0	0	1	1	2
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF		0.625	0	0	0	0	NR	0
State and tribal leaking storage tank lists								
LUST		0.625	0	0	0	0	NR	0
SLIC		0.625	0	0	0	0	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
Alameda County CS		0.500	0	0	0	NR	NR	0
INDIAN LUST		0.625	0	0	0	0	NR	0
State and tribal registered storage tank lists								
UST		0.375	0	0	0	NR	NR	0
AST		0.375	0	0	0	NR	NR	0
INDIAN UST		0.375	0	0	0	NR	NR	0
FEMA UST		0.375	0	0	0	NR	NR	0
State and tribal voluntary cleanup sites								
INDIAN VCP		0.625	0	0	0	0	NR	0
VCP		0.625	0	0	0	0	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS		0.625	0	0	0	0	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
DEBRIS REGION 9		0.625	0	0	0	0	NR	0
ODI		0.625	0	0	0	0	NR	0
WMUDS/SWAT		0.625	0	0	0	0	NR	0
SWRCY		0.625	0	0	0	0	NR	0
HAULERS		0.125	0	NR	NR	NR	NR	0
INDIAN ODI		0.625	0	0	0	0	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US CDL		0.125	0	NR	NR	NR	NR	0
HIST Cal-Sites		1.125	0	0	0	0	0	0
SCH		0.375	0	0	0	NR	NR	0
Toxic Pits		1.125	0	0	0	0	0	0
CDL		0.125	0	NR	NR	NR	NR	0
US HIST CDL		0.125	0	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
CA FID UST		0.375	0	0	0	NR	NR	0
HIST UST		0.375	0	0	0	NR	NR	0
SWEEPS UST		0.375	0	0	0	NR	NR	0
Local Land Records								
LIENS 2		0.125	0	NR	NR	NR	NR	0
LUCIS		0.625	0	0	0	0	NR	0
LIENS		0.125	0	NR	NR	NR	NR	0
DEED		0.625	0	0	0	0	NR	0
Records of Emergency Release Reports								
HMIRS		0.125	0	NR	NR	NR	NR	0
CHMIRS		0.125	0	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LDS		0.125	0	NR	NR	NR	NR	0
MCS		0.125	0	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA-NonGen		0.375	0	0	0	NR	NR	0
DOT OPS		0.125	0	NR	NR	NR	NR	0
DOD		1.125	0	0	0	0	0	0
FUDS		1.125	0	0	0	0	0	0
CONSENT		1.125	0	0	0	0	0	0
ROD		1.125	0	0	0	0	0	0
UMTRA		0.625	0	0	0	0	NR	0
MINES		0.375	0	0	0	NR	NR	0
TRIS		0.125	0	NR	NR	NR	NR	0
TSCA		0.125	0	NR	NR	NR	NR	0
FTTS		0.125	0	NR	NR	NR	NR	0
HIST FTTS		0.125	0	NR	NR	NR	NR	0
SSTS		0.125	0	NR	NR	NR	NR	0
ICIS		0.125	0	NR	NR	NR	NR	0
PADS		0.125	0	NR	NR	NR	NR	0
MLTS		0.125	0	NR	NR	NR	NR	0
RADINFO		0.125	0	NR	NR	NR	NR	0
FINDS		0.125	0	NR	NR	NR	NR	0
RAATS		0.125	0	NR	NR	NR	NR	0
CA BOND EXP. PLAN		1.125	0	0	0	0	0	0
WDS		0.125	0	NR	NR	NR	NR	0
NPDES		0.125	0	NR	NR	NR	NR	0
Cortese		0.625	0	0	0	0	NR	0
HIST CORTESE		0.500	0	0	0	NR	NR	0
Notify 65		1.125	0	0	0	0	0	0
DRYCLEANERS		0.375	0	0	0	NR	NR	0
WIP		0.375	0	0	0	NR	NR	0
HAZNET		0.125	0	NR	NR	NR	NR	0
EMI		0.125	0	NR	NR	NR	NR	0
INDIAN RESERV		1.125	0	0	0	0	0	0
SCRD DRYCLEANERS		0.625	0	0	0	0	NR	0
PROC		0.625	0	0	0	0	NR	0
MWMP		0.375	0	0	0	NR	NR	0
COAL ASH DOE		0.125	0	NR	NR	NR	NR	0
COAL ASH EPA		0.625	0	0	0	0	NR	0
HWT		0.375	0	0	0	NR	NR	0
HWP		1.125	0	0	0	0	0	0
FINANCIAL ASSURANCE		0.125	0	NR	NR	NR	NR	0
PCB TRANSFORMER		0.125	0	NR	NR	NR	NR	0
EDR PROPRIETARY RECORDS								
EDR Proprietary Records								
Manufactured Gas Plants		1.125	0	0	0	0	0	0
EDR Historical Auto Stations		0.375	0	0	0	NR	NR	0
EDR Historical Cleaners		0.375	0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

1
SSE
1/2-1
0.877 mi.
4633 ft.

FORMFACTOR, INC.
501 LAWRENCE DR.
LIVERMORE, CA 94551

RCRA-LQG
MANIFEST
HAZNET
ENVIROSTOR

1007263995
CAR000151431

Relative:
Lower

Actual:
556 ft.

RCRA-LQG:

Date form received by agency:	01/10/2008
Facility name:	FORMFACTOR, INC.
Facility address:	501 LAWRENCE DRIVE LIVERMORE, CA 94551
EPA ID:	CAR000151431
Mailing address:	7005 SOUTHFRONT ROAD LIVERMORE, CA 94551
Contact:	STEVEN C VAN TASSELL
Contact address:	Not reported Not reported
Contact country:	Not reported
Contact telephone:	(925) 290-4484
Contact email:	SVANTASSELL@FORMFACTOR.COM
EPA Region:	09
Classification:	Large Quantity Generator
Description:	Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

Owner/Operator Summary:

Owner/operator name:	PACIFIC UNION COMMERCIAL DEVELOPMENT INC
Owner/operator address:	675 HARTZ AVE STE 300 DANVILLE, CA 94526
Owner/operator country:	US
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	08/01/2002
Owner/Op end date:	Not reported
Owner/operator name:	FORMFACTOR, INC.
Owner/operator address:	Not reported Not reported
Owner/operator country:	US
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	05/03/2001
Owner/Op end date:	Not reported
Owner/operator name:	PACIFIC UNION COMMERCIAL DEVELOPMENT
Owner/operator address:	675 HARTZ AVE., STE 300 DANVILLE, CA 94526

FORMFACTOR, INC. (Continued) **1007263995**

Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: 08/01/2000
Owner/Op end date: Not reported

Owner/operator name: FORM FACTOR INC
Owner/operator address: Not reported
Not reported
Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 05/03/2001
Owner/Op end date: Not reported

Owner/operator name: PACIFIC UNION COMMERCIAL
Owner/operator address: 675 HARTZ AVE., STE. 300
DANVILLE, CA 94526
Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: 08/01/2000
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No
Off-site waste receiver: Commercial status unknown

Universal Waste Summary:
Waste type: Batteries
Accumulated waste on-site: No
Generated waste on-site: No

Waste type: Lamps
Accumulated waste on-site: No
Generated waste on-site: No

Waste type: Pesticides
Accumulated waste on-site: No

FORMFACTOR, INC. (Continued) **1007263995**

Generated waste on-site: No

Waste type: Thermostats
Accumulated waste on-site: No
Generated waste on-site: No

Waste type: Batteries
Accumulated waste on-site: No
Generated waste on-site: Not reported

Waste type: Lamps
Accumulated waste on-site: No
Generated waste on-site: Not reported

Waste type: Pesticides
Accumulated waste on-site: No
Generated waste on-site: Not reported

Waste type: Thermostats
Accumulated waste on-site: No
Generated waste on-site: Not reported

Historical Generators:
Date form received by agency: 01/09/2006
Facility name: FORMFACTOR, INC.
Site name: FORMFACTOR INC.
Classification: Large Quantity Generator

Date form received by agency: 01/09/2006
Facility name: FORMFACTOR, INC.
Site name: FORMFACTOR INC.
Classification: Small Quantity Generator

Date form received by agency: 04/29/2005
Facility name: FORMFACTOR, INC.
Site name: FORMFACTOR INC
Classification: Large Quantity Generator

Date form received by agency: 02/24/2004
Facility name: FORMFACTOR, INC.
Site name: FORM FACTOR INC
Classification: Large Quantity Generator

Hazardous Waste Summary:
Waste code: 121
Waste name: 121

Waste code: 122
Waste name: 122

Waste code: 123
Waste name: 123

Waste code: 131
Waste name: 131

FORMFACTOR, INC. (Continued) **1007263995**

Waste code: 132
Waste name: 132

Waste code: 134
Waste name: 134

Waste code: 135
Waste name: 135

Waste code: 181
Waste name: 181

Waste code: 212
Waste name: 212

Waste code: 214
Waste name: 214

Waste code: 221
Waste name: 221

Waste code: 343
Waste name: 343

Waste code: 352
Waste name: 352

Waste code: 491
Waste name: 491

Waste code: 551
Waste name: 551

Waste code: 711
Waste name: 711

Waste code: 726
Waste name: 726

Waste code: 791
Waste name: 791

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN

FORMFACTOR, INC. (Continued) **1007263995**

THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D003
Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.

Waste code: D007
Waste name: CHROMIUM

Waste code: D008
Waste name: LEAD

Waste code: D009
Waste name: MERCURY

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F006
Waste name: WASTEWATER TREATMENT SLUDGES FROM ELECTROPLATING OPERATIONS EXCEPT FROM THE FOLLOWING PROCESSES: (1) SULFURIC ACID ANODIZING OF ALUMINUM; (2) TIN PLATING ON CARBON STEEL; (3) ZINC PLATING (SEGREGATED BASIS) ON CARBON STEEL; (4) ALUMINUM OR ZINC-ALUMINUM PLATING ON CARBON STEEL; (5) CLEANING/STRIPPING ASSOCIATED WITH TIN, ZINC AND ALUMINUM PLATING ON CARBON STEEL; AND (6) CHEMICAL ETCHING AND MILLING OF ALUMINUM.

Waste code: F007
Waste name: SPENT CYANIDE PLATING BATH SOLUTIONS FROM ELECTROPLATING OPERATIONS

Waste code: F009
Waste name: SPENT STRIPPING AND CLEANING BATH SOLUTIONS FROM ELECTROPLATING OPERATIONS WHERE CYANIDES ARE USED IN THE PROCESS.

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002

FORMFACTOR, INC. (Continued) **1007263995**

Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D003
Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.

Waste code: D007
Waste name: CHROMIUM

Waste code: D008
Waste name: LEAD

Waste code: D009
Waste name: MERCURY

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F006
Waste name: WASTEWATER TREATMENT SLUDGES FROM ELECTROPLATING OPERATIONS EXCEPT FROM THE FOLLOWING PROCESSES: (1) SULFURIC ACID ANODIZING OF ALUMINUM; (2) TIN PLATING ON CARBON STEEL; (3) ZINC PLATING (SEGREGATED BASIS) ON CARBON STEEL; (4) ALUMINUM OR ZINC-ALUMINUM PLATING ON CARBON STEEL; (5) CLEANING/STRIPPING ASSOCIATED WITH TIN, ZINC AND ALUMINUM PLATING ON CARBON STEEL; AND (6) CHEMICAL ETCHING AND MILLING OF ALUMINUM.

Waste code: F007
Waste name: SPENT CYANIDE PLATING BATH SOLUTIONS FROM ELECTROPLATING OPERATIONS

Waste code: F009
Waste name: SPENT STRIPPING AND CLEANING BATH SOLUTIONS FROM ELECTROPLATING OPERATIONS WHERE CYANIDES ARE USED IN THE PROCESS.

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET,

FORMFACTOR, INC. (Continued) **1007263995**

WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D003
Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.

Waste code: D007
Waste name: CHROMIUM

Waste code: D008
Waste name: LEAD

Waste code: D009
Waste name: MERCURY

Waste code: D011
Waste name: SILVER

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F006
Waste name: WASTEWATER TREATMENT SLUDGES FROM ELECTROPLATING OPERATIONS EXCEPT FROM THE FOLLOWING PROCESSES: (1) SULFURIC ACID ANODIZING OF ALUMINUM; (2) TIN PLATING ON CARBON STEEL; (3) ZINC PLATING (SEGREGATED BASIS) ON CARBON STEEL; (4) ALUMINUM OR ZINC-ALUMINUM PLATING ON CARBON STEEL; (5) CLEANING/STRIPPING ASSOCIATED WITH TIN, ZINC AND ALUMINUM PLATING ON CARBON STEEL; AND (6) CHEMICAL ETCHING AND MILLING OF ALUMINUM.

Waste code: F007
Waste name: SPENT CYANIDE PLATING BATH SOLUTIONS FROM ELECTROPLATING OPERATIONS

Waste code: F009

FORMFACTOR, INC. (Continued) **1007263995**

Waste name: SPENT STRIPPING AND CLEANING BATH SOLUTIONS FROM ELECTROPLATING OPERATIONS WHERE CYANIDES ARE USED IN THE PROCESS.

Biennial Reports:

Last Biennial Reporting Year: 2009

Annual Waste Handled:

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.
Amount (Lbs): 170395

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.
Amount (Lbs): 376485

Waste code: D003
Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.
Amount (Lbs): 87072

Waste code: D007
Waste name: CHROMIUM
Amount (Lbs): 80760

Waste code: D008
Waste name: LEAD
Amount (Lbs): 113921

Waste code: D011
Waste name: SILVER
Amount (Lbs): 10

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT

FORMFACTOR, INC. (Continued) **1007263995**

MIXTURES.
Amount (Lbs): 104000

Waste code: F006
Waste name: WASTEWATER TREATMENT SLUDGES FROM ELECTROPLATING OPERATIONS EXCEPT FROM THE FOLLOWING PROCESSES: (1) SULFURIC ACID ANODIZING OF ALUMINUM; (2) TIN PLATING ON CARBON STEEL; (3) ZINC PLATING (SEGREGATED BASIS) ON CARBON STEEL; (4) ALUMINUM OR ZINC-ALUMINUM PLATING ON CARBON STEEL; (5) CLEANING/STRIPPING ASSOCIATED WITH TIN, ZINC AND ALUMINUM PLATING ON CARBON STEEL; AND (6) CHEMICAL ETCHING AND MILLING OF ALUMINUM.
Amount (Lbs): 3650

Waste code: F007
Waste name: SPENT CYANIDE PLATING BATH SOLUTIONS FROM ELECTROPLATING OPERATIONS
Amount (Lbs): 4957

Waste code: F009
Waste name: SPENT STRIPPING AND CLEANING BATH SOLUTIONS FROM ELECTROPLATING OPERATIONS WHERE CYANIDES ARE USED IN THE PROCESS.
Amount (Lbs): 84430

Waste code: LABP
Waste name: LAB PACK
Amount (Lbs): 3172

Violation Status: No violations found

MANIFEST:
GEN Cert Date: 9/28/2006
Transporter Recpt Date: 9/21/2006
Number Of Containers: 2
Container Type: DF
Waste Code1: NONE
Waste Code2: Not reported
Waste Code3: Not reported
Comment: Not reported
Fee Exempt Code: Not reported
TSDF Name: Technic Incorporated
TSDF ID: RID001200252
TSDF Date: 9/15/2005
Date Imported: 9/28/2007 3:21:56 PM
Transporter 2 Name: Not reported
Transporter 2 ID: Not reported
Manifest Docket Number: Not reported
Waste Description: Not reported
Quantity: Not reported
WT/Vol Units: Not reported
Item Number: Not reported
Transporter Name: Not reported
Transporter EPA ID: Not reported
GEN Cert Date: Not reported
Transporter Recpt Date: Not reported
Transporter 2 Recpt Date: Not reported
TSDF Recpt Date: Not reported
EPA ID: Not reported
Transporter 2 ID: Not reported

FORMFACTOR, INC. (Continued) **1007263995**

HAZNET:

Gepaid:	CAR000151431
Contact:	STEVE VAN TASSELL EHS MANAGER
Telephone:	9252904484
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	2140 RESEARCH DR
Mailing City,St,Zip:	LIVERMORE, CA 945500000
Gen County:	Alameda
TSD EPA ID:	CAD059494310
TSD County:	Santa Clara
Waste Category:	Alkaline solution (pH <UN-> 12.5) with metals (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc)
Disposal Method:	Treatment, Tank
Tons:	4.17
Facility County:	Not reported

Gepaid:	CAR000151431
Contact:	STEVE VAN TASSELL EHS MANAGER
Telephone:	9252904484
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	7005 SOUTHFRONT RD
Mailing City,St,Zip:	LIVERMORE, CA 945510000
Gen County:	Alameda
TSD EPA ID:	CAD059494310
TSD County:	Santa Clara
Waste Category:	Aqueous solution (2 < pH < 12.5) containing reactive anions (azide, bromate, chlorate, cyanide, fluoride, hypochlorite, nitrite, perchlorate, and sulfide anions)
Disposal Method:	H141
Tons:	0.45
Facility County:	Alameda

Gepaid:	CAR000151431
Contact:	STEVE VAN TASSELL EHS MANAGER
Telephone:	9252904484
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	7005 SOUTHFRONT RD
Mailing City,St,Zip:	LIVERMORE, CA 945510000
Gen County:	Alameda
TSD EPA ID:	UTD981552177
TSD County:	99
Waste Category:	Unspecified organic liquid mixture
Disposal Method:	Not reported
Tons:	0.18
Facility County:	Alameda

Gepaid:	CAR000151431
Contact:	STEVE VAN TASSELL EHS MANAGER
Telephone:	9252904484
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	7005 SOUTHFRONT RD
Mailing City,St,Zip:	LIVERMORE, CA 945510000

FORMFACTOR, INC. (Continued) **1007263995**

Gen County: Alameda
TSD EPA ID: UTD981552177
TSD County: 99
Waste Category: Not reported
Disposal Method: H040
Tons: Not reported
Facility County: Alameda

Gepaid: CAR000151431
Contact: STEVE VAN TASSELL EHS MANAGER
Telephone: 9252904484
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 7005 SOUTHFRONT RD
Mailing City,St,Zip: LIVERMORE, CA 945510000
Gen County: Alameda
TSD EPA ID: ARD069748192
TSD County: 99
Waste Category: Unspecified organic liquid mixture
Disposal Method: Not reported
Tons: 0.37
Facility County: Alameda

Click this hyperlink while viewing on your computer to access
148 additional CA_HAZNET: record(s) in the EDR Site Report.

ENVIROSTOR:
Site Type: Not reported
Site Type Detailed: Tiered Permit
Acres: Not reported
NPL: NO
Regulatory Agencies: NONE SPECIFIED
Lead Agency: NONE SPECIFIED
Program Manager: Not reported
Supervisor: Not reported
Division Branch: Cypress
Facility ID: 71003799
Site Code: Not reported
Assembly: 15
Senate: 9
Special Program: Not reported
Status: Not reported
Status Date: Not reported
Restricted Use: NO
Site Mgmt. Req.: NONE SPECIFIED
Funding: Not reported
Latitude: 37.713987000000003
Longitude: -121.707808
APN: NONE SPECIFIED
Past Use: NONE SPECIFIED
Potential COC: NONE SPECIFIED
Confirmed COC: NONE SPECIFIED
Potential Description: NONE SPECIFIED
Alias Name: CAR000151431
Alias Type: EPA Identification Number

Completed Info:

FORMFACTOR, INC. (Continued) **1007263995**

Completed Area Name:	Not reported
Completed Sub Area Name:	Not reported
Completed Document Type:	Not reported
Completed Date:	Not reported
Comments:	Not reported
Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

2
SE
> 1
1.019 mi.
5381 ft.

Relative:
Lower

Actual:
564 ft.

FORM FACTOR, INC. **ENVIROSTOR** **S110493845**
7545 LONGARD AVENUE **N/A**
LIVERMORE, CA 94551

ENVIROSTOR:

Site Type:	Not reported
Site Type Detailed:	Tiered Permit
Acres:	0
NPL:	NO
Regulatory Agencies:	NONE SPECIFIED
Lead Agency:	NONE SPECIFIED
Program Manager:	Not reported
Supervisor:	Not reported
Division Branch:	Cypress
Facility ID:	71004123
Site Code:	Not reported
Assembly:	15
Senate:	9
Special Program:	Not reported
Status:	Not reported
Status Date:	Not reported
Restricted Use:	NO
Site Mgmt. Req.:	NONE SPECIFIED
Funding:	Not reported
Latitude:	37.7151572
Longitude:	-121.70636349999999
APN:	NONE SPECIFIED
Past Use:	NONE SPECIFIED
Potential COC:	NONE SPECIFIED
Confirmed COC:	NONE SPECIFIED
Potential Description:	NONE SPECIFIED
Alias Name:	CAR000157347
Alias Type:	EPA Identification Number

Completed Info:

Completed Area Name:	Not reported
Completed Sub Area Name:	Not reported
Completed Document Type:	Not reported
Completed Date:	Not reported
Comments:	Not reported

FORM FACTOR, INC. (Continued) **S110493845**

Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
ALAMEDA COUNTY	S105256196	CAL DEPT OF TRANS- STATE RTE 4	HWY 4, CONTRA COSTA COUNTY	0	WDS
ALAMEDA COUNTY	S107537953		CALAVERAS RD/MI MARKER 5.70 @	0	CDL
LIVERMORE	S110502868	NEXTEL OF CALIFORNIA INC SITE	11705TH N FLYNN RD & HWY 580	94550	EMI
LIVERMORE	1003878884	PG&E GAS PLANT LIVERMORE	200 TO 375 FT W OF N ST @RR	94550	CERC-NFRAP
LIVERMORE	S110496270	JESS RANCH SEWAGE SLUDGE LANDSPREA	I 580 & GRANT LINE RD		SWF/LF
LIVERMORE	S109931102	CALTRANS D-4/CONSTRUCTION/EA04-290	RTE 580 EB/WB PM R7.8-R13.2	94551	HAZNET
LIVERMORE	S109424230	CALTRANS DIST 4/CONSTR/EA04-2A6904	RTE 580 PM R3.7-19.9	94551	HAZNET
LIVERMORE	S108200515	CALTRANS DIST 4/CONSTR/EA04-272614	RTE 84 PM 20.0-20.4	94550	HAZNET
LIVERMORE	S107536681		847 / 863 NORTH VASCO RD	94550	CDL
LIVERMORE	S108745078	CLUB MOTO	7727 ALTAMONT PASS RD	94550	NPDES, HAZNET
LIVERMORE	S109694231	WATER CONSERVATION TEST BED PROJEC	7000 E AVE WATER CONSERVATION	94551	NPDES
LIVERMORE	S105024480	WDR-LAWRENCE LIVERMORE NT	E. AVE./VASCO RD	94550	HIST CORTESE
LIVERMORE	S108203000	CON-WAY WESTERN EXPRESS INC	EAST BOUND HWY 1-80 GRANTLINE	94550	HAZNET
LIVERMORE	S109604387	VERIZON WIRELESS (WINDFARM)	N FLYNN RD / HWY 580	94550	EMI
LIVERMORE	S106800322	TESLA NEWARK RECONDUCTORING PR	FREMONT / ALTAMONT PASS	0	WDS
LIVERMORE	S109452536	OAKS BUSINESS PARK	WEST JACK LONDON BLVD / HWY 84	94550	NPDES
LIVERMORE	A100323531	CSAA	2650 KITTY HAWK RD	94550	AST
LIVERMORE	S110326604	LIVERMORE SANITATION RECY. MATERIA	7000 NATIONAL DR	94550	SWF/LF
LIVERMORE	1003879288	CALIFORNIA WATER SERV WELL #10-01	RICHEN AVE & SUNSET DRIVE	94550	CERC-NFRAP
LIVERMORE	90188893	5771 RUNNING HILLS	5771 RUNNING HILLS AVE	94551	ERNS
LIVERMORE	S109447583	KITTY HAWK	SEC KITTY HAWK RD / AIRPORT	94551	NPDES
LIVERMORE	S109463934	VASCO ACE PARKING LOT CITY PROJECT	SEC VASCO AVE / BRISA ST	94550	NPDES
LIVERMORE	S106931772	SAN ANTONE VALLEY RANCH CORP.	STAR RT BOX 53	94550	SWEEPS UST
LIVERMORE	S105726056	7-ELEVEN STORE #33005	33245 VASCO RD	94550	HAZNET
LIVERMORE	S107146396	ENXCO INC	8001_N VASCO RD	94550	HAZNET
LIVERMORE	S110376286	DE PAOLI EQUIPMENT	4000 VASCO RD	94550	Alameda County CS
LIVERMORE	S102816964	HOWDEN WIND PARK	8001 NORTH VASCO ROAD	94550	HAZNET
LIVERMORE	S104580229	ENXCO INC	8001_N VASCO RD	94550	HAZNET
LIVERMORE	S106829831	DE PAOLI EQUIPMENT COMPANY	VASCO ROAD	94550	EMI
LIVERMORE	S106784879	REGENCY COURT	0 VASCO RD / MESQUITE RD	94550	Alameda County CS
LIVERMORE	S106896012	VERIZON WIRELESS/VASCO RD NORTH	8565 VASCO RD		CONTRA COSTA CO. SITE LIST
LIVERMORE	S109426221	ENXCO INC-TRES VAQUEROS	8001 N VASCO RD	94550	HAZNET
LIVERMORE	S109459073	SOUZA RANCH	8001 N VASCO ROAD	94551	NPDES
LIVERMORE	S108217597	QUIK STOP MARKET #157	951 VASCO RD	94551	HAZNET
LIVERMORE	S108246058	REGENCY COURT	0 VASCO RD / MESQUITE	94550	SLIC
LIVERMORE	S108216829	PG & E	VASCO RD AT DALTON	94551	HAZNET
LIVERMORE	S109455709	RELOCATION OF VASCO RD	VICINITY OF VASCO RD MILEPOST	94551	NPDES
LIVERMORE	S109444791	GRADING WORK FOR RELOCATION OF PG&	VICINITY OF VASCO RD MILEPOST	94551	NPDES
PLEASANTON	S109426489	FOLEY RANCH	MILE POST 20 HWY 84 EAST	94550	HAZNET

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 07/02/2010
Date Data Arrived at EDR: 07/14/2010
Date Made Active in Reports: 10/04/2010
Number of Days to Update: 82

Source: EPA
Telephone: N/A
Last EDR Contact: 10/13/2010
Next Scheduled EDR Contact: 01/24/2011
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 07/02/2010
Date Data Arrived at EDR: 07/14/2010
Date Made Active in Reports: 10/04/2010
Number of Days to Update: 82

Source: EPA
Telephone: N/A
Last EDR Contact: 10/13/2010
Next Scheduled EDR Contact: 01/24/2011
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/16/2010
Next Scheduled EDR Contact: 11/29/2010
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Delisted NPL site list

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 07/02/2010
Date Data Arrived at EDR: 07/14/2010
Date Made Active in Reports: 10/04/2010
Number of Days to Update: 82

Source: EPA
Telephone: N/A
Last EDR Contact: 10/13/2010
Next Scheduled EDR Contact: 01/24/2011
Data Release Frequency: Quarterly

Federal CERCLIS list

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 01/29/2010
Date Data Arrived at EDR: 02/09/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 62

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 10/01/2010
Next Scheduled EDR Contact: 01/10/2011
Data Release Frequency: Quarterly

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPAa??s Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 06/23/2009
Date Data Arrived at EDR: 01/15/2010
Date Made Active in Reports: 02/10/2010
Number of Days to Update: 26

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 10/13/2010
Next Scheduled EDR Contact: 01/24/2011
Data Release Frequency: Varies

Federal CERCLIS NFRAP site List

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 06/23/2009
Date Data Arrived at EDR: 09/02/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 19

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 10/01/2010
Next Scheduled EDR Contact: 12/13/2010
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 05/25/2010
Date Data Arrived at EDR: 06/02/2010
Date Made Active in Reports: 10/04/2010
Number of Days to Update: 124

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 08/16/2010
Next Scheduled EDR Contact: 11/29/2010
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 02/17/2010
Date Data Arrived at EDR: 02/19/2010
Date Made Active in Reports: 05/17/2010
Number of Days to Update: 87

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 10/07/2010
Next Scheduled EDR Contact: 01/17/2011
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 02/17/2010
Date Data Arrived at EDR: 02/19/2010
Date Made Active in Reports: 05/17/2010
Number of Days to Update: 87

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 10/07/2010
Next Scheduled EDR Contact: 01/17/2011
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 02/17/2010
Date Data Arrived at EDR: 02/19/2010
Date Made Active in Reports: 05/17/2010
Number of Days to Update: 87

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 10/07/2010
Next Scheduled EDR Contact: 01/17/2011
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 02/17/2010
Date Data Arrived at EDR: 02/19/2010
Date Made Active in Reports: 05/17/2010
Number of Days to Update: 87

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 10/07/2010
Next Scheduled EDR Contact: 01/17/2011
Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 12/20/2009
Date Data Arrived at EDR: 01/20/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 82

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 09/13/2010
Next Scheduled EDR Contact: 12/27/2010
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 12/20/2009
Date Data Arrived at EDR: 01/20/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 82

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 09/13/2010
Next Scheduled EDR Contact: 12/27/2010
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 07/09/2010
Date Data Arrived at EDR: 07/09/2010
Date Made Active in Reports: 08/17/2010
Number of Days to Update: 39

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 10/06/2010
Next Scheduled EDR Contact: 01/17/2011
Data Release Frequency: Annually

State- and tribal - equivalent NPL

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 08/18/2010
Date Data Arrived at EDR: 09/16/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 13

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 09/16/2010
Next Scheduled EDR Contact: 11/22/2010
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 08/18/2010
Date Data Arrived at EDR: 09/16/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 13

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 09/16/2010
Next Scheduled EDR Contact: 11/22/2010
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 08/23/2010
Date Data Arrived at EDR: 08/24/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 36

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 08/24/2010
Next Scheduled EDR Contact: 12/06/2010
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

LUST REG 9: Leaking Underground Storage Tank Report

Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 09/27/2010
Next Scheduled EDR Contact: 01/10/2011
Data Release Frequency: No Update Planned

LUST REG 7: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 11/01/2011
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: No Update Planned

LUST REG 6V: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 09/13/2010
Next Scheduled EDR Contact: 09/27/2010
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing

For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 09/13/2010
Next Scheduled EDR Contact: 12/27/2010
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 10/04/2010
Next Scheduled EDR Contact: 01/17/2011
Data Release Frequency: Quarterly

LUST REG 4: Underground Storage Tank Leak List

Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 09/07/2010
Next Scheduled EDR Contact: 12/20/2010
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 10/18/2010
Next Scheduled EDR Contact: 01/31/2011
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List

Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 09/20/2010
Next Scheduled EDR Contact: 01/03/2011
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation

Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 11/01/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: No Update Planned

LUST: Geotracker's Leaking Underground Fuel Tank Report

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 09/20/2010
Date Data Arrived at EDR: 09/21/2010
Date Made Active in Reports: 10/18/2010
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 10/28/2010
Next Scheduled EDR Contact: 01/03/2011
Data Release Frequency: Quarterly

LUST REG 8: Leaking Underground Storage Tanks

California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 10/18/2010
Next Scheduled EDR Contact: 01/31/2011
Data Release Frequency: Varies

SLIC: Statewide SLIC Cases

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/20/2010
Date Data Arrived at EDR: 09/21/2010
Date Made Active in Reports: 10/18/2010
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 10/28/2010
Next Scheduled EDR Contact: 01/03/2011
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 11/01/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 09/20/2010
Next Scheduled EDR Contact: 01/03/2011
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 10/18/2010
Next Scheduled EDR Contact: 01/31/2011
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 10/04/2010
Next Scheduled EDR Contact: 01/17/2011
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 09/13/2010
Next Scheduled EDR Contact: 12/27/2010
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 08/16/2010
Next Scheduled EDR Contact: 11/29/2010
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 08/16/2010
Next Scheduled EDR Contact: 11/29/2010
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 11/01/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 09/13/2010
Next Scheduled EDR Contact: 12/27/2010
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/09/2010
Next Scheduled EDR Contact: 11/22/2010
Data Release Frequency: Annually

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 08/05/2010
Date Data Arrived at EDR: 08/06/2010
Date Made Active in Reports: 10/04/2010
Number of Days to Update: 59

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 11/01/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: Quarterly

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 02/19/2009
Date Data Arrived at EDR: 02/19/2009
Date Made Active in Reports: 03/16/2009
Number of Days to Update: 25

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 11/02/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 05/24/2010
Date Data Arrived at EDR: 05/27/2010
Date Made Active in Reports: 08/09/2010
Number of Days to Update: 74

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 11/01/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: Quarterly

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 08/05/2010
Date Data Arrived at EDR: 08/06/2010
Date Made Active in Reports: 10/04/2010
Number of Days to Update: 59

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 11/01/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 08/27/2010
Date Data Arrived at EDR: 08/30/2010
Date Made Active in Reports: 10/04/2010
Number of Days to Update: 35

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 11/01/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: Semi-Annually

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 08/30/2010
Date Data Arrived at EDR: 08/30/2010
Date Made Active in Reports: 10/04/2010
Number of Days to Update: 35

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 11/01/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 11/04/2009
Date Data Arrived at EDR: 05/04/2010
Date Made Active in Reports: 07/07/2010
Number of Days to Update: 64

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 08/11/2010
Next Scheduled EDR Contact: 11/15/2010
Data Release Frequency: Varies

State and tribal registered storage tank lists

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 09/20/2010
Date Data Arrived at EDR: 09/21/2010
Date Made Active in Reports: 09/30/2010
Number of Days to Update: 9

Source: SWRCB
Telephone: 916-480-1028
Last EDR Contact: 10/28/2010
Next Scheduled EDR Contact: 01/03/2011
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
Registered Aboveground Storage Tanks.

Date of Government Version: 08/01/2009
Date Data Arrived at EDR: 09/10/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 21

Source: State Water Resources Control Board
Telephone: 916-341-5712
Last EDR Contact: 10/12/2010
Next Scheduled EDR Contact: 01/24/2011
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 08/05/2010
Date Data Arrived at EDR: 08/06/2010
Date Made Active in Reports: 10/04/2010
Number of Days to Update: 59

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 11/01/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 08/30/2010
Date Data Arrived at EDR: 08/30/2010
Date Made Active in Reports: 10/04/2010
Number of Days to Update: 35

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 11/01/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: Quarterly

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 05/24/2010
Date Data Arrived at EDR: 05/27/2010
Date Made Active in Reports: 08/09/2010
Number of Days to Update: 74

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 11/01/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: Quarterly

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 04/01/2008
Date Data Arrived at EDR: 12/30/2008
Date Made Active in Reports: 03/16/2009
Number of Days to Update: 76

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 08/11/2010
Next Scheduled EDR Contact: 11/15/2010
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 08/03/2010
Date Data Arrived at EDR: 08/04/2010
Date Made Active in Reports: 10/04/2010
Number of Days to Update: 61

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 11/01/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 02/11/2010
Date Data Arrived at EDR: 02/11/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 60

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 11/01/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 08/27/2010
Date Data Arrived at EDR: 08/30/2010
Date Made Active in Reports: 10/04/2010
Number of Days to Update: 35

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 11/01/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: Semi-Annually

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 02/19/2009
Date Data Arrived at EDR: 02/19/2009
Date Made Active in Reports: 03/16/2009
Number of Days to Update: 25

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 11/02/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: Varies

FEMA UST: Underground Storage Tank Listing

A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 10/29/2010
Next Scheduled EDR Contact: 01/31/2011
Data Release Frequency: Varies

State and tribal voluntary cleanup sites

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties

Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 08/18/2010
Date Data Arrived at EDR: 09/16/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 13

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 09/16/2010
Next Scheduled EDR Contact: 11/22/2010
Data Release Frequency: Quarterly

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 04/02/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 10/04/2010
Next Scheduled EDR Contact: 01/17/2011
Data Release Frequency: Varies

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 06/24/2010
Date Data Arrived at EDR: 06/25/2010
Date Made Active in Reports: 08/17/2010
Number of Days to Update: 53

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 09/29/2010
Next Scheduled EDR Contact: 01/10/2011
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 10/18/2010
Next Scheduled EDR Contact: 01/10/2011
Data Release Frequency: Varies

WMUDS/SWAT: Waste Management Unit Database

Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 08/16/2010
Next Scheduled EDR Contact: 11/29/2010
Data Release Frequency: Quarterly

SWRCY: Recycler Database

A listing of recycling facilities in California.

Date of Government Version: 07/23/2010
Date Data Arrived at EDR: 09/21/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 8

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 09/21/2010
Next Scheduled EDR Contact: 01/03/2011
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing

A listing of registered waste tire haulers.

Date of Government Version: 09/27/2010
Date Data Arrived at EDR: 09/28/2010
Date Made Active in Reports: 10/18/2010
Number of Days to Update: 20

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 09/20/2010
Next Scheduled EDR Contact: 12/06/2010
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands

Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 09/07/2010
Next Scheduled EDR Contact: 11/22/2010
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 05/07/2010
Date Data Arrived at EDR: 06/18/2010
Date Made Active in Reports: 08/17/2010
Number of Days to Update: 60

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 10/29/2010
Next Scheduled EDR Contact: 12/20/2010
Data Release Frequency: Quarterly

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 08/18/2010
Date Data Arrived at EDR: 09/16/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 13

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 09/16/2010
Next Scheduled EDR Contact: 11/22/2010
Data Release Frequency: Quarterly

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 08/19/2010
Date Data Arrived at EDR: 08/23/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 37

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 10/04/2010
Next Scheduled EDR Contact: 01/17/2011
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/01/2007
Date Data Arrived at EDR: 11/19/2008
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 131

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

Local Lists of Registered Storage Tanks

CA FID UST: Facility Inventory Database

The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database
A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 09/23/2009
Date Data Arrived at EDR: 09/23/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 8
Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 09/07/2010
Next Scheduled EDR Contact: 12/20/2010
Data Release Frequency: Annually

HIST UST: Hazardous Substance Storage Container Database
The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18
Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SWEEPS UST: SWEEPS UST Listing
Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35
Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Local Land Records

LIENS 2: CERCLA Lien Information
A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 05/06/2010
Date Data Arrived at EDR: 05/11/2010
Date Made Active in Reports: 08/09/2010
Number of Days to Update: 90
Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 11/01/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: Varies

LUCIS: Land Use Control Information System
LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/09/2005
Date Data Arrived at EDR: 12/11/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 31
Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 09/08/2010
Next Scheduled EDR Contact: 12/06/2010
Data Release Frequency: Varies

LIENS: Environmental Liens Listing
A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 07/27/2010
Date Data Arrived at EDR: 08/13/2010
Date Made Active in Reports: 08/20/2010
Number of Days to Update: 7
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 10/18/2010
Next Scheduled EDR Contact: 01/31/2011
Data Release Frequency: Varies

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 09/15/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 14

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 09/15/2010
Next Scheduled EDR Contact: 12/27/2010
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 04/06/2010
Date Data Arrived at EDR: 04/07/2010
Date Made Active in Reports: 05/27/2010
Number of Days to Update: 50

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 10/07/2010
Next Scheduled EDR Contact: 01/17/2011
Data Release Frequency: Annually

CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 07/21/2010
Date Made Active in Reports: 08/20/2010
Number of Days to Update: 30

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 11/01/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing

The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units.

Date of Government Version: 09/20/2010
Date Data Arrived at EDR: 09/21/2010
Date Made Active in Reports: 10/18/2010
Number of Days to Update: 27

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 10/28/2010
Next Scheduled EDR Contact: 01/03/2011
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing

The State Water Resources Control Board and nine Regional Water Quality Control Boards partner with the Department of Defense (DoD) through the Defense and State Memorandum of Agreement (DSMOA) to oversee the investigation and remediation of water quality issues at military facilities.

Date of Government Version: 09/20/2010
Date Data Arrived at EDR: 09/21/2010
Date Made Active in Reports: 10/18/2010
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 10/28/2010
Next Scheduled EDR Contact: 01/03/2011
Data Release Frequency: Quarterly

Other Ascertainable Records

RCRA-NonGen: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 02/17/2010
Date Data Arrived at EDR: 02/19/2010
Date Made Active in Reports: 05/17/2010
Number of Days to Update: 87

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 10/07/2010
Next Scheduled EDR Contact: 01/17/2011
Data Release Frequency: Varies

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 01/12/2010
Date Data Arrived at EDR: 02/09/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 62

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 08/11/2010
Next Scheduled EDR Contact: 11/22/2010
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 703-692-8801
Last EDR Contact: 10/28/2010
Next Scheduled EDR Contact: 01/31/2011
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 09/30/2009
Date Made Active in Reports: 12/01/2009
Number of Days to Update: 62

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 09/14/2010
Next Scheduled EDR Contact: 12/27/2010
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 04/11/2010
Date Data Arrived at EDR: 04/19/2010
Date Made Active in Reports: 05/17/2010
Number of Days to Update: 28

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 10/04/2010
Next Scheduled EDR Contact: 01/17/2011
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 06/01/2010
Date Data Arrived at EDR: 06/16/2010
Date Made Active in Reports: 08/17/2010
Number of Days to Update: 62

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 09/15/2010
Next Scheduled EDR Contact: 12/27/2010
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 12/14/2009
Date Data Arrived at EDR: 09/29/2010
Date Made Active in Reports: 10/04/2010
Number of Days to Update: 5

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 09/01/2010
Next Scheduled EDR Contact: 12/13/2010
Data Release Frequency: Varies

MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 05/07/2010
Date Data Arrived at EDR: 06/09/2010
Date Made Active in Reports: 08/30/2010
Number of Days to Update: 82

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 09/09/2010
Next Scheduled EDR Contact: 12/20/2010
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 01/13/2010
Date Made Active in Reports: 02/18/2010
Number of Days to Update: 36

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 09/01/2010
Next Scheduled EDR Contact: 12/13/2010
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2002
Date Data Arrived at EDR: 04/14/2006
Date Made Active in Reports: 05/30/2006
Number of Days to Update: 46

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 10/01/2010
Next Scheduled EDR Contact: 01/10/2011
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/30/2010
Next Scheduled EDR Contact: 12/13/2010
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/30/2010
Next Scheduled EDR Contact: 12/13/2010
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 01/06/2010
Date Made Active in Reports: 02/10/2010
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 11/01/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 04/24/2010
Date Data Arrived at EDR: 04/29/2010
Date Made Active in Reports: 05/17/2010
Number of Days to Update: 18

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 09/27/2010
Next Scheduled EDR Contact: 01/10/2011
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 02/01/2010
Date Data Arrived at EDR: 04/22/2010
Date Made Active in Reports: 08/09/2010
Number of Days to Update: 109

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 10/29/2010
Next Scheduled EDR Contact: 01/31/2011
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 03/18/2010
Date Data Arrived at EDR: 04/06/2010
Date Made Active in Reports: 05/27/2010
Number of Days to Update: 51

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 09/13/2010
Next Scheduled EDR Contact: 12/27/2010
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 07/13/2010
Date Data Arrived at EDR: 07/14/2010
Date Made Active in Reports: 08/09/2010
Number of Days to Update: 26

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 10/14/2010
Next Scheduled EDR Contact: 01/24/2011
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 04/14/2010
Date Data Arrived at EDR: 04/16/2010
Date Made Active in Reports: 05/27/2010
Number of Days to Update: 41

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 09/15/2010
Next Scheduled EDR Contact: 12/27/2010
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 02/25/2010
Date Made Active in Reports: 05/12/2010
Number of Days to Update: 76

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 08/24/2010
Next Scheduled EDR Contact: 12/06/2010
Data Release Frequency: Biennially

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

WDS: Waste Discharge System

Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 08/30/2010
Next Scheduled EDR Contact: 12/13/2010
Data Release Frequency: Quarterly

NPDES: NPDES Permits Listing

A listing of NPDES permits, including stormwater.

Date of Government Version: 08/24/2010
Date Data Arrived at EDR: 08/24/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 36

Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 08/24/2010
Next Scheduled EDR Contact: 12/06/2010
Data Release Frequency: Quarterly

CORTESE: "Cortese" Hazardous Waste & Substances Sites List

The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites). This listing is no longer updated by the state agency.

Date of Government Version: 07/08/2010
Date Data Arrived at EDR: 07/09/2010
Date Made Active in Reports: 08/12/2010
Number of Days to Update: 34

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 10/06/2010
Next Scheduled EDR Contact: 01/17/2011
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List

The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES].

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

NOTIFY 65: Proposition 65 Records

Proposition 65 Notification Records. NOTIFY 65 contains facility notifications about any release which could impact drinking water and thereby expose the public to a potential health risk.

Date of Government Version: 10/21/1993
Date Data Arrived at EDR: 11/01/1993
Date Made Active in Reports: 11/19/1993
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 09/27/2010
Next Scheduled EDR Contact: 01/10/2011
Data Release Frequency: No Update Planned

DRYCLEANERS: Cleaner Facilities

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 09/15/2010
Date Data Arrived at EDR: 09/16/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 13

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 09/13/2010
Next Scheduled EDR Contact: 12/27/2010
Data Release Frequency: Annually

WIP: Well Investigation Program Case List

Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13

Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 10/05/2010
Next Scheduled EDR Contact: 01/17/2011
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 07/07/2010
Date Made Active in Reports: 08/12/2010
Number of Days to Update: 36

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 10/19/2010
Next Scheduled EDR Contact: 01/31/2011
Data Release Frequency: Annually

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 09/29/2010
Date Made Active in Reports: 10/18/2010
Number of Days to Update: 19

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 09/29/2010
Next Scheduled EDR Contact: 01/10/2011
Data Release Frequency: Varies

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 10/28/2010
Next Scheduled EDR Contact: 01/31/2011
Data Release Frequency: Semi-Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 05/12/2010
Date Data Arrived at EDR: 05/13/2010
Date Made Active in Reports: 08/17/2010
Number of Days to Update: 96

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 10/25/2010
Next Scheduled EDR Contact: 02/07/2011
Data Release Frequency: Varies

PROC: Certified Processors Database
A listing of certified processors.

Date of Government Version: 07/23/2010
Date Data Arrived at EDR: 09/21/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 8
Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 09/21/2010
Next Scheduled EDR Contact: 01/03/2011
Data Release Frequency: Quarterly

MWMP: Medical Waste Management Program Listing
The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 09/03/2010
Date Data Arrived at EDR: 09/16/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 13
Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 09/14/2010
Next Scheduled EDR Contact: 12/27/2010
Data Release Frequency: Varies

COAL ASH DOE: Sleam-Electric Plan Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76
Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 10/28/2010
Next Scheduled EDR Contact: 01/31/2011
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 11/09/2009
Date Data Arrived at EDR: 12/18/2009
Date Made Active in Reports: 02/10/2010
Number of Days to Update: 54
Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 09/15/2010
Next Scheduled EDR Contact: 12/27/2010
Data Release Frequency: Varies

HWT: Registered Hazardous Waste Transporter Database
A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 07/21/2010
Date Data Arrived at EDR: 07/21/2010
Date Made Active in Reports: 08/12/2010
Number of Days to Update: 22
Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 10/20/2010
Next Scheduled EDR Contact: 01/31/2011
Data Release Frequency: Quarterly

HWP: EnviroStor Permitted Facilities Listing
Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 08/09/2010
Date Data Arrived at EDR: 08/11/2010
Date Made Active in Reports: 08/20/2010
Number of Days to Update: 9
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 08/11/2010
Next Scheduled EDR Contact: 11/22/2010
Data Release Frequency: Quarterly

FINANCIAL ASSURANCE 2: Financial Assurance Information Listing
A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 09/27/2010
Date Data Arrived at EDR: 09/28/2010
Date Made Active in Reports: 10/18/2010
Number of Days to Update: 20

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 09/20/2010
Next Scheduled EDR Contact: 12/06/2010
Data Release Frequency: Varies

FINANCIAL ASSURANCE: Financial Assurance Information Listing

Financial Assurance information

Date of Government Version: 03/01/2007
Date Data Arrived at EDR: 06/01/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 28

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 08/13/2010
Next Scheduled EDR Contact: 11/15/2010
Data Release Frequency: Varies

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 10/28/2010
Next Scheduled EDR Contact: 01/31/2011
Data Release Frequency: N/A

PCB TRANSFORMER: PCB Transformer Registration Database

The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 01/01/2008
Date Data Arrived at EDR: 02/18/2009
Date Made Active in Reports: 05/29/2009
Number of Days to Update: 100

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 08/10/2010
Next Scheduled EDR Contact: 11/15/2010
Data Release Frequency: Varies

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Manufactured Gas Plants: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Historical Auto Stations: EDR Proprietary Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Historical Cleaners: EDR Proprietary Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 07/14/2010
Date Data Arrived at EDR: 07/16/2010
Date Made Active in Reports: 08/12/2010
Number of Days to Update: 27

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 10/04/2010
Next Scheduled EDR Contact: 01/17/2011
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 07/14/2010
Date Data Arrived at EDR: 07/16/2010
Date Made Active in Reports: 08/12/2010
Number of Days to Update: 27

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 10/04/2010
Next Scheduled EDR Contact: 01/17/2011
Data Release Frequency: Semi-Annually

CONTRA COSTA COUNTY:

Site List

List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 08/16/2010
Date Data Arrived at EDR: 08/17/2010
Date Made Active in Reports: 08/20/2010
Number of Days to Update: 3

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 08/09/2010
Next Scheduled EDR Contact: 11/22/2010
Data Release Frequency: Semi-Annually

FRESNO COUNTY:

CUPA Resources List

Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 07/19/2010
Date Data Arrived at EDR: 07/21/2010
Date Made Active in Reports: 08/12/2010
Number of Days to Update: 22

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 10/18/2010
Next Scheduled EDR Contact: 01/31/2011
Data Release Frequency: Semi-Annually

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 08/31/2010
Date Data Arrived at EDR: 09/01/2010
Date Made Active in Reports: 09/30/2010
Number of Days to Update: 29

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 08/30/2010
Next Scheduled EDR Contact: 11/29/2010
Data Release Frequency: Quarterly

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206

Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 09/27/2010
Next Scheduled EDR Contact: 01/10/2011
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 04/13/2010
Date Made Active in Reports: 05/18/2010
Number of Days to Update: 35

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 10/18/2010
Next Scheduled EDR Contact: 01/31/2011
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 07/26/2010
Date Data Arrived at EDR: 08/10/2010
Date Made Active in Reports: 08/20/2010
Number of Days to Update: 10

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 10/25/2010
Next Scheduled EDR Contact: 02/07/2011
Data Release Frequency: Varies

City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 03/05/2009
Date Data Arrived at EDR: 03/10/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 29

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 08/25/2010
Next Scheduled EDR Contact: 12/06/2010
Data Release Frequency: Varies

Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 02/09/2010
Date Data Arrived at EDR: 02/12/2010
Date Made Active in Reports: 03/04/2010
Number of Days to Update: 20

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 10/25/2010
Next Scheduled EDR Contact: 02/07/2011
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 07/27/2010
Date Data Arrived at EDR: 07/28/2010
Date Made Active in Reports: 08/12/2010
Number of Days to Update: 15

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 10/25/2010
Next Scheduled EDR Contact: 02/07/2011
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank
Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/28/2003
Date Data Arrived at EDR: 10/23/2003
Date Made Active in Reports: 11/26/2003
Number of Days to Update: 34

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 11/01/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: Annually

City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 07/07/2010
Date Data Arrived at EDR: 07/30/2010
Date Made Active in Reports: 08/12/2010
Number of Days to Update: 13

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 10/18/2010
Next Scheduled EDR Contact: 01/31/2011
Data Release Frequency: Semi-Annually

MARIN COUNTY:

Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 07/19/2010
Date Data Arrived at EDR: 08/16/2010
Date Made Active in Reports: 09/30/2010
Number of Days to Update: 45

Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 10/12/2010
Next Scheduled EDR Contact: 01/24/2011
Data Release Frequency: Semi-Annually

NAPA COUNTY:

Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 07/09/2008
Date Data Arrived at EDR: 07/09/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 22

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 09/07/2010
Next Scheduled EDR Contact: 12/20/2010
Data Release Frequency: No Update Planned

Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/16/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 23

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 09/07/2010
Next Scheduled EDR Contact: 12/20/2010
Data Release Frequency: No Update Planned

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 08/05/2010
Date Data Arrived at EDR: 08/23/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 37

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 08/17/2010
Next Scheduled EDR Contact: 11/29/2010
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 08/05/2010
Date Data Arrived at EDR: 08/23/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 37

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 08/17/2010
Next Scheduled EDR Contact: 11/29/2010
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 08/05/2010
Date Data Arrived at EDR: 08/23/2010
Date Made Active in Reports: 09/30/2010
Number of Days to Update: 38

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 08/17/2010
Next Scheduled EDR Contact: 11/29/2010
Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 09/13/2010
Date Data Arrived at EDR: 09/14/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 15

Source: Placer County Health and Human Services
Telephone: 530-889-7312
Last EDR Contact: 09/13/2010
Next Scheduled EDR Contact: 12/27/2010
Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 08/04/2010
Date Data Arrived at EDR: 08/13/2010
Date Made Active in Reports: 08/20/2010
Number of Days to Update: 7

Source: Department of Public Health
Telephone: 951-358-5055
Last EDR Contact: 09/27/2010
Next Scheduled EDR Contact: 01/10/2011
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 08/04/2010
Date Data Arrived at EDR: 08/13/2010
Date Made Active in Reports: 09/30/2010
Number of Days to Update: 48
Source: Health Services Agency
Telephone: 951-358-5055
Last EDR Contact: 09/27/2010
Next Scheduled EDR Contact: 01/10/2011
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 06/30/2010
Date Data Arrived at EDR: 07/21/2010
Date Made Active in Reports: 08/12/2010
Number of Days to Update: 22
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 10/12/2010
Next Scheduled EDR Contact: 01/24/2011
Data Release Frequency: Quarterly

Master Hazardous Materials Facility List
Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 07/26/2010
Date Data Arrived at EDR: 08/16/2010
Date Made Active in Reports: 08/20/2010
Number of Days to Update: 4
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 10/12/2010
Next Scheduled EDR Contact: 01/24/2011
Data Release Frequency: Quarterly

SAN BERNARDINO COUNTY:

Hazardous Material Permits
This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 09/07/2010
Date Data Arrived at EDR: 09/08/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 21
Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 08/16/2010
Next Scheduled EDR Contact: 11/29/2010
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database
The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 09/09/2010
Date Data Arrived at EDR: 09/15/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 14
Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 09/15/2010
Next Scheduled EDR Contact: 12/27/2010
Data Release Frequency: Quarterly

Solid Waste Facilities
San Diego County Solid Waste Facilities.

Date of Government Version: 10/01/2009
Date Data Arrived at EDR: 12/04/2009
Date Made Active in Reports: 01/18/2010
Number of Days to Update: 45
Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 11/01/2010
Next Scheduled EDR Contact: 02/14/2011
Data Release Frequency: Varies

Environmental Case Listing
The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24
Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 09/23/2010
Next Scheduled EDR Contact: 12/27/2010
Data Release Frequency: Varies

SAN FRANCISCO COUNTY:

Local Oversite Facilities
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10
Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 08/16/2010
Next Scheduled EDR Contact: 11/29/2010
Data Release Frequency: Quarterly

Underground Storage Tank Information
Underground storage tank sites located in San Francisco county.

Date of Government Version: 09/08/2010
Date Data Arrived at EDR: 09/10/2010
Date Made Active in Reports: 09/30/2010
Number of Days to Update: 20
Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 08/30/2010
Next Scheduled EDR Contact: 11/29/2010
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 05/14/2010
Date Data Arrived at EDR: 06/09/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 30
Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 09/27/2010
Next Scheduled EDR Contact: 01/10/2011
Data Release Frequency: Semi-Annually

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 07/15/2010
Date Data Arrived at EDR: 07/16/2010
Date Made Active in Reports: 08/12/2010
Number of Days to Update: 27
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/21/2010
Next Scheduled EDR Contact: 01/03/2011
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 09/20/2010
Date Data Arrived at EDR: 09/21/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 8
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 09/20/2010
Next Scheduled EDR Contact: 10/04/2010
Data Release Frequency: Semi-Annually

SANTA CLARA COUNTY:

HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22
Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 05/29/2009
Date Data Arrived at EDR: 06/01/2009
Date Made Active in Reports: 06/15/2009
Number of Days to Update: 14
Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 09/07/2010
Next Scheduled EDR Contact: 12/20/2010
Data Release Frequency: Annually

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 08/31/2009
Date Data Arrived at EDR: 08/31/2009
Date Made Active in Reports: 09/18/2009
Number of Days to Update: 18
Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 09/13/2010
Next Scheduled EDR Contact: 11/29/2010
Data Release Frequency: Annually

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 09/07/2010
Date Data Arrived at EDR: 09/10/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 19
Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 09/07/2010
Next Scheduled EDR Contact: 12/20/2010
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 09/07/2010
Date Data Arrived at EDR: 09/14/2010
Date Made Active in Reports: 09/30/2010
Number of Days to Update: 16
Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 09/07/2010
Next Scheduled EDR Contact: 12/20/2010
Data Release Frequency: Quarterly

SONOMA COUNTY:

Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 07/12/2010
Date Data Arrived at EDR: 07/13/2010
Date Made Active in Reports: 08/12/2010
Number of Days to Update: 30

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 10/04/2010
Next Scheduled EDR Contact: 01/17/2011
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 09/13/2010
Date Data Arrived at EDR: 09/14/2010
Date Made Active in Reports: 09/30/2010
Number of Days to Update: 16

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 09/13/2010
Next Scheduled EDR Contact: 12/27/2010
Data Release Frequency: Semi-Annually

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 07/26/2010
Date Data Arrived at EDR: 09/01/2010
Date Made Active in Reports: 09/29/2010
Number of Days to Update: 28

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 08/24/2010
Next Scheduled EDR Contact: 12/06/2010
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 08/01/2009
Date Data Arrived at EDR: 10/05/2009
Date Made Active in Reports: 10/13/2009
Number of Days to Update: 8

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 09/27/2010
Next Scheduled EDR Contact: 11/15/2010
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 08/24/2010
Next Scheduled EDR Contact: 12/06/2010
Data Release Frequency: Quarterly

Underground Tank Closed Sites List
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 08/31/2010
Date Data Arrived at EDR: 09/21/2010
Date Made Active in Reports: 09/30/2010
Number of Days to Update: 9

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 09/21/2010
Next Scheduled EDR Contact: 01/03/2011
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report
Underground storage tank sites located in Yolo county.

Date of Government Version: 07/20/2010
Date Data Arrived at EDR: 09/16/2010
Date Made Active in Reports: 09/30/2010
Number of Days to Update: 14

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 09/27/2010
Next Scheduled EDR Contact: 01/10/2011
Data Release Frequency: Annually

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 08/26/2009
Date Made Active in Reports: 09/11/2009
Number of Days to Update: 16

Source: Department of Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 08/25/2010
Next Scheduled EDR Contact: 12/06/2010
Data Release Frequency: Annually

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 07/22/2010
Date Made Active in Reports: 08/26/2010
Number of Days to Update: 35

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 10/19/2010
Next Scheduled EDR Contact: 01/31/2011
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 07/28/2010
Date Data Arrived at EDR: 08/11/2010
Date Made Active in Reports: 09/24/2010
Number of Days to Update: 44

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 08/11/2010
Next Scheduled EDR Contact: 11/22/2010
Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 12/01/2009
Date Made Active in Reports: 12/14/2009
Number of Days to Update: 13

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 08/23/2010
Next Scheduled EDR Contact: 12/06/2010
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 07/19/2010
Date Made Active in Reports: 08/26/2010
Number of Days to Update: 38

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 08/30/2010
Next Scheduled EDR Contact: 12/13/2010
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 07/06/2010
Date Made Active in Reports: 07/26/2010
Number of Days to Update: 20

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 09/20/2010
Next Scheduled EDR Contact: 01/03/2011
Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: Rextag Strategies Corp.
Telephone: (281) 769-2247
U.S. Electric Transmission and Power Plants Systems Digital GIS Data

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2009 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

STREET AND ADDRESS INFORMATION

© 2010 Tele Atlas North America, Inc. All rights reserved. This material is proprietary and the subject of copyright protection and other intellectual property rights owned by or licensed to Tele Atlas North America, Inc. The use of this material is subject to the terms of a license agreement. You will be held liable for any unauthorized copying or disclosure of this material.

GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

GARAVENTA HILLS
VASCO ROAD
LIVERMORE, CA 94551

TARGET PROPERTY COORDINATES

Latitude (North):	37.72490 - 37° 43' 29.6''
Longitude (West):	121.716 - 121° 42' 57.6''
Universal Tranverse Mercator:	Zone 10
UTM X (Meters):	613156.8
UTM Y (Meters):	4175863.8
Elevation:	606 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	37121-F6 ALTAMONT, CA
Most Recent Revision:	1981

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

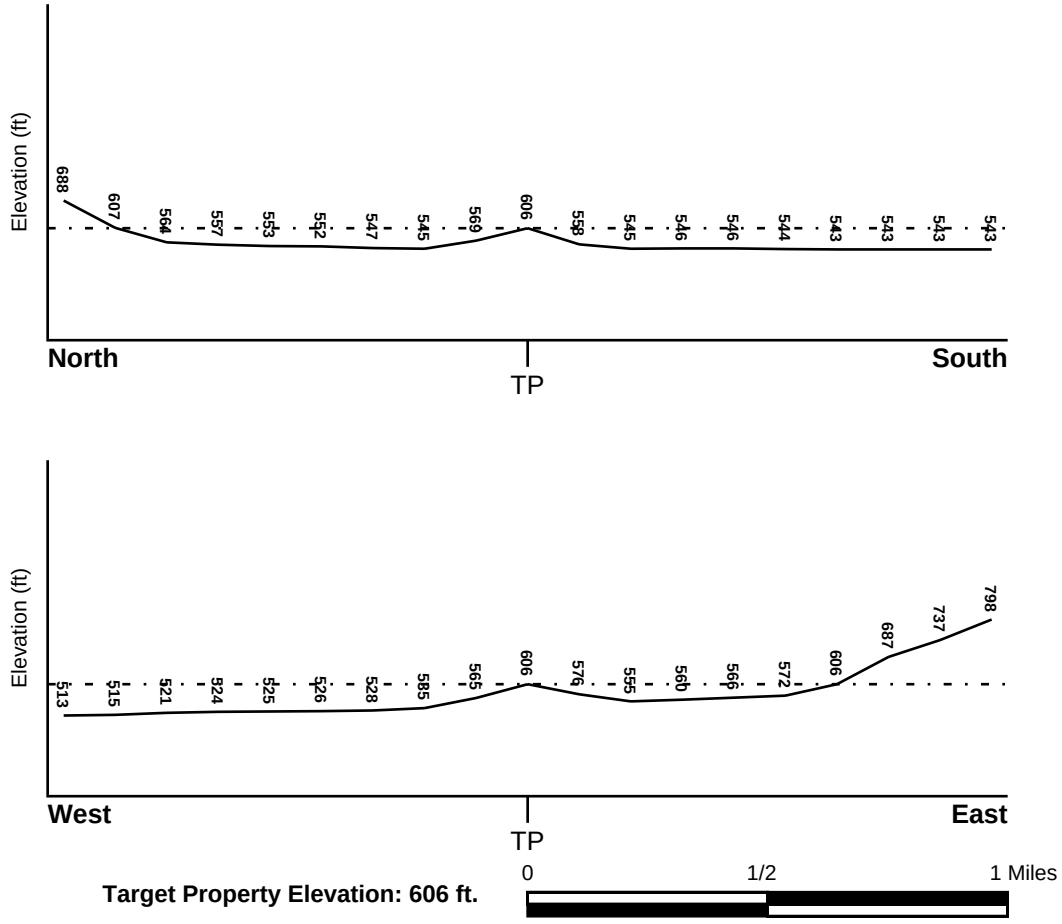
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General West

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
ALAMEDA, CA	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 06001C - FEMA DFIRM Flood data

Additional Panels in search area: Not Reported

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
ALTAMONT	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius: 1.25 miles
Status: Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

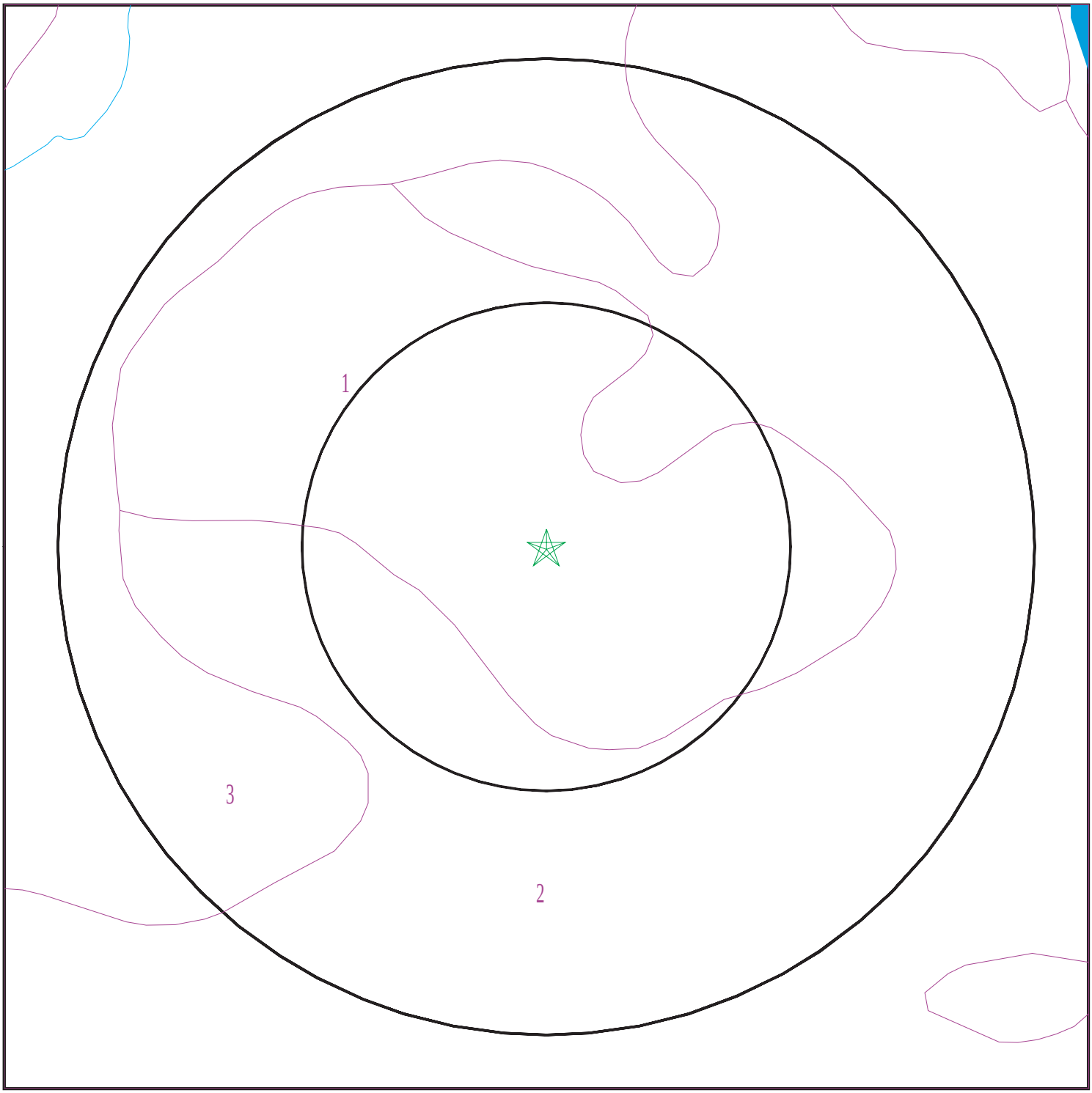
Era:	Cenozoic
System:	Tertiary
Series:	Miocene
Code:	Tm *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratified Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 2914012.2s



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	Garaventa Hills	CLIENT:	Engeo Inc.
ADDRESS:	Vasco Road Livermore CA 94551	CONTACT:	Richard Gandolfo
LAT/LONG:	37.7249 / 121.7160	INQUIRY #:	2914012.2s
		DATE:	November 05, 2010 12:49 pm

Copyright © 2010 EDR, Inc. © 2010 Tele Atlas Rel. 07/2009.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: Positas

Soil Surface Texture: gravelly loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	11 inches	gravelly loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand.	Max: 1.4 Min: 0.42	Max: 7.8 Min: 7.4
2	11 inches	29 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand.	Max: 1.4 Min: 0.42	Max: 7.8 Min: 7.4
3	29 inches	53 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand.	Max: 1.4 Min: 0.42	Max: 7.8 Min: 7.4
4	53 inches	59 inches	gravelly sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand.	Max: 1.4 Min: 0.42	Max: 7.8 Min: 7.4

Soil Map ID: 2

Soil Component Name: San Ysidro

Soil Surface Texture: loam

Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.

Soil Drainage Class: Moderately well drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	16 inches	loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 1.4 Min: 0.42	Max: 8.4 Min: 7.8
2	16 inches	33 inches	clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 1.4 Min: 0.42	Max: 8.4 Min: 7.8
3	33 inches	59 inches	silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 1.4 Min: 0.42	Max: 8.4 Min: 7.8

Soil Map ID: 3

Soil Component Name: Solano

Soil Surface Texture: fine sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Somewhat poorly drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	5 inches	fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 4 Min: 1.4	Max: 9 Min: 6.6
2	5 inches	59 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 4 Min: 1.4	Max: 9 Min: 6.6

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.125
Federal FRDS PWS	Nearest PWS within 0.125 miles
State Database	1.125

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	USGS3222932	1/2 - 1 Mile SW
2	USGS3222926	1/2 - 1 Mile WSW

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

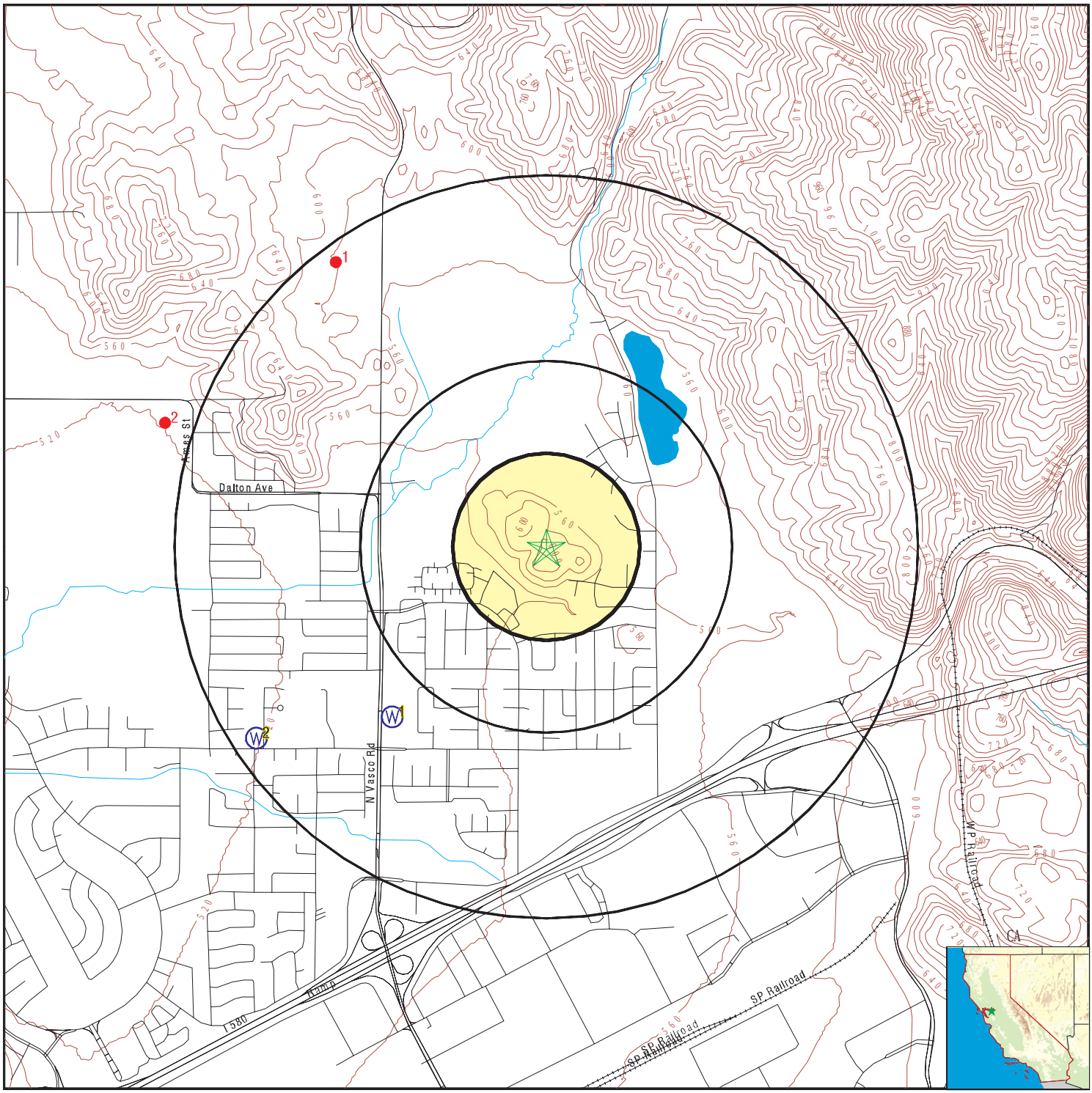
MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

OTHER STATE DATABASE INFORMATION

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	CAOG60000191715	1/2 - 1 Mile NW
2	CAOG60000191692	1 - 2 Miles WNW

PHYSICAL SETTING SOURCE MAP - 2914012.2s



- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- HD Closest Hydrogeological Data
- Oil, gas or related wells

SITE NAME: Garaventa Hills	CLIENT: Engeo Inc.
ADDRESS: Vasco Road Livermore CA 94551	CONTACT: Richard Gandolfo
LAT/LONG: 37.7249 / 121.7160	INQUIRY #: 2914012.2s DATE: November 05, 2010 12:49 pm

Copyright © 2010 EDR, Inc. © 2010 Tele Atlas Rel. 07/2009.

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

1
SW
1/2 - 1 Mile
Lower | **FED USGS** | **USGS3222932**

Agency cd:	USGS	Site no:	374306121432101
Site name:	002S002E35G002M		
Latitude:	374306	EDR Site id:	USGS3222932
Longitude:	1214321	Dec lat:	37.7182624
Dec lon:	-121.72356318	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	001
Country:	US	Land net:	NWSWNES35 T2S R2E M
Location map:	ALTAMONT	Map scale:	24000
Altitude:	525.60		
Altitude method:	Level or other surveying method		
Altitude accuracy:	.1		
Altitude datum:	National Geodetic Vertical Datum of 1929		
Hydrologic:	San Francisco Bay. California. Area = 1200 sq.mi.		
Topographic:	Valley flat		
Site type:	Ground-water other than Spring	Date construction:	19510905
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	ALLUVIUM (QUATERNARY)		
Well depth:	88.0	Hole depth:	88.0
Source of depth data:	Not Reported		
Project number:	CA-9-358M		
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	1976-02-11
Water quality data end date:	1980-03-24	Water quality data count:	17
Ground water data begin date:	1976-01-29	Ground water data end date:	1981-11-18
Ground water data count:	32		

Ground-water levels, Number of Measurements: 32

Date	Feet below Surface	Feet to Sealevel	Date	Feet below Surface	Feet to Sealevel
1981-11-18	11.8		1981-10-26	11.8	
1981-09-30	12.4		1981-04-10	10.7	
1980-10-14	9.7		1979-10-29	12.0	
1979-05-22	11.2		1979-04-23	10.9	
1979-03-16	10.5		1979-01-18	11.8	
1978-12-18	13.1		1978-08-11	12.6	
1978-06-08	11.7		1978-04-11	10.8	
1977-12-09	15.1		1977-10-18	15.3	
1977-06-09	14.7		1977-03-29	14.4	
1977-01-27	14.3		1977-01-20	14.2	
1976-12-21	14.4		1976-11-22	14.9	
1976-10-22	14.6		1976-09-16	16.1	
1976-08-26	15.0		1976-07-01	14.3	
1976-06-17	14.3		1976-05-28	16.0	
1976-04-29	13.8		1976-03-25	13.6	

Ground-water levels, continued.

Date	Feet below Surface	Feet to Sealevel	Date	Feet below Surface	Feet to Sealevel
1976-02-11	13.5		1976-01-29	13.4	

2
WSW
1/2 - 1 Mile
Lower

FED USGS **USGS3222926**

Agency cd:	USGS	Site no:	374303121434501
Site name:	002S002E35F001M		
Latitude:	374303	EDR Site id:	USGS3222926
Longitude:	1214345	Dec lat:	37.71742907
Dec lon:	-121.73023002	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	001
Country:	US	Land net:	S 35T2S R2E M
Location map:	ALTAMONT	Map scale:	24000
Altitude:	522.00		
Altitude method:	Interpolated from topographic map		
Altitude accuracy:	5		
Altitude datum:	National Geodetic Vertical Datum of 1929		
Hydrologic:	San Francisco Bay. California. Area = 1200 sq.mi.		
Topographic:	Valley flat		
Site type:	Ground-water other than Spring	Date construction:	19600913
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	ALLUVIUM (QUATERNARY)		
Well depth:	100	Hole depth:	100
Source of depth data:	Not Reported		
Project number:	CA-9-358M		
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1969-10-09	Ground water data end date:	1981-10-22
Ground water data count:	22		

Ground-water levels, Number of Measurements: 22

Date	Feet below Surface	Feet to Sealevel	Date	Feet below Surface	Feet to Sealevel
1981-10-22	13.8		1979-09-25	11.9	
1979-04-23	10.4		1978-09-19	12.9	
1978-08-21	16.0		1978-03-14	10.0	
1977-10-18	14.0		1977-03-14	13.3	
1976-09-29	13.6		1976-03-11	14.5	
1975-09-15	12.5		1974-09-16	16.4	
1974-03-05	9.0		1973-09-24	12.8	
1973-03-12	9.5		1972-09-19	16.7	
1972-03-02	15.0		1971-09-03	14.5	
1971-03-16	13.2		1970-09-15	15.6	
1970-03-17	14.2		1969-10-09	16.0	

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance

Database EDR ID Number

1
NW
1/2 - 1 Mile

OIL_GAS **CAOG60000191715**

Apinumber:	00100016	Operator:	Chevron U.S.A. Inc.
Lease:	Signal-Hancock Christensen	Well no:	1
Field:	Not Reported	Caog m2 area:	Not Reported
Map:	608	Status cod:	006
Source:	Not Reported		
Latitude27:	37.73608		
Longitude2:	-121.72527		
Latitude83:	37.736009		
Longitude8:	-121.726333		
Td:	0		
Sec:	26		
Twn:	2S	Rge:	2E
Bm:	MD		
X coord:	0		
Y coord:	0		
Zone:	Not Reported	Spuddate:	06/27/2007
Abanddate:	09/28/2007	Comments 1:	Not Reported
District:	6	Site id:	CAOG60000191715

2
WNW
1 - 2 Miles

OIL_GAS **CAOG60000191692**

Apinumber:	00120019	Operator:	Venoco Inc.
Lease:	City of Livermore	Well no:	1
Field:	Not Reported	Caog m2 area:	Not Reported
Map:	608	Status cod:	006
Source:	Not Reported		
Latitude27:	37.72981		
Longitude2:	-121.73366		
Latitude83:	37.729739		
Longitude8:	-121.734724		
Td:	0		
Sec:	27		
Twn:	2S	Rge:	2E
Bm:	MD		
X coord:	0		
Y coord:	0		
Zone:	Not Reported	Spuddate:	06/27/2007
Abanddate:	09/28/2007	Comments 1:	Not Reported
District:	6	Site id:	CAOG60000191692

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: CA Radon

Radon Test Results

Zipcode	Num Tests	> 4 pCi/L
94551	5	0

Federal EPA Radon Zone for ALAMEDA County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for ALAMEDA COUNTY, CA

Number of sites tested: 49

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.776 pCi/L	100%	0%	0%
Living Area - 2nd Floor	-0.400 pCi/L	100%	0%	0%
Basement	1.338 pCi/L	100%	0%	0%

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2009 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Health Services
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

OTHER STATE DATABASE INFORMATION

California Oil and Gas Well Locations
Source: Department of Conservation
Telephone: 916-323-1779
Oil and Gas well locations in the state.

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

STREET AND ADDRESS INFORMATION

© 2010 Tele Atlas North America, Inc. All rights reserved. This material is proprietary and the subject of copyright protection and other intellectual property rights owned by or licensed to Tele Atlas North America, Inc. The use of this material is subject to the terms of a license agreement. You will be held liable for any unauthorized copying or disclosure of this material.

APPENDIX B

FIRST AMERICAN TITLE COMAPNY

Preliminary Title Report

APPENDIX B

Updated

First American Title Company

6683 Owens Drive
Pleasanton, CA 94588

Escrow Officer:	Diane Burton (DB)
Phone:	(925)738-4050
Fax No.:	(866)648-7806
E-Mail:	dburton@firstam.com
Title Officer:	Jim Benson
Phone:	(925)225-2643
Fax No.:	(925)225-2684
E-Mail:	jbenson@firstam.com
Buyer:	RL Communities, Inc
Owner:	Alwin R. Garaventa
Property:	Vacant Land LIVERMORE, CA

PRELIMINARY REPORT

In response to the above referenced application for a policy of title insurance, this company hereby reports that it is prepared to issue, or cause to be issued, as of the date hereof, a Policy or Policies of Title Insurance describing the land and the estate or interest therein hereinafter set forth, insuring against loss which may be sustained by reason of any defect, lien or encumbrance not shown or referred to as an Exception below or not excluded from coverage pursuant to the printed Schedules, Conditions and Stipulations of said Policy forms.

The printed Exceptions and Exclusions from the coverage of said Policy or Policies are set forth in Exhibit A attached. Copies of the Policy forms should be read. They are available from the office which issued this report.

Please read the exceptions shown or referred to below and the exceptions and exclusions set forth in Exhibit A of this report carefully. The exceptions and exclusions are meant to provide you with notice of matters which are not covered under the terms of the title insurance policy and should be carefully considered.

It is important to note that this preliminary report is not a written representation as to the condition of title and may not list all liens, defects, and encumbrances affecting title to the land.

This report (and any supplements or amendments hereto) is issued solely for the purpose of facilitating the issuance of a policy of title insurance and no liability is assumed hereby. If it is desired that liability be assumed prior to the issuance of a policy of title insurance, a Binder or Commitment should be requested.

Dated as of August 13, 2010 at 7:30 A.M.

The form of Policy of title insurance contemplated by this report is:

1992 ALTA Owner's Policy (10-17-92) with Regional Exceptions

1992 ALTA Loan Policy (10-17-92)

A specific request should be made if another form or additional coverage is desired.

Title to said estate or interest at the date hereof is vested in:

ALWIN ROBERT GARAVENTA, TRUSTEE, GARAVENTA TRUST, DATED JULY 24, 2009, AS TO AN UNDIVIDED 50% INTEREST; AND SHARON LEE ALBRIGHT, TRUSTEE OF THE THIRD AMENDED & RESTATED SHARON LEE ALBRIGHT REVOCABLE TRUST DATED AUGUST 29, 2006, AND KAREN JEAN RED ELK, TRUSTEE OF THE KAREN JEAN RED ELK REVOCABLE TRUST DATED AUGUST 29, 2006, EACH AS TO AN UNDIVIDED ONE-HALF INTEREST AS TENANTS IN COMMON, AS TO AN UNDIVIDED 50% INTEREST, AS TO PARCEL ONE; AND

ALWIN ROBERT GARAVENTA, TRUSTEE, GARAVENTA TRUST, DATED JULY 24, 2009, AS TO AN UNDIVIDED 1/2 INTEREST AND SHARON LEE ALBRIGHT, TRUSTEE OF THE SECOND AMENDED & RESTATED SHARON LEE ALBRIGHT REVOCABLE TRUST DATED SEPTEMBER 15, 2004, AND KAREN JEAN RED ELK, AN UNMARRIED WOMAN, AS TO AN UNDIVIDED 1/2 INTEREST, AS TO PARCELS TWO AND THREE

The estate or interest in the land hereinafter described or referred to covered by this Report is:

A fee as to Parcels One and Two; an easement as to Parcel Three.

The Land referred to herein is described as follows:

(See attached Legal Description)

At the date hereof exceptions to coverage in addition to the printed Exceptions and Exclusions in said policy form would be as follows:

1. General and special taxes and assessments for the fiscal year 2010-2011, a lien not yet due or payable.

2. The lien of supplemental taxes, if any, assessed pursuant to Chapter 3.5 commencing with Section 75 of the California Revenue and Taxation Code.

THE FOLLOWING MATTERS AFFECT PARCEL ONE:

3. An easement for electric transmission lines and incidental purposes, recorded August 06, 1926 as Book 1319, Page 329 of Official Records.
   In Favor of: Pacific Gas and Electric Company
   Affects: A portion of the land

   Terms and provisions contained in the above document.

4. The terms and provisions contained in the document entitled "Annexation Agreement" recorded June 13, 1962 as Book/Reel 606, Page/Image 361 of Official Records.

5. Terms, provisions, covenants, restrictions and conditions contained in a document executed pursuant to the California Land Conservation Act of 1965 (Williamson Act) and recorded February 10, 1976 as Instrument No. 76-20388 in Book/Reel 4254, Page/Image 699 of Official Records.

   Certificate and Notice of Nonrenewal Pursuant to California Land Conservation Act of 1965 recorded October 13th, 1981, Series No. 81-173808, Alameda County Records.

   Notice of Nonrenewal of Land Conservation Contract recorded October 13th, 1981, Series No. 81-173809, Alameda County Records.

6. Rights of parties in possession.

THE FOLLOWING MATTERS AFFECT PARCEL TWO:

7. Additional matters, if any, relating to waterways and boundaries issues, to be determined by a review by the Company's underwriting staff.

8. The terms and provisions contained in the document entitled Right of Way Improvement Agreement recorded February 5, 1996 as Instrument No. 96-30625 of Official Records.

9. The terms and provisions contained in the document entitled Agreement for Provision of School Facilities Funding recorded September 6, 1996 as Instrument No. 96-223326 of Official Records.

10. The terms and provisions contained in the document entitled Impact Mitigation Agreement recorded September 22, 1999 as instrument No. 99-360333 of Official Records.

11. The terms and provisions contained in the document entitled Agreement for Advance of School Facilities Construction Funds recorded September 22, 1999 as Instrument No. 99-361286 of Official Records.

12. Rights of parties in possession.

INFORMATIONAL NOTES

Note: The policy to be issued may contain an arbitration clause. When the Amount of Insurance is less than the certain dollar amount set forth in any applicable arbitration clause, all arbitrable matters shall be arbitrated at the option of either the Company or the Insured as the exclusive remedy of the parties. If you desire to review the terms of the policy, including any arbitration clause that may be included, contact the office that issued this Commitment or Report to obtain a sample of the policy jacket for the policy that is to be issued in connection with your transaction.

1. General and special taxes and assessments for the fiscal year 2009-2010.

First Installment:	$1,949.53, PAID
Penalty:	$0.00
Second Installment:	$1,949.53, PAID
Penalty:	$0.00
Tax Rate Area:	16-071
A. P. No.:	099-0024-001-05

(Affects Parcel One)

2. General and special taxes and assessments for the fiscal year 2009-2010.

First Installment:	$715.79, PAID
Penalty:	$0.00
Second Installment:	$715.79, PAID
Penalty:	$0.00
Tax Rate Area:	16-000
A. P. No.:	099B-5300-010

(Affects Parcel Two)

3. The property covered by this report is vacant land.

4. According to the public records, there has been no conveyance of the land within a period of twenty four months prior to the date of this report, except as follows:

A document recorded October 26, 2009 as Instrument No. 2009341021 of Official Records.
From: Alwin R. Garaventa, AKA Alwin Robert Garaventa
To: Alwin Robert Garaventa, Trustee, Garaventa Trust, dated July 24, 2009

(Affects Parcel One)

A document recorded October 26, 2009 as Instrument No. 2009341020 of Official Records.
From: Alwin R. Garaventa, AKA Alwin Robert Garaventa
To: Alwin Robert Garaventa, Trustee, Garaventa Trust, dated July 24, 2009

(Affects Parcel Two)

5. We find no open deeds of trust. Escrow please confirm before closing.

6. Should this report be used to facilitate your transaction, we must be provided with the following prior to the issuance of the policy:

A. WITH RESPECT TO A CORPORATION:

a. A certificate of good standing of recent date issued by the Secretary of State of the corporation's state of domicile.

b. A certificate copy of a resolution of the Board of Directors authorizing the contemplated transaction and designating which corporate officers shall have the power to execute on behalf of the corporation.

c. Requirements which the Company may impose following its review of the above material and other information which the Company may require.

B. WITH RESPECT TO A CALIFORNIA LIMITED PARTNERSHIP:

a. A certified copy of the certificate of limited partnership (form LP-1) and any amendments thereto (form LP-2) to be recorded in the public records;

b. A full copy of the partnership agreement and any amendments;

c. Satisfactory evidence of the consent of a majority in interest of the limited partners to the contemplated transaction;

d. Requirements which the Company may impose following its review of the above material and other information which the Company may require.

C. WITH RESPECT TO A FOREIGN LIMITED PARTNERSHIP:

a. A certified copy of the application for registration, foreign limited partnership (form LP-5) and any amendments thereto (form LP-6) to be recorded in the public records;

b. A full copy of the partnership agreement and any amendment;

c. Satisfactory evidence of the consent of a majority in interest of the limited partners to the contemplated transaction;

d. Requirements which the Company may impose following its review of the above material and other information which the Company may require.

D. WITH RESPECT TO A GENERAL PARTNERSHIP:

a. A certified copy of a statement of partnership authority pursuant to Section 16303 of the California Corporation Code (form GP-I), executed by at least two partners, and a certified copy of any amendments to such statement (form GP-7), to be recorded in the public records;

b. A full copy of the partnership agreement and any amendments;

c. Requirements which the Company may impose following its review of the above material required herein and other information which the Company may require.

E. WITH RESPECT TO A LIMITED LIABILITY COMPANY:

a. A copy of its operating agreement and any amendments thereto;

b. If it is a California limited liability company, a certified copy of its articles of organization (LLC-1) and any certificate of correction (LLC-11), certificate of amendment (LLC-2), or restatement of articles of organization (LLC-10) to be recorded in the public records;

c. If it is a foreign limited liability company, a certified copy of its application for registration (LLC-5) to be recorded in the public records;

d. With respect to any deed, deed of trust, lease, subordination agreement or other document or instrument executed by such limited liability company and presented for recordation by the Company or upon which the Company is asked to rely, such document or instrument must be executed in accordance with one of the following, as appropriate:

(i) If the limited liability company properly operates through officers appointed or elected pursuant to the terms of a written operating agreement, such documents must be executed by at least two duly elected or appointed officers, as follows: the chairman of the board, the president or any vice president, and any secretary, assistant secretary, the chief financial officer or any assistant treasurer;

(ii) If the limited liability company properly operates through a manager or managers identified in the articles of organization and/or duly elected pursuant to the terms of a written operating agreement, such document must be executed by at least two such managers or by one manager if the limited liability company properly operates with the existence of only one manager.

e. Requirements which the Company may impose following its review of the above material and other information which the Company may require.

F. WITH RESPECT TO A TRUST:

a. A certification pursuant to Section 18500.5 of the California Probate Code in a form satisfactory to the Company.

b. Copies of those excerpts from the original trust documents and amendments thereto which designate the trustee and confer upon the trustee the power to act in the pending transaction.

c. Other requirements which the Company may impose following its review of the material require herein and other information which the Company may require.

G. WITH RESPECT TO INDIVIDUALS:

a. A statement of information.

The map attached, if any, may or may not be a survey of the land depicted hereon. First American expressly disclaims any liability for loss or damage which may result from reliance on this map except to the extent coverage for such loss or damage is expressly provided by the terms and provisions of the title insurance policy, if any, to which this map is attached.

LEGAL DESCRIPTION

Real property in the City of LIVERMORE, County of ALAMEDA, State of California, described as follows:

PARCEL ONE:

THE NORTHEAST ¼ OF SECTION 34, TOWNSHIP 2 SOUTH, RANGE 2 EAST, MOUNT DIABLO BASE AND MERIDIAN.

EXCEPTING THEREFROM: THAT CERTAIN 28.874 ACRE PARCEL OF LAND CONVEYED TO FIRST SAVINGS AND LOAN ASSOCIATION, BY DEED RECORDED OCTOBER 29, 1964 IN REEL 1351, IMAGE 901, OFFICIAL RECORDS, DESCRIBED AS FOLLOWS:

REAL PROPERTY IN THE CITY OF LIVERMORE, COUNTY OF ALAMEDA, STATE OF CALIFORNIA, AND BEING THE SOUTHERN 476.710 FEET OF THE NORTHEASTERN ¼ OF SECTION 34, TOWNSHIP 2 SOUTH, RANGE 2 EAST, MOUNT DIABLO BASE AND MERIDIAN, FURTHER DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE LINE COMMON TO SECTION 34 AND SECTION 35, TOWNSHIP 2 SOUTH, RANGE 2 EAST, MOUNT DIABLO BASE AND MERIDIAN, DISTANT THEREON SOUTH 0° 03' 13" WEST 2172.674 FEET FROM THE NORTHWESTERN CORNER OF SAID SECTION 35, AND RUNNING THENCE ALONG THE LAST AFORESAID LINE, SOUTH 0° 03' 13" WEST 476.710 FEET TO THE SOUTHERN LINE OF THE NORTHEASTERN ¼ OF SAID SECTION 34, THENCE ALONG THE LAST AFORESAID LINE, NORTH 89° 51' 57" WEST 2638.321 FEET TO THE WESTERN LINE OF THE LAST AFORESAID ¼ SECTION, THENCE ALONG THE LAST AFORESAID LINE NORTH 0° 02' 14" EAST 476.710 FEET, THENCE SOUTH 89° 51' 57" EAST 2638.458 FEET TO THE POINT OF BEGINNING.

ALSO EXCEPTING THEREFROM THAT PORTION DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHWESTERN CORNER OF THE 28.874 ACRE PARCEL OF LAND DESCRIBED IN THE DEED TO FIRST SAVINGS AND LOAN ASSOCIATION, RECORDED OCTOBER 29, 1964 UNDER RECORDER'S SERIES NO. AM/174181, IN THE OFFICE OF THE COUNTY RECORDER IN AND FOR SAID COUNTY OF ALAMEDA, BEING ALSO A POINT ON THE WESTERN LINE OF THE NORTHEASTERN ¼ OF SECTION 34, TOWNSHIP 2 SOUTH, RANGE 2 EAST, MOUNT DIABLO BASE AND MERIDIAN, DISTANT THEREON NORTH 0° 02' 14" EAST 476.710 FEET FROM THE SOUTHWESTERN CORNER THEREOF, AND RUNNING THENCE FROM SAID POINT OF BEGINNING ALONG THE WESTERN LINE OF THE LAST AFORESAID ¼ SECTION NORTH 0° 02' 14" EAST 350.976 FEET THENCE SOUTHEASTERLY ALONG A 906 FOOT RADIUS CURVE TO THE RIGHT THE RADIUS POINT OF WHICH BEARS SOUTH 31° 07' 50" WEST FROM THE NORTHERN TERMINUS OF THE LAST AFORESAID 350.976 FOOT COURSE, THROUGH A CENTRAL ANGLE OF 1° 22' 41", A DISTANCE OF 21.791 FEET, THENCE NORTH 32° 30' 31" EAST 80.000 FEET, THENCE SOUTHEASTERLY ALONG A 986 FOOT RADIUS CURVE TO THE RIGHT CONCENTRIC TO THE LAST AFORESAID 906 FOOT RADIUS CURVE, THROUGH A CENTRAL ANGLE OF 32° 03' 02", A DISTANCE OF 551.556 FEET TO THE NORTHERN BOUNDARY LINE OF THE LAST AFORESAID 28.874 ACRE PARCEL; THENCE ALONG THE LAST AFORESAID LINE NORTH 89° 51' 57° WEST 422.222 FEET TO THE POINT OF BEGINNING.

ALSO EXCEPTING THEREFROM THAT PORTION DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE WESTERN LINE OF SAID NORTHEAST ¼ OF SECTION 34 DISTANT THEREON NORTH 0° 02' 14" EAST 827.686 FEET FROM THE SOUTHWESTERN CORNER THEREOF, AND RUNNING THENCE ALONG THE NORTHERLY AND EASTERLY BOUNDARY LINE OF THE 2.522 ACRE PARCEL OF LAND DESCRIBED IN THE DEED OF PARTIAL RECONVEYANCE TO THE WINDSOR LAND COMPANY, A PARTNERSHIP, RECORDED NOVEMBER 22, 1966, UNDER RECORDER'S SERIES NUMBER AY/131797 IN THE OFFICE OF THE COUNTY RECORDER IN SAID COUNTY THE FOLLOWING COURSES: (1) SOUTHEASTERLY ALONG A 906 FOOT RADIUS CURVE TO THE RIGHT, THE RADIUS POINT OF WHICH BEARS SOUTH 31° 02' 50" WEST FROM SAID POINT OF BEGINNING, THROUGH A CENTRAL ANGLE OF 1° 22' 41" A DISTANCE OF 21.791 FEET; (2) NORTH 32° 30' 31" EAST 80.000 FEET; (3) SOUTHEASTERLY ALONG A 906 FOOT RADIUS CURVE TO THE RIGHT CONCENTRIC TO THE LAST AFORESAID 906 FOOT RADIUS CURVE, THROUGH A CENTRAL ANGLE OF 32° 03' 02°, A DISTANCE OF 551.556 FEET TO THE NORTHERN BOUNDARY LINE OF THE 28.874 ACRE PARCEL OF LAND DESCRIBED IN THE DEED TO FIRST SAVINGS & LOAN ASSOCIATION RECORDED OCTOBER 29, 1964 UNDER RECORDER'S SERIES NUMBER AM/174181 IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY, THENCE ALONG THE LAST NAMED LINE SOUTH 89° 51' 57" EAST 2,216.236 FEET TO THE WESTERN LINE OF SAID SECTION 34, THENCE ALONG THE LAST NAMED LINE NORTH 0° 03' 13" EAST 410.140 FEET, THENCE LEAVING THE LAST NAMED LINE NORTH 89° 51' 57" WEST 2.638.575 FEET TO THE WESTERN LINE OF SAID NORTHEAST ¼ OF SECTION 34, THENCE ALONG THE LAST NAMED LINE SOUTH 0° 02' 14" WEST 59.165 FEET TO THE POINT OF BEGINNING.

ALSO EXCEPTING THEREFROM THAT PORTION DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE LINE COMMON TO SECTION 34, AND SECTION 35, TOWNSHIP 2 SOUTH, RANGE 2 EAST, MOUNT DIABLO BASE AND MERIDIAN, DISTANT THEREON SOUTH 0° 03' 13" WEST 1412.327 FEET FROM THE NORTHEASTERN CORNER OF THE NORTHEASTERN ONE QUARTER OF SAID SECTION 34, AND RUNNING THENCE ALONG THE LAST AFORESAID LINE SOUTH 0° 03' 13" WEST 351.118 FEET; THENCE NORTH 89° 51' 57" WEST 2638.6 FEET MORE OR LESS TO THE WESTERN LINE OF THE NORTHEASTERN QUARTER OF SECTION 34, THENCE ALONG THE LAST AFORESAID LINE NORTH 0° 02' 14" EAST 351.118 FEET; THENCE SOUTH 89° 51' 57" EAST 2638.7 FEET MORE OR LESS TO THE POINT OF BEGINNING.

PARCEL TWO:

ALL THAT PORTION SHOWN AS "DESIGNATED REMAINDER" ON PARCEL MAP 6972, FILED ON JUNE 11, 1996, IN MAP BOOK 223, AT PAGES 65 AND 66, ALAMEDA COUNTY RECORDS.

PARCEL THREE:

A TEMPORARY NON-EXCLUSIVE EASEMENT FOR THE PURPOSES OF MAINTENANCE, ACCESS AND INGRESS AND EGRESS, OVER, UNDER, THROUGH AND ACROSS THOSE PORTIONS OF PARCELS "A" AND "B" OF PARCEL MAP 6972, FILED ON JUNE 11, 1996, IN MAP BOOK 223, AT PAGES 65 AND 66, ALAMEDA COUNTY RECORDS DESIGNATED AS "CL OF 20' WIDE TEMPORARY ACCESS EASEMENT" FOR THE BENEFIT OF PARCEL TWO ABOVE. SAID EASEMENT TO TERMINATE UPON FILING OF TRACT 6433 FINAL MAP.

APN: 099-0024-001-05 (Parcel One) and 099B-5300-010 (Parcel Two)

NOTICE

Section 12413.1 of the California Insurance Code, effective January 1, 1990, requires that any title insurance company, underwritten title company, or controlled escrow company handling funds in an escrow or sub-escrow capacity, wait a specified number of days after depositing funds, before recording any documents in connection with the transaction or disbursing funds. This statute allows for funds deposited by wire transfer to be disbursed the same day as deposit. In the case of cashier's checks or certified checks, funds may be disbursed the next day after deposit. In order to avoid unnecessary delays of three to seven days, or more, please use wire transfer, cashier's checks, or certified checks whenever possible.

If you have any questions about the effect of this new law, please contact your local First American Office for more details.

EXHIBIT A
LIST OF PRINTED EXCEPTIONS AND EXCLUSIONS (BY POLICY TYPE)

1. CALIFORNIA LAND TITLE ASSOCIATION STANDARD COVERAGE POLICY - 1990
SCHEDULE B

EXCEPTIONS FROM COVERAGE

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records. Proceedings by a public agency which may result in taxes or assessments, or notice of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of the land or which may be asserted by persons in possession thereof.
3. Easements, liens or encumbrances, or claims thereof, which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by the public records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the public records.

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims or other matters:
   (a) whether or not recorded in the public records at Date of Policy, but created, suffered, assumed or agreed to by the insured claimant;
   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
   (c) resulting in no loss or damage to the insured claimant;
   (d) attaching or created subsequent to Date of Policy; or
   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the insured mortgage or for the estate or interest insured by this policy.
4. Unenforceability of the lien of the insured mortgage because of the inability or failure of the insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with applicable "doing business" laws of the state in which the land is situated.
5. Invalidity or unenforceability of the lien of the insured mortgage, or claim thereof, which arises out of the transaction evidenced by the insured mortgage and is based upon usury or any consumer credit protection or truth in lending law.
6. Any claim, which arises out of the transaction vesting in the insured the estate or interest insured by their policy or the transaction creating the interest of the insured lender, by reason of the operation of federal bankruptcy, state insolvency or similar creditors' rights laws.

2. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY FORM B - 1970
SCHEDULE OF EXCLUSIONS FROM COVERAGE

1. Any law, ordinance or governmental regulation (including but not limited to building and zoning ordinances) restricting or regulating or prohibiting the occupancy, use or enjoyment of the land, or regulating the character, dimensions or location of any improvement now or hereafter erected on the land, or prohibiting a separation in ownership or a reduction in the dimensions of area of the land, or the effect of any violation of any such law, ordinance or governmental regulation.
2. Rights of eminent domain or governmental rights of police power unless notice of the exercise of such rights appears in the public records at Date of Policy.
3. Defects, liens, encumbrances, adverse claims, or other matters (a) created, suffered, assumed or agreed to by the insured claimant; (b) not known to the Company and not shown by the public records but known to the insured claimant either at Date of Policy or at the date such claimant acquired an estate or interest insured by this policy and not disclosed in writing by the insured claimant to the Company prior to the date such insured claimant became an insured hereunder; (c) resulting in no loss or damage to the insured claimant; (d) attaching or

created subsequent to Date of Policy; or (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the estate or interest insured by this policy.

3. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY FORM B - 1970
WITH REGIONAL EXCEPTIONS

When the American Land Title Association policy is used as a Standard Coverage Policy and not as an Extended Coverage Policy the exclusions set forth in paragraph 2 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B

This policy does not insure against loss or damage by reason of the matters shown in parts one and two following:
Part One

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
3. Easements, claims of easement or encumbrances which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
5. Unpatented mining claims; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
6. Any lien, or right to a lien, for services, labor or material heretofore or hereafter furnished, imposed by law and not shown by the public records.

4. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1970
WITH A.L.T.A. ENDORSEMENT FORM 1 COVERAGE
SCHEDULE OF EXCLUSIONS FROM COVERAGE

1. Any law, ordinance or governmental regulation (including but not limited to building and zoning ordinances) restricting or regulating or prohibiting the occupancy, use or enjoyment of the land, or regulating the character, dimensions or location of any improvement now or hereafter erected on the land, or prohibiting a separation in ownership or a reduction in the dimensions or area of the land, or the effect of any violation of any such law ordinance or governmental regulation.
2. Rights of eminent domain or governmental rights of police power unless notice of the exercise of such rights appears in the public records at Date of Policy.
3. Defects, liens, encumbrances, adverse claims, or other matters (a) created, suffered, assumed or agreed to by the insured claimant, (b) not known to the Company and not shown by the public records but known to the insured claimant either at Date of Policy or at the date such claimant acquired an estate or interest insured by this policy or acquired the insured mortgage and not disclosed in writing by the insured claimant to the Company prior to the date such insured claimant became an insured hereunder, (c) resulting in no loss or damage to the insured claimant; (d) attaching or created subsequent to Date of Policy (except to the extent insurance is afforded herein as to any statutory lien for labor or material or to the extent insurance is afforded herein as to assessments for street improvements under construction or completed at Date of Policy).
4. Unenforceability of the lien of the insured mortgage because of failure of the insured at Date of Policy or of any subsequent owner of the indebtedness to comply with applicable "doing business" laws of the state in which the land is situated.

5. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1970
WITH REGIONAL EXCEPTIONS

When the American Land Title Association Lenders Policy is used as a Standard Coverage Policy and not as an Extended Coverage Policy, the exclusions set forth in paragraph 4 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B

This policy does not insure against loss or damage by reason of the matters shown in parts one and two following:
Part One

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
3. Easements, claims of easement or encumbrances which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
5. Unpatented mining claims; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
6. Any lien, or right to a lien, for services, labor or material theretofore or hereafter furnished, imposed by law and not shown by the public records.

6. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1992
WITH A.L.T.A. ENDORSEMENT FORM 1 COVERAGE
EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy;
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims, or other matters:
   (a) whether or not recorded in the public records at Date of Policy, but created, suffered, assumed or agreed to by the insured claimant;
   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
   (c) resulting in no loss or damage to the insured claimant;
   (d) attaching or created subsequent to Date of Policy (except to the extent that this policy insures the priority of the lien of the insured mortgage over any statutory lien for services, labor or material or the extent insurance is afforded herein as to assessments for street improvements under construction or completed at date of policy); or
   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the insured mortgage.
4. Unenforceability of the lien of the insured mortgage because of the inability or failure of the insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with the applicable "doing business" laws of the state in which the land is situated.
5. Invalidity or unenforceability of the lien of the insured mortgage, or claim thereof, which arises out of the transaction evidenced by the insured mortgage and is based upon usury or any consumer credit protection or truth in lending law.
6. Any statutory lien for services, labor or materials (or the claim of priority of any statutory lien for services, labor or materials over the lien of the insured mortgage) arising from an improvement or work related to the land which is contracted for and commenced subsequent to Date of Policy and is not financed in whole or in part by proceeds of the indebtedness secured by the insured mortgage which at Date of Policy the insured has advanced or is obligated to advance.
7. Any claim, which arises out of the transaction creating the interest of the mortgagee insured by this policy, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that is based on:
   (i) the transaction creating the interest of the insured mortgagee being deemed a fraudulent conveyance or fraudulent transfer; or
   (ii) the subordination of the interest of the insured mortgagee as a result of the application of the doctrine of equitable subordination; or
   (iii) the transaction creating the interest of the insured mortgagee being deemed a preferential transfer except where the preferential transfer results from the failure:
   (a) to timely record the instrument of transfer; or
   (b) of such recordation to impart notice to a purchaser for value or a judgment or lien creditor.

7. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 1992
WITH REGIONAL EXCEPTIONS

When the American Land Title Association policy is used as a Standard Coverage Policy and not as an Extended Coverage Policy the exclusions set forth in paragraph 6 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
3. Easements, claims of easement or encumbrances which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
5. Unpatented mining claims; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
6. Any lien, or right to a lien, for services, labor or material theretofore or hereafter furnished, imposed by law and not shown by the public records.

8. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY - 1992

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the land; (iii) a separation in ownership or a change in the dimensions or area of the land or any parcel of which the land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
   (b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the public records at Date of Policy.
2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the public records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without knowledge.
3. Defects, liens, encumbrances, adverse claims, or other matters:
   (a) created, suffered, assumed or agreed to by the insured claimant;
   (b) not known to the Company, not recorded in the public records at Date of Policy, but known to the insured claimant and not disclosed in writing to the Company by the insured claimant prior to the date the insured claimant became an insured under this policy;
   (c) resulting in no loss or damage to the insured claimant;
   (d) attaching or created subsequent to Date of Policy; or
   (e) resulting in loss or damage which would not have been sustained if the insured claimant had paid value for the estate or interest insured by this policy.
4. Any claim, which arises out of the transaction vesting in the insured the estate or interest insured by this policy, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that is based on:
   (i) the transaction creating the estate or interest insured by this policy being deemed a fraudulent conveyance or fraudulent transfer; or
   (ii) the transaction creating the estate or interest insured by this policy being deemed a preferential transfer except where the preferential transfer results from the failure:
   (a) to timely record the instrument of transfer; or
   (b) of such recordation to impart notice to a purchaser for value or a judgment or lien creditor.

9. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY - 1992
WITH REGIONAL EXCEPTIONS

When the American Land Title Association policy is used as a Standard Coverage Policy and not as an Extended Coverage Policy the exclusions set forth in paragraph 8 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:
Part One:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
3. Easements, claims of easement or encumbrances which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
5. Unpatented mining claims; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
6. Any lien, or right to a lien, for services, labor or material theretofore or hereafter furnished, imposed by law and not shown by the public records.

10. AMERICAN LAND TITLE ASSOCIATION RESIDENTIAL
TITLE INSURANCE POLICY - 1987
EXCLUSIONS

In addition to the Exceptions in Schedule B, you are not insured against loss, costs, attorneys' fees and expenses resulting from:

1. Governmental police power, and the existence or violation of any law or government regulation. This includes building and zoning ordinances and also laws and regulations concerning:
   * land use
   * land division
   * improvements on the land
   * environmental protection

   This exclusion does not apply to violations or the enforcement of these matters which appear in the public records at Policy Date.
   This exclusion does not limit the zoning coverage described in items 12 and 13 of Covered Title Risks.

2. The right to take the land by condemning it, unless:
   * a notice of exercising the right appears in the public records on the Policy Date
   * the taking happened prior to the Policy Date and is binding on you if you bought the land without knowing of the taking.
3. Title Risks:
   * that are created, allowed, or agreed to by you
   * that are known to you, but not to us, on the Policy Date - unless they appeared in the public records
   * that result in no loss to you
   * that first affect your title after the Policy Date - this does not limit the labor and material lien coverage in Item 8 of Covered Title Risks
4. Failure to pay value for your title.
5. Lack of a right:
   * to any land outside the area specifically described and referred to in Item 3 of Schedule A, or
   * in streets, alleys, or waterways that touch your land

   This exclusion does not limit the access coverage in Item 5 of Covered Title Risks.

11. EAGLE PROTECTION OWNER'S POLICY

CLTA HOMEOWNER'S POLICY OF TITLE INSURANCE - 1998
ALTA HOMEOWNER'S POLICY OF TITLE INSURANCE - 1998

Covered Risks 14 (Subdivision Law Violation). 15 (Building Permit). 16 (Zoning) and 18 (Encroachment of boundary walls or fences) are subject to Deductible Amounts and Maximum Dollar Limits of Liability

EXCLUSIONS

In addition to the Exceptions in Schedule B, you are not insured against loss, costs, attorneys' fees, and expenses resulting from:

1. Governmental police power, and the existence or violation of any law or government regulation. This includes ordinances, laws and regulations concerning:
   a. building
   b. zoning
   c. land use
   d. improvements on the land
   e. land division
   f. environmental protection

   This exclusion does not apply to violations or the enforcement of these matters if notice of the violation or enforcement appears in the Public Records at the Policy Date.
   This exclusion does not limit the coverage described in Covered Risk 14, 15, 16, 17 or 24.
2. The failure of Your existing structures, or any part of them, to be constructed in accordance with applicable building codes. This Exclusion does not apply to violations of building codes if notice of the violation appears in the Public Records at the Policy Date.
3. The right to take the Land by condemning it, unless:
   a. a notice of exercising the right appears in the Public Records at the Policy Date; or
   b. the taking happened before the Policy Date and is binding on You if You bought the Land without Knowing of the taking.
4. Risks:
   a. that are created, allowed, or agreed to by You, whether or not they appear in the Public Records;
   b. that are Known to You at the Policy Date, but not to Us, unless they appear in the Public Records at the Policy Date;
   c. that result in no loss to You; or
   d. that first occur after the Policy Date - this does not limit the coverage described in Covered Risk 7, 8.d, 22, 23, 24 or 25.
5. Failure to pay value for Your Title.
6. Lack of a right:
   a. to any Land outside the area specifically described and referred to in paragraph 3 of Schedule A; and
   b. in streets, alleys, or waterways that touch the Land.

   This exclusion does not limit the coverage described in Covered Risk 11 or 18.

12. SECOND GENERATION EAGLE LOAN POLICY AMERICAN LAND TITLE ASSOCIATION EXPANDED COVERAGE RESIDENTIAL LOAN POLICY (10/13/01)

EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance or governmental regulation (including but not limited to building and zoning laws, ordinances, or regulations) restricting, regulating, prohibiting or relating to (i) the occupancy, use, or enjoyment of the Land; (ii) the character, dimensions or location of any improvement now or hereafter erected on the Land; (iii) a separation in ownership or a change in the dimensions or area of the Land or any parcel of which the Land is or was a part; or (iv) environmental protection, or the effect of any violation of these laws, ordinances or governmental regulations, except to the extent that a notice of the enforcement thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the Land has been recorded in the Public Records at Date of Policy. This exclusion does not limit the coverage provided under Covered Risks 12, 13, 14 and 16 of this policy.

(b) Any governmental police power not excluded by (a) above, except to the extent that a notice of the exercise thereof or a notice of a defect, lien or encumbrance resulting from a violation or alleged violation affecting the land has been recorded in the Public Records at Date of Policy. This exclusion does not limit the coverage provided under Covered Risks 12, 13, 14 and 16 of this policy.

2. Rights of eminent domain unless notice of the exercise thereof has been recorded in the Public Records at Date of Policy, but not excluding from coverage any taking which has occurred prior to Date of Policy which would be binding on the rights of a purchaser for value without Knowledge.
3. Defects, liens, encumbrances, adverse claims or other matters:
(a) created, suffered, assumed or agreed to by the Insured Claimant;
(b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
(c) resulting in no loss or damage to the Insured Claimant;
(d) attaching or created subsequent to Date of Policy (this paragraph does not limit the coverage provided under Covered Risks 8, 16, 18, 19, 20, 21, 22, 23, 24, 25 and 26); or
(e) resulting in loss or damage which would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of the Insured at Date of Policy, or the inability or failure of any subsequent owner of the indebtedness, to comply with applicable doing business laws of the state in which the Land is situated.
5. Invalidity or unenforceability of the lien of the Insured Mortgage, or claim thereof, which arises out of the transaction evidenced by the Insured Mortgage and is based upon usury, except as provided in Covered Risk 27, or any consumer credit protection or truth in lending law.
6. Real property taxes or assessments of any governmental authority which become a lien on the Land subsequent to Date of Policy. This exclusion does not limit the coverage provided under Covered Risks 7, 8 (e) and 26.
7. Any claim of invalidity, unenforceability or lack of priority of the lien of the Insured Mortgage as to advances or modifications made after the Insured has Knowledge that the vestee shown in Schedule A is no longer the owner of the estate or interest covered by this policy. This exclusion does not limit the coverage provided in Covered Risk 8.
8. Lack of priority of the lien of the Insured Mortgage as to each and every advance made after Date of Policy, and all interest charged thereon, over liens, encumbrances and other matters affecting title, the existence of which are Known to the Insured at:
(a) The time of the advance; or
(b) The time a modification is made to the terms of the Insured Mortgage which changes the rate of interest charged, if the rate of interest is greater as a result of the modification than it would have been before the modification**.**
This exclusion does not limit the coverage provided in Covered Risk 8.
9. The failure of the residential structure, or any portion thereof to have been constructed before, on or after Date of Policy in accordance with applicable building codes. This exclusion does not apply to violations of building codes if notice of the violation appears in the Public Records at Date of Policy.

SCHEDULE B

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. The following existing statutes, reference to which are made part of the ALTA 8.1 Environmental Protection Lien Endorsement incorporated into this Policy following item 28 of Covered Risks: NONE.

13. SECOND GENERATION EAGLE LOAN POLICY AMERICAN LAND TITLE ASSOCIATION EXPANDED COVERAGE RESIDENTIAL LOAN POLICY (10/13/01)
WITH REGIONAL EXCEPTIONS

When the American Land Title Association loan policy with EAGLE Protection Added is used as a Standard Coverage Policy and not as an Extended Coverage Policy the exclusions set forth in paragraph 12 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B

This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:
Part One:
1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records.
2. Any facts, rights, interests, or claims which are not shown by the public records but which could be ascertained by an inspection of said land or by making inquiry of persons in possession thereof.
3. Easements, claims of easement or encumbrances which are not shown by the public records.
4. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, or any other facts which a correct survey would disclose, and which are not shown by public records.
5. Unpatented mining claims; reservations or exceptions in patents or in acts authorizing the issuance thereof; water rights, claims or title to water.
6. Any lien, or right to a lien, for services, labor or material theretofore or hereafter furnished, imposed by law and not shown by the public records.

Part Two:
1. The following existing statutes, reference to which are made part of the ALTA 8.1 Environmental Protection Lien Endorsement incorporated into this Policy following item 28 of Covered Risks: None.

14. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 2006
EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
(i) the occupancy, use, or enjoyment of the Land;
(ii) the character, dimensions, or location of any improvement erected on the Land;
(iii) the subdivision of land; or
(iv) environmental protection;
or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
(b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
(a) created, suffered, assumed, or agreed to by the Insured Claimant;
(b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
(c) resulting in no loss or damage to the Insured Claimant;
(d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 13, or 14); or
(e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing-business laws of the state where the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury or any consumer credit protection or truth-in-lending law.
6. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors? rights laws, that the transaction creating the lien of the Insured Mortgage, is
(a) a fraudulent conveyance or fraudulent transfer, or
(b) a preferential transfer for any reason not stated in Covered Risk 13(b) of this policy.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the Insured Mortgage in the Public Records. This Exclusion does not modify or limit the coverage provided under Covered Risk 11(b).

15. AMERICAN LAND TITLE ASSOCIATION LOAN POLICY - 2006
WITH REGIONAL EXCEPTIONS

When the American Land Title Association policy is used as a Standard Coverage Policy and not as an Extended Coverage Policy the exclusions set forth in paragraph 14 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B
This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:
1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Any facts, rights, interests, or claims that are not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.
3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.

16. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY - 2006
EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy and the Company will not pay loss or damage, costs, attorneys' fees or expenses which arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
(i) the occupancy, use, or enjoyment of the Land;
(ii) the character, dimensions, or location of any improvement erected on the Land;
(iii) the subdivision of land; or
(iv) environmental protection;or the effect of any violation of these laws, ordinances,
or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
(b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.

3. Defects, liens, encumbrances, adverse claims, or other matters
(a) created, suffered, assumed, or agreed to by the Insured Claimant;
(b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
(c) resulting in no loss or damage to the Insured Claimant;
(d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risks 9 and 10); or
(e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Title.
4. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors? rights laws, that the transaction vesting the Title as shown in Schedule A, is
(a) a fraudulent conveyance or fraudulent transfer; or
(b) a preferential transfer for any reason not stated in Covered Risk 9 of this policy.
5. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.

17. AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY - 2006
WITH REGIONAL EXCEPTIONS

When the American Land Title Association policy is used as a Standard Coverage Policy and not as an Extended Coverage Policy the exclusions set forth in paragraph 16 above are used and the following exceptions to coverage appear in the policy.

SCHEDULE B
This policy does not insure against loss or damage (and the Company will not pay costs, attorneys' fees or expenses) which arise by reason of:

1. (a) Taxes or assessments that are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the Public Records; (b) proceedings by a public agency that may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the Public Records.
2. Any facts, rights, interests, or claims that are not shown by the Public Records but that could be ascertained by an inspection of the Land or that may be asserted by persons in possession of the Land.
3. Easements, liens or encumbrances, or claims thereof, not shown by the Public Records.
4. Any encroachment, encumbrance, violation, variation, or adverse circumstance affecting the Title that would be disclosed by an accurate and complete land survey of the Land and not shown by the Public Records.
5. (a) Unpatented mining claims; (b) reservations or exceptions in patents or in Acts authorizing the issuance thereof; (c) water rights, claims or title to water, whether or not the matters excepted under (a), (b), or (c) are shown by the Public Records.

PRIVACY POLICY

We Are Committed to Safeguarding Customer Information

In order to better serve your needs now and in the future, we may ask you to provide us with certain information. We understand that you may be concerned about what we will do with such information – particularly any personal or financial information. We agree that you have a right to know how we will utilize the personal information you provide to us. Therefore, together with our parent company, The First American Corporation, we have adopted this Privacy Policy to govern the use and handling of your personal information.

Applicability

This Privacy Policy governs our use of the information which you provide to us. It does not govern the manner in which we may use information we have obtained from any other source, such as information obtained from a public record or from another person or entity. First American has also adopted broader guidelines that govern our use of personal information regardless of its source. First American calls these guidelines its *Fair Information Values*, a copy of which can be found on our website at www.firstam.com.

Types of Information

Depending upon which of our services you are utilizing, the types of nonpublic personal information that we may collect include:

- Information we receive from you on applications, forms and in other communications to us, whether in writing, in person, by telephone or any other means;
- Information about your transactions with us, our affiliated companies, or others; and
- Information we receive from a consumer reporting agency.

Use of Information

We request information from you for our own legitimate business purposes and not for the benefit of any nonaffiliated party. Therefore, we will not release your information to nonaffiliated parties except: (1) as necessary for us to provide the product or service you have requested of us; or (2) as permitted by law. We may, however, store such information indefinitely, including the period after which any customer relationship has ceased. Such information may be used for any internal purpose, such as quality control efforts or customer analysis. We may also provide all of the types of nonpublic personal information listed above to one or more of our affiliated companies. Such affiliated companies include financial service providers, such as title insurers, property and casualty insurers, and trust and investment advisory companies, or companies involved in real estate services, such as appraisal companies, home warranty companies, and escrow companies. Furthermore, we may also provide all the information we collect, as described above, to companies that perform marketing services on our behalf, on behalf of our affiliated companies, or to other financial institutions with whom we or our affiliated companies have joint marketing agreements.

Former Customers

Even if you are no longer our customer, our Privacy Policy will continue to apply to you.

Confidentiality and Security

We will use our best efforts to ensure that no unauthorized parties have access to any of your information. We restrict access to nonpublic personal information about you to those individuals and entities who need to know that information to provide products or services to you. We will use our best efforts to train and oversee our employees and agents to ensure that your information will be handled responsibly and in accordance with this Privacy Policy and First American's *Fair Information Values*. We currently maintain physical, electronic, and procedural safeguards that comply with federal regulations to guard your nonpublic personal information.

© 2001 The First American Corporation • All Rights Reserved

APPENDIX C

ENVIRONMENTAL DATA RESOURCES, INC.

Topographic Map Report

APPENDIX C

Garaventa Hills
Vasco Road
Livermore, CA 94551

Inquiry Number: 2914012.4
November 05, 2010

EDR Historical Topographic Map Report

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Historical Topographic Map Report

Environmental Data Resources, Inc.s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topographic Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the early 1900s.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

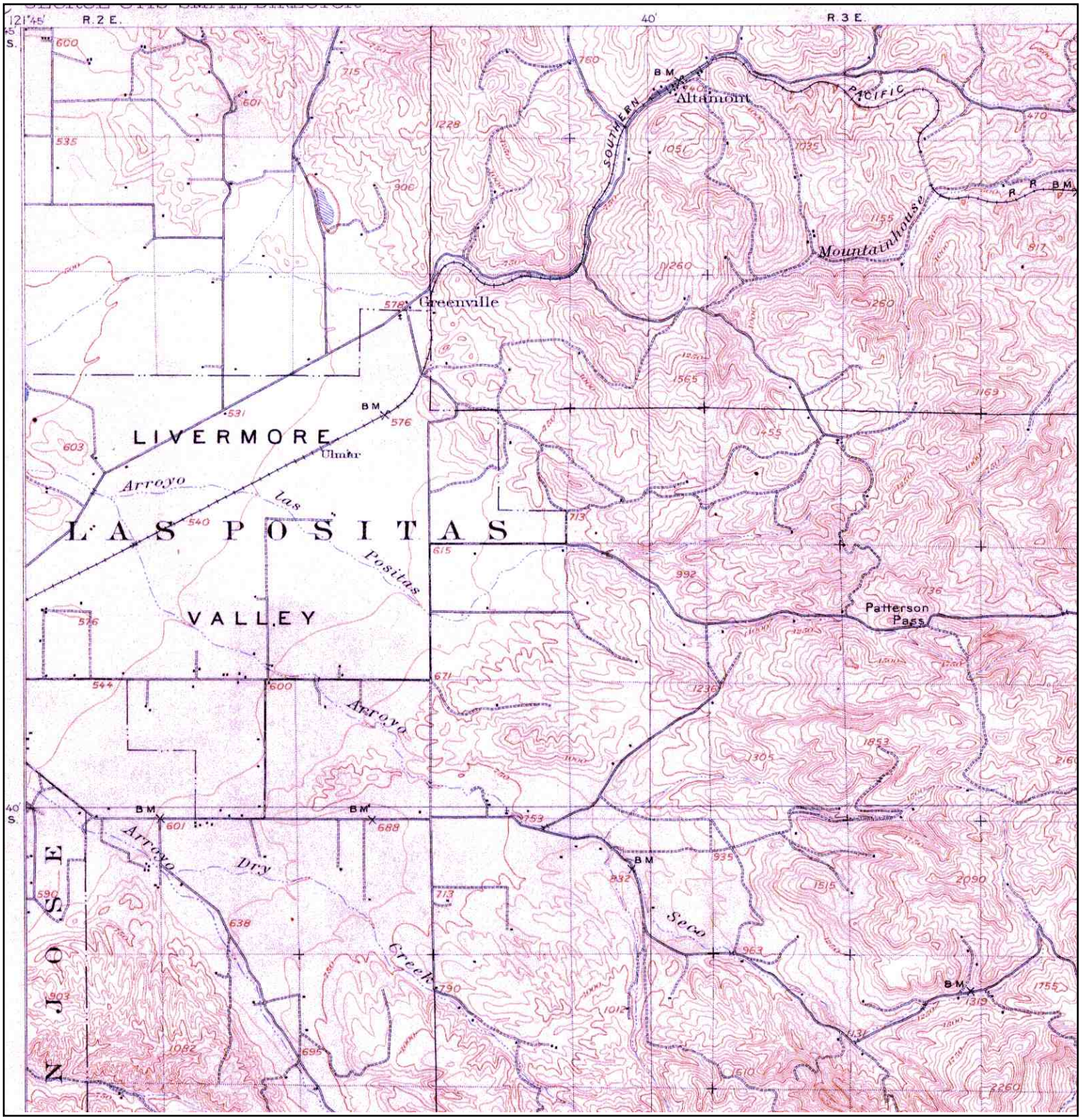
Disclaimer - Copyright and Trademark Notice

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. **NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OF DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT.** Purchaser accepts this Report AS IS. Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction or forecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report is not to be construed as legal advice.

Copyright 2010 by Environmental Data Resources, Inc. All rights reserved. Reproduction in any media or format, in whole or in part, of any report or map of Environmental Data Resources, Inc., or its affiliates, is prohibited without prior written permission.

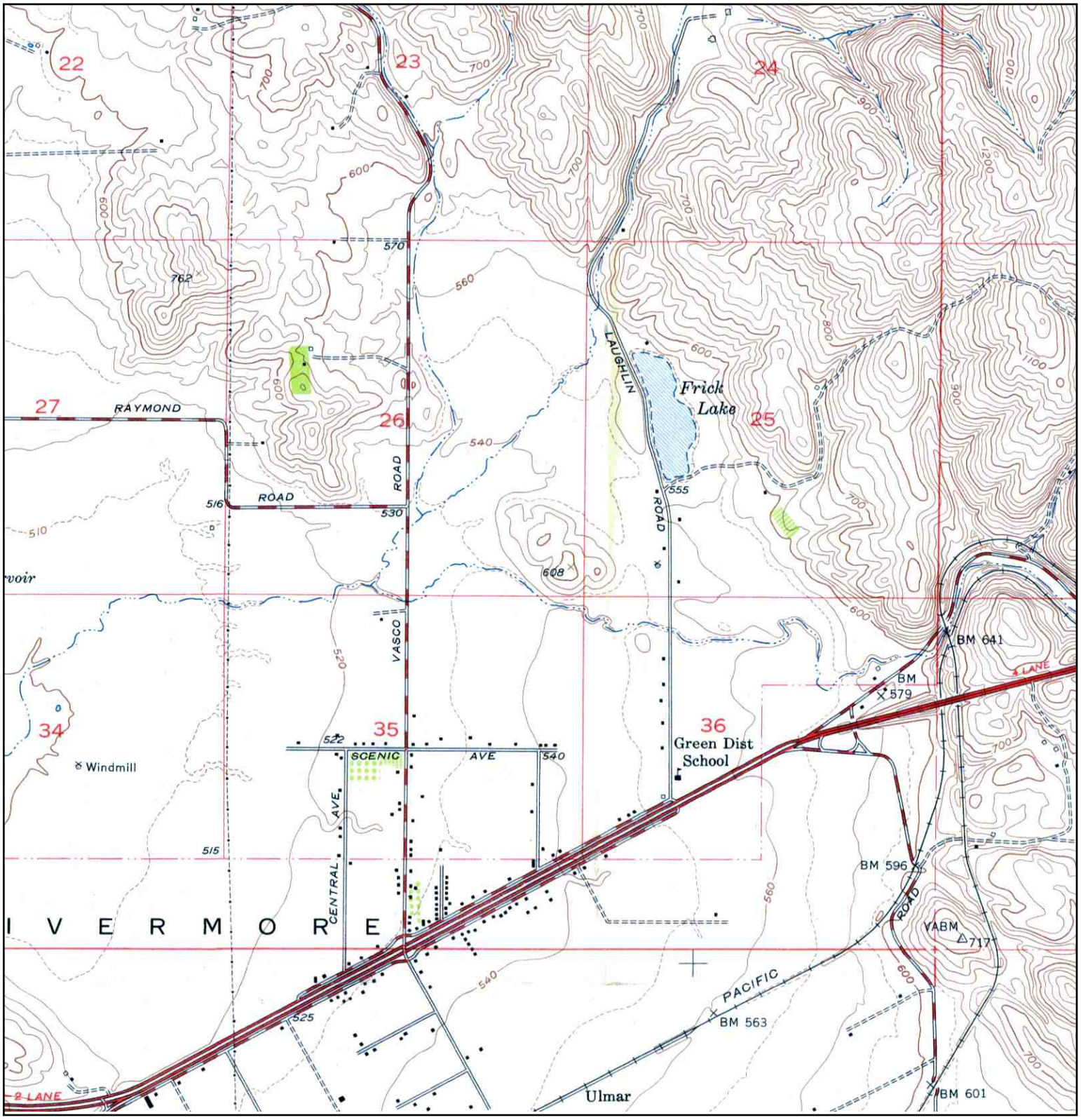
EDR and its logos (including Sanborn and Sanborn Map) are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.

Historical Topographic Map



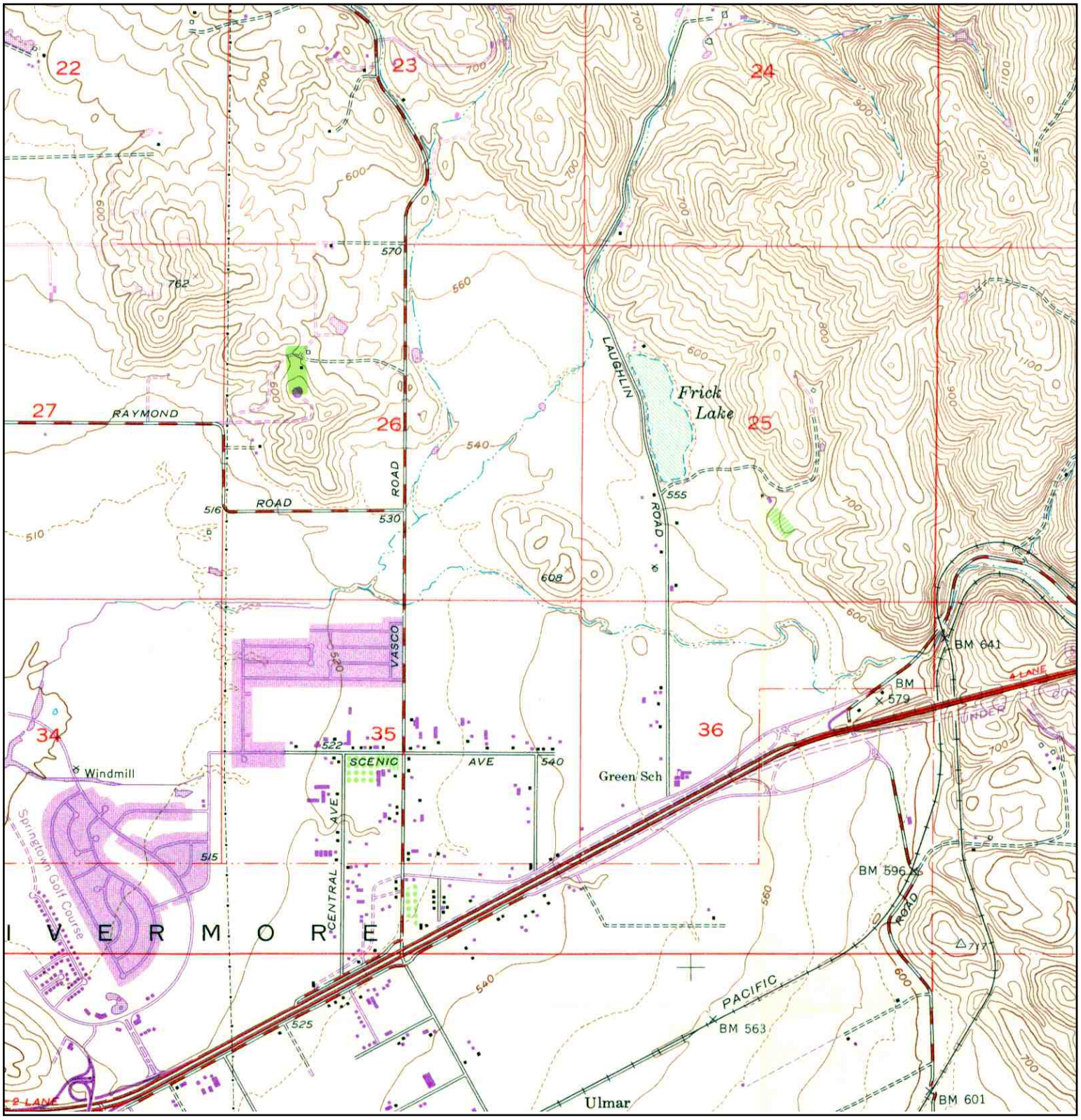
N	TARGET QUAD NAME: TESLA MAP YEAR: 1907 SERIES: 15 SCALE: 1:62500	SITE NAME: Garaventa Hills ADDRESS: Vasco Road Livermore, CA 94551 LAT/LONG: 37.7249 / -121.716	CLIENT: Engeo Inc. CONTACT: Richard Gandolfo INQUIRY#: 2914012.4 RESEARCH DATE: 11/05/2010

Historical Topographic Map



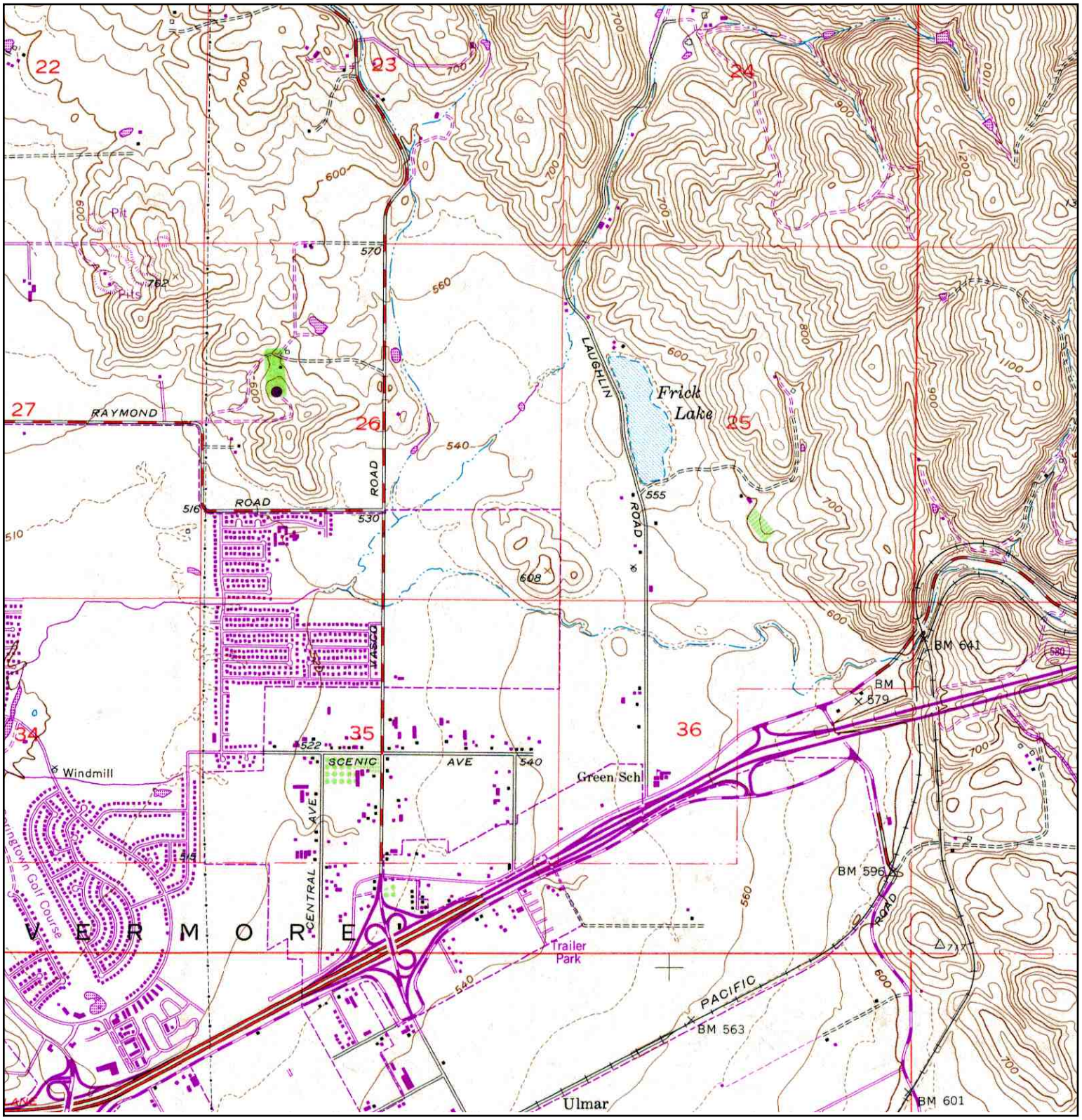
N	TARGET QUAD NAME: ALTAMONT MAP YEAR: 1953 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Garaventa Hills ADDRESS: Vasco Road Livermore, CA 94551 LAT/LONG: 37.7249 / -121.716	CLIENT: Engeo Inc. CONTACT: Richard Gandolfo INQUIRY#: 2914012.4 RESEARCH DATE: 11/05/2010

Historical Topographic Map



N	TARGET QUAD		SITE NAME:	Garaventa Hills	CLIENT:	Engeo Inc.
	NAME:	ALTAMONT	ADDRESS:	Vasco Road	CONTACT:	Richard Gandolfo
	MAP YEAR:	1968		Livermore, CA 94551	INQUIRY#:	2914012.4
	PHOTOREVISED:	1953	LAT/LONG:	37.7249 / -121.716	RESEARCH DATE:	11/05/2010
	SERIES:	7.5				
	SCALE:	1:24000				

Historical Topographic Map



N	TARGET QUAD		SITE NAME:	Garaventa Hills	CLIENT:	Engeo Inc.
	NAME:	ALTAMONT	ADDRESS:	Vasco Road	CONTACT:	Richard Gandolfo
	MAP YEAR:	1981		Livermore, CA 94551	INQUIRY#:	2914012.4
	PHOTOREVISED:	1953	LAT/LONG:	37.7249 / -121.716	RESEARCH DATE:	11/05/2010
	SERIES:	7.5				
	SCALE:	1:24000				

APPENDIX D

ENVIRONMENTAL DATA RESOURCES, INC.

Aerial Decade Package

Garaventa Hills
Vasco Road
Livermore, CA 94551

Inquiry Number: 2914012.5
November 09, 2010

The EDR Aerial Photo Decade Package

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Disclaimer - Copyright and Trademark Notice

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. **NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OF DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT.** Purchaser accepts this Report AS IS. Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction or forecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report is not to be construed as legal advice.

Copyright 2010 by Environmental Data Resources, Inc. All rights reserved. Reproduction in any media or format, in whole or in part, of any report or map of Environmental Data Resources, Inc., or its affiliates, is prohibited without prior written permission.

EDR and its logos (including Sanborn and Sanborn Map) are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.

Date EDR Searched Historical Sources:

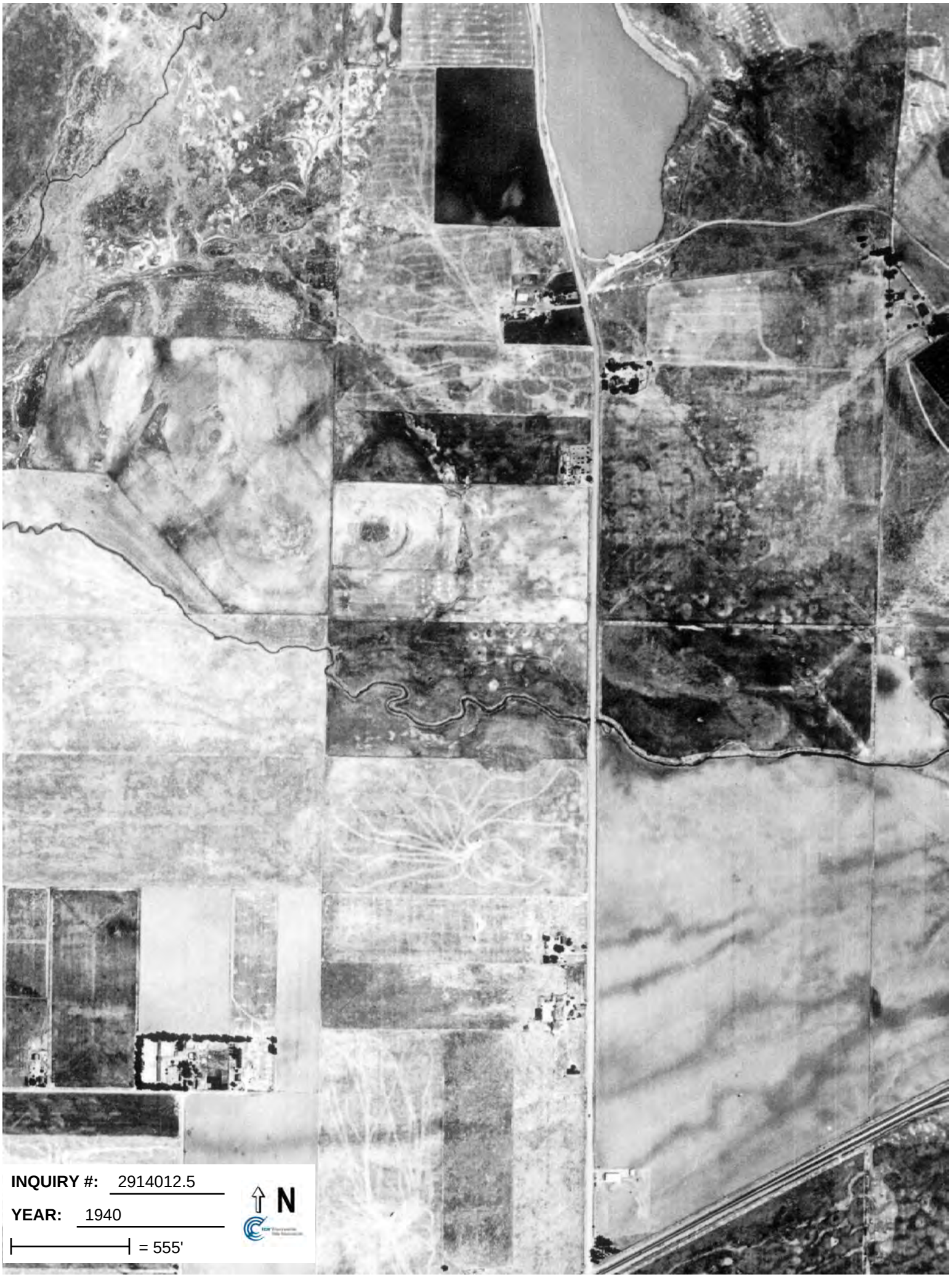
Aerial Photography November 09, 2010

Target Property:

Vasco Road

Livermore, CA 94551

Year	***Scale***	***Details***	***Source***
1940	Aerial Photograph. Scale: 1"=555'	Flight Year: 1940	Fairchild
1958	Aerial Photograph. Scale: 1"=555'	Flight Year: 1958	Cartwright
1965	Aerial Photograph. Scale: 1"=333'	Flight Year: 1965	Cartwright
1974	Aerial Photograph. Scale: 1"=601'	Flight Year: 1974	NASA
1982	Aerial Photograph. Scale: 1"=690'	Flight Year: 1982	USGS
1993	Aerial Photograph. Scale: 1"=666'	Flight Year: 1993	USGS
1998	Aerial Photograph. Scale: 1"=666'	Flight Year: 1998	USGS
2005	Aerial Photograph. Scale: 1"=604'	Flight Year: 2005	EDR


INQUIRY #: 2914012.5
YEAR: 1940
= 555'
N

INQUIRY #: 2914012.5
YEAR: 1958
= 555'
N

INQUIRY #: 2914012.5
YEAR: 1965
= 333'
N

INQUIRY #: 2914012.5
YEAR: 1974
= 601'
N

INQUIRY #: 2914012.5
YEAR: 1982
= 690'
N

INQUIRY #: 2914012.5
YEAR: 1993
= 666'
N

INQUIRY #: 2914012.5
YEAR: 1998
= 666'
N

INQUIRY #: 2914012.5
YEAR: 2005
= 604'
N

APPENDIX E

ENVIRONMENTAL DATA RESOURCES, INC.

Sanborn Map Report

APPENDIX E

Garaventa Hills
Vasco Road
Livermore, CA 94551

Inquiry Number: 2914012.3
November 05, 2010

Certified Sanborn® Map Report

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

11/05/10

Site Name:
Garaventa Hills
Vasco Road
Livermore, CA 94551

Client Name:
Engeo Inc.
580 North Wilma Avenue
Ripon, CA 95366

EDR Inquiry # 2914012.3

Contact: Richard Gandolfo

EDR® Environmental Data Resources Inc

The complete Sanborn Library collection has been searched by EDR, and fire insurance maps covering the target property location provided by Engeo Inc. were identified for the years listed below. The certified Sanborn Library search results in this report can be authenticated by visiting www.edrnet.com/sanborn and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by Sanborn Library LLC, the copyright holder for the collection.

Certified Sanborn Results:

Site Name: Garaventa Hills
Address: Vasco Road
City, State, Zip: Livermore, CA 94551
Cross Street:
P.O. # 9126.000.000
Project: Garaveta Hills
Certification # 8D96-424E-8A81

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Sanborn® Library search results
Certification # 8D96-424E-8A81

The Sanborn Library includes more than 1.2 million Sanborn fire insurance maps, which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ✓ Library of Congress
- ✓ University Publications of America
- ✓ EDR Private Collection

The Sanborn Library LLC Since 1866™

Limited Permission To Make Copies

Engeo Inc. (the client) is permitted to make up to THREE photocopies of this Sanborn Map transmittal and each fire insurance map accompanying this report solely for the limited use of its customer. No one other than the client is authorized to make copies. Upon request made directly to an EDR Account Executive, the client may be permitted to make a limited number of additional photocopies. This permission is conditioned upon compliance by the client, its customer and their agents with EDR's copyright policy; a copy of which is available upon request.

Disclaimer - Copyright and Trademark notice

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OF DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT. Purchaser accepts this Report "AS IS". Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction or forecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report is not to be construed as legal advice.

Copyright 2010 by Environmental Data Resources, Inc. All rights reserved. Reproduction in any media or format, in whole or in part, of any report or map of Environmental Data Resources, Inc., or its affiliates, is prohibited without prior written permission.

EDR and its logos (including Sanborn and Sanborn Map) are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.

APPENDIX F

ENVIRONMENTAL DATA RESOURCES, INC.

City Directory Abstract

APPENDIX F

Garaventa Hills
Vasco Road
Livermore, CA 94551

Inquiry Number: 2914012.6
November 05, 2010

The EDR-City Directory Abstract

Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION

Executive Summary

Findings

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Disclaimer - Copyright and Trademark Notice

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. **NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OR DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT.** Purchaser accepts this Report "AS IS". Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction orforecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report is not to be construed as legal advice.

Copyright 2009 by Environmental Data Resources, Inc. All rights reserved. Reproduction in any media or format, in whole or in part, of any report or map of Environmental Data Resources, Inc. or its affiliates is prohibited without prior written permission.

EDR and its logos (including Sanborn and Sanborn Map) are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.

2009 Enhancements to EDR City Directory Abstract

New for 2009, the EDR City Directory Abstract has been enhanced with additional information and features. These enhancements will make your city directory research process more efficient, flexible, and insightful than ever before. The enhancements will improve the options for selecting adjoining properties, and will speed up your review of the report.

City Directory Report. Three important enhancements have been made to the EDR City Directory Abstract:

1. *Executive Summary.* The report begins with an Executive Summary that lists the sources consulted in the preparation of the report. Where available, a parcel map is also provided within the report, showing the locations of properties researched.

2. *Page Images.* Where available, the actual page source images will be included in the Appendix, so that you can review them for information that may provide additional insight. EDR has copyright permission to include these images.

3. *Findings Listed by Location.* Another useful enhancement is that findings are now grouped by address. This will significantly reduce the time you need to review your abstracts. Findings are provided under each property address, listed in reverse chronological order and referencing the source for each entry.

Options for Selecting Adjoining Properties. Ensuring that the right adjoining property addresses are searched is one of the biggest challenges that environmental professionals face when conducting city directory historical research. EDR's new enhancements make it easier for you to meet this challenge. Now, when you place an order for the EDR City Directory Abstract, you have the following choices for determining which addresses should be researched.

1. *You Select Addresses and EDR Selects Addresses.* Use the "Add Another Address" feature to specify the addresses you want researched. Your selections will be supplemented by addresses selected by EDR researchers using our established research methods. Where available, a digital map will be shown, indicating property lines overlaid on a color aerial photo and their corresponding addresses. Simply use the address list below the map to check off which properties shown on the map you want to include. You may also select other addresses using the "Add Another Address" feature at the bottom of the list.

2. *EDR Selects Addresses.* Choose this method if you want EDR's researchers to select the addresses to be researched for you, using our established research methods.

3. *You Select Addresses.* Use this method for research based solely on the addresses you select or enter into the system.

4. *Hold City Directory Research Option.* If you choose to select your own adjoining addresses, you may pause production of your EDR City Directory Abstract report until you have had a chance to look at your other EDR reports and sources. Sources for property addresses include: your Certified Sanborn Map Report may show you the location of property addresses; the new EDR Property Tax Map Report may show the location of property addresses; and your field research can supplement these sources with additional address information. To use this capability, simply click "Hold City Directory research" box under "Other Options" at the bottom of the page. Once you have determined what addresses you want researched, go to your EDR Order Status page, select the EDR City Directory Abstract, and enter the addresses and submit for production.

Questions? Contact your EDR representative at 800-352-0050. For more information about all of EDR's 2009 report and service enhancements, visit www.edrnet.com/2009enhancements

EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Abstract is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Abstract includes a search and abstract of available city directory data. For each address, the directory lists the name of the corresponding occupant at five year intervals.

Business directories including city, cross reference and telephone directories were reviewed, if available, at approximately five year intervals for the years spanning 1920 through 2006. This report compiles information gathered in this review by geocoding the latitude and longitude of properties identified and gathering information about properties within 1320 feet of the target property.

A summary of the information obtained is provided in the text of this report.

RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. An "X" indicates where information was identified in the source and provided in this report.

Year	Source	TP	Adjoining	Text Abstract	Source Image
2006	Haines Company, Inc.	-	-	-	-
2002	Haines	-	X	X	-
	R. L. Polk & Co.	-	X	X	-
2000	Pacific Bell	-	-	-	-
1996	PACIFIC BELL DIRECTORY	-	-	-	-
1993	Pacific Bell	-	-	-	-
1992	PACIFIC BELL DIRECTORY	-	-	-	-
1991	PACIFIC BELL WHITE PAGES	-	-	-	-
1986	Pacific Bell	-	-	-	-
1984	Pacific Bell	-	-	-	-
1982	Pacific Telephone	-	-	-	-
1980	Pacific Telephone	-	-	-	-
1979	Pacific Telephone	-	-	-	-
1976	Pacific Telephone	-	-	-	-
1975	Pacific Telephone	-	-	-	-
1973	Pacific Telephone	-	-	-	-
1970	Pacific Telephone	-	-	-	-
1967	R. L. Polk Co.	-	-	-	-
1965	Pacific Telephone	-	-	-	-
1962	Pacific Telephone	-	-	-	-
1960	Pacific Telephone	-	-	-	-
1959	R. L. Polk & Co.	-	-	-	-
1956	Pacific Telephone	-	-	-	-
1955	R. L. Polk & Co.	-	-	-	-
1954	R. L. Polk & Co. of California	-	-	-	-

EXECUTIVE SUMMARY

Year	Source	TP	Adjoining	Text Abstract	Source Image
1951	R. L. Polk & Co.	-	-	-	-
1950	The Pacific Telephone & Telegraph Co.	-	-	-	-
1946	R. L. Polk & Co.	-	-	-	-
1945	The Pacific Telephone & Telegraph Co.	-	-	-	-
1943	R. L. Polk & Co.	-	-	-	-
1940	R. L. Polk & Co.	-	-	-	-
1938	Pacific Telephone	-	-	-	-
1933	R. L. Polk & Co.	-	-	-	-
1932	R. L. Polk & Co. of California	-	-	-	-
1928	R.L. Polk and Co of California	-	-	-	-
1926	R. L. Polk & Co.	-	-	-	-
1925	R. L. Polk & Co. of California	-	-	-	-
1920	R. L. Polk & Co. of California	-	-	-	-

FINDINGS

TARGET PROPERTY INFORMATION

ADDRESS

Vasco Road
Livermore, CA 94551

FINDINGS DETAIL

Target Property research detail.

No Addresses Found

FINDINGS

ADJOINING PROPERTY DETAIL

The following Adjoining Property addresses were researched for this report. Detailed findings are provided for each address.

ALTAMONT CIR

1893 ALTAMONT CIR

Year	Uses	Source
2002	DICRESCENZOR	Haines

ALTAMONT CREEK DR

6567 ALTAMONT CREEK DR

Year	Uses	Source
2002	OKOBYLSKI Kevin	Haines
	OKOBYLSKI Kevin	R. L. Polk & Co.

6589 ALTAMONT CREEK DR

Year	Uses	Source
2002	BENCH Barbara	R. L. Polk & Co.
	BENCH Barbara	Haines

6591 ALTAMONT CREEK DR

Year	Uses	Source
2002	BAILEY Steven W	Haines
	BAILEY	Haines
	BAILEY Steven W	R. L. Polk & Co.
	BAILEY	R. L. Polk & Co.

6613 ALTAMONT CREEK DR

Year	Uses	Source
2002	SKILLMAN Rhoda	R. L. Polk & Co.
	SKILLMAN	R. L. Polk & Co.
	SKILLMAN	Haines
	SKILLMAN Rhoda	Haines

BEAR CREEK DR

6811 BEAR CREEK DR

Year	Uses	Source
2002	SOARE	Haines

FINDINGS

Year	Uses	Source
2002	SOARE	R. L. Polk & Co.

6832 BEAR CREEK DR

Year	Uses	Source
2002	FORSFEE Wi	Haines
	FORSFEE Wi	R. L. Polk & Co.

6865 BEAR CREEK DR

Year	Uses	Source
2002	REGNIER	Haines
	BREGNIERB	Haines
	BREGNIERB	R. L. Polk & Co.
	REGNIER	R. L. Polk & Co.

6874 BEAR CREEK DR

Year	Uses	Source
2002	RIETVELD Palncia	R. L. Polk & Co.
	RIETVELD Palncia	Haines

6877 BEAR CREEK DR

Year	Uses	Source
2002	CAYABYABErneslo	Haines
	CAYABYABErneslo	R. L. Polk & Co.

6886 BEAR CREEK DR

Year	Uses	Source
2002	MONTGOME	R. L. Polk & Co.
	MONTGOMERYMi	R. L. Polk & Co.
	MONTGOMERYMi	Haines
	MONTGOME	Haines

6899 BEAR CREEK DR

Year	Uses	Source
2002	SCAUGHEY Floyd	Haines
	SCAUGHEY Floyd	R. L. Polk & Co.

6905 BEAR CREEK DR

Year	Uses	Source
2002	OSPANGLER	R. L. Polk & Co.
	SPANGLER	R. L. Polk & Co.
	SPANGLER	Haines

FINDINGS

Year	Uses	Source
2002	OSPANGLER	Haines

6910 BEAR CREEK DR

Year	Uses	Source
2002	GARCIASiman	Haines
	GARCIASiman	R. L. Polk & Co.

6927 BEAR CREEK DR

Year	Uses	Source
2002	PACKYT	R. L. Polk & Co.
	PACKYT	Haines

BRIDLE PATH CT

1616 BRIDLE PATH CT

Year	Uses	Source
2002	0 MONTGOMERYJames	Haines

1621 BRIDLE PATH CT

Year	Uses	Source
2002	DONKFrank	Haines

1662 BRIDLE PATH CT

Year	Uses	Source
2002	KOCH Davad	Haines

1665 BRIDLE PATH CT

Year	Uses	Source
2002	OBRADODavld	Haines

1674 BRIDLE PATH CT

Year	Uses	Source
2002	IBOUGHAN	Haines
	OBOUGHAN	Haines

1696 BRIDLE PATH CT

Year	Uses	Source
2002	REEDPatricia	Haines

FINDINGS

EDGEWATER LN

6812 EDGEWATER LN

Year	Uses	Source
2002	HAYDENdamne	R. L. Polk & Co.
	HAYDEN Paul	R. L. Polk & Co.
	HAYDEN	Haines
	HAYDEN Paul	Haines

6834 EDGEWATER LN

Year	Uses	Source
2002	VICKROYTimolhy	Haines
	VICKROYTimolhy	R. L. Polk & Co.

FOX CREEK CT

1479 FOX CREEK CT

Year	Uses	Source
2002	CHANDLER	R. L. Polk & Co.
	CHANDL	R. L. Polk & Co.
	CHANDLER	Haines
	CHANOLERBo O	Haines

1480 FOX CREEK CT

Year	Uses	Source
2002	00 A 0 RI Robert	Haines
	OUADORI Robert	R. L. Polk & Co.

1491 FOX CREEK CT

Year	Uses	Source
2002	DAWNJohn	R. L. Polk & Co.
	DAWNJohn	Haines

GARAVENTA RANCH DR

6509 GARAVENTA RANCH DR

Year	Uses	Source
2002	LIVERMRCTYRECSRV	Haines
	LIVERMRRECO&PK	Haines
	ALTAMONTCRK UVEMRRSCELEM	Haines

FINDINGS

GARAVENTA RANCH RD

6509 GARAVENTA RANCH RD

Year	Uses	Source
2002	LIVERMRCTYRECSRV	R. L. Polk & Co.
	LIVERMRRECO&PK	R. L. Polk & Co.
	ALTAMONTCRK UVEMRRSCELEM	R. L. Polk & Co.
	ALTAMONT CREEK	R. L. Polk & Co.

HAWK ST

1922 HAWK ST

Year	Uses	Source
2002	SKUMARPr	R. L. Polk & Co.
	SKUMARPr	Haines

1934 HAWK ST

Year	Uses	Source
2002	SILVAMar Ia	Haines
	SILVA	Haines
	SILVAMar Ia	R. L. Polk & Co.
	SILVA	R. L. Polk & Co.

1978 HAWK ST

Year	Uses	Source
2002	OSAMULIJ	R. L. Polk & Co.
	OSAMULIJ	Haines

2018 HAWK ST

Year	Uses	Source
2002	DIETSCHCara A	Haines
	DIETSCHCara A	R. L. Polk & Co.

KNOLL CT

1711 KNOLL CT

Year	Uses	Source
2002	SCHILLER Saadia	R. L. Polk & Co.
	SCHILLER Saadia	Haines

FINDINGS

1728 KNOLL CT

Year	Uses	Source
2002	ERLIN	Haines
	ERLIN	R. L. Polk & Co.

1735 KNOLL CT

Year	Uses	Source
2002	SOLORIOHank	R. L. Polk & Co.
	SOLORIOHank	Haines

1744 KNOLL CT

Year	Uses	Source
2002	OJAHN David	Haines
	OJAHN David	R. L. Polk & Co.

1776 KNOLL CT

Year	Uses	Source
2002	BUS 59 ES 31 NEW	R. L. Polk & Co.
	ENWIYAAIr Oa	R. L. Polk & Co.
	ENWIYAAIr Oa	Haines

MALLARD CT

1710 MALLARD CT

Year	Uses	Source
2002	BROWN DL	Haines
	BROWN DL	R. L. Polk & Co.

1798 MALLARD CT

Year	Uses	Source
2002	WHITING Pat	R. L. Polk & Co.
	WHITING Pat	R. L. Polk & Co.
	WHITING John	R. L. Polk & Co.
	WHITIN	R. L. Polk & Co.
	WHITING Pat	Haines
	WHITING Pat	Haines
	WHITING John	Haines
	WHITIN	Haines

FINDINGS

MEADOW GLEN DR

1867 MEADOW GLEN DR

Year	Uses	Source
2002	CARDENAS Grace	Haines
	CARDENAS George	Haines
	CARDENAS George	R. L. Polk & Co.
	CARDENAS Grace	R. L. Polk & Co.

1872 MEADOW GLEN DR

Year	Uses	Source
2002	LEEPak	R. L. Polk & Co.
	LEEPak	Haines

1879 MEADOW GLEN DR

Year	Uses	Source
2002	DICKEY Franklin	Haines
	DICKEY Franklin	R. L. Polk & Co.

1886 MEADOW GLEN DR

Year	Uses	Source
2002	COLLINSS	R. L. Polk & Co.
	COLLINS Pa	R. L. Polk & Co.
	COLLINS Patnck	R. L. Polk & Co.
	COLLINSS	Haines
	COLLINS Pa	Haines
	COLLINS Patnck	Haines

1891 MEADOW GLEN DR

Year	Uses	Source
2002	OCHOAJir	Haines
	HOLTERJe	Haines
	HOLTERJef S	Haines
	BOSHBradden	Haines
	HOLTERJe	R. L. Polk & Co.
	OCHOAJir	R. L. Polk & Co.
	HOLTERJef S	R. L. Polk & Co.
	BOSHBradden	R. L. Polk & Co.

FINDINGS

1904 MEADOW GLEN DR

Year	Uses	Source
2002	CUNNINGHAMJe O	R. L. Polk & Co.
	CUNNINGHAMJe O	Haines

1918 MEADOW GLEN DR

Year	Uses	Source
2002	WEINSHELBAUM	Haines
	WEINSHELBAUM Daved	R. L. Polk & Co.

1920 MEADOW GLEN DR

Year	Uses	Source
2002	OFOLSOME	R. L. Polk & Co.
	OFOLSOME	Haines

1925 MEADOW GLEN DR

Year	Uses	Source
2002	FBOMERO	Haines
	FBOMERO	R. L. Polk & Co.

1932 MEADOW GLEN DR

Year	Uses	Source
2002	MILLERMi Re	R. L. Polk & Co.
	ILLE 84 Re	R. L. Polk & Co.
	I 0 EADOWGLEN 0 R 4550 00t	R. L. Polk & Co.
	I 0 EADOWGLEN 0 R 4550 00t	Haines
	MILLERMi Re	Haines
	ILLE 84 Re	Haines

FINDINGS

TARGET PROPERTY: ADDRESS NOT IDENTIFIED IN RESEARCH SOURCE

The following Target Property addresses were researched for this report, and the addresses were not identified in the research source.

Address Researched	Address Not Identified in Research Source
Vasco Road	2006, 2002, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920

ADJOINING PROPERTY: ADDRESSES NOT IDENTIFIED IN RESEARCH SOURCE

The following Adjoining Property addresses were researched for this report, and the addresses were not identified in research source.

Address Researched	Address Not Identified in Research Source
1479 FOX CREEK CT	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1480 FOX CREEK CT	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1491 FOX CREEK CT	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1616 BRIDLE PATH CT	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1621 BRIDLE PATH CT	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1662 BRIDLE PATH CT	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1665 BRIDLE PATH CT	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1674 BRIDLE PATH CT	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1696 BRIDLE PATH CT	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1710 MALLARD CT	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1711 KNOLL CT	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920

FINDINGS

Address Researched	Address Not Identified in Research Source
1728 KNOLL CT	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1735 KNOLL CT	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1744 KNOLL CT	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1776 KNOLL CT	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1798 MALLARD CT	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1867 MEADOW GLEN DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1872 MEADOW GLEN DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1879 MEADOW GLEN DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1886 MEADOW GLEN DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1891 MEADOW GLEN DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1893 ALTAMONT CIR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1904 MEADOW GLEN DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1918 MEADOW GLEN DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1920 MEADOW GLEN DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1922 HAWK ST	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1925 MEADOW GLEN DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1932 MEADOW GLEN DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920

FINDINGS

Address Researched	Address Not Identified in Research Source
1934 HAWK ST	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
1978 HAWK ST	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
2018 HAWK ST	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
6509 GARAVENTA RANCH DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
6509 GARAVENTA RANCH RD	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
6567 ALTAMONT CREEK DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
6589 ALTAMONT CREEK DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
6591 ALTAMONT CREEK DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
6613 ALTAMONT CREEK DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
6811 BEAR CREEK DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
6812 EDGEWATER LN	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
6832 BEAR CREEK DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
6834 EDGEWATER LN	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
6865 BEAR CREEK DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
6874 BEAR CREEK DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
6877 BEAR CREEK DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
6886 BEAR CREEK DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920

FINDINGS

Address Researched	Address Not Identified in Research Source
6899 BEAR CREEK DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
6905 BEAR CREEK DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
6910 BEAR CREEK DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920
6927 BEAR CREEK DR	2006, 2000, 1996, 1993, 1992, 1991, 1986, 1984, 1982, 1980, 1979, 1976, 1975, 1973, 1970, 1967, 1965, 1962, 1960, 1959, 1956, 1955, 1954, 1951, 1950, 1946, 1945, 1943, 1940, 1938, 1933, 1932, 1928, 1926, 1925, 1920

APPENDIX G

Environmental Site Assessment Questionnaire(s)

APPENDIX G

Project Name: Proposed Garaventa Hills Estates
Project No. P2010.000.417

ENGEO INCORPORATED

☒ 2010 Crow Canyon Place ▪ Suite 250 ▪ San Ramon, CA 94583 (925) 866-9000 ▪ Fax (888) 279-2698
☐ 2213 Plaza Drive ▪ Rocklin, CA 95765 (916) 786-8883 ▪ Fax (888) 279-2698
☐ 332 Pine Street ▪ Suite 300 ▪ San Francisco, CA 94104 (415) 284-9900 ▪ Fax (888) 279-2698
☐ 6399 San Ignacio Avenue ▪ Suite 150 ▪ San Jose, CA 95119 (408) 574-4900 ▪ Fax (888) 279-2698
☐ 580 N. Wilma Avenue▪ Suite A ▪ Ripon, CA 95366 (209) 835-0610 ▪ Fax (888) 279-2698
☐ 17675 Sierra Highway ▪ Santa Clarita, CA 91351 (661) 257-4004 ▪ Fax (888) 279-2698

ENVIRONMENTAL SITE ASSESSMENT QUESTIONNAIRE FOR CLIENT

To evaluate the potential for possible environmentally related impacts and site contamination the following information is requested. This questionnaire is to be completed by the user of the phase one environmental site assessment, or their authorized representative.

PART I

1. Property address and Assessor's Parcel Number (APN):

2. Current property owner (name, address, voice/fax number):
   Garaventa

3. Date current property owner assumed title of property:
   A long time ago

4. Current property development/improvements:
   None

5. Past property use, development/improvements:
   Fallow

6. Neighboring property uses:
   School, Subdivision, Open Space

PART II

1. Are you aware of any environmental cleanup liens against the *property* that are filed under federal, tribal, local or state law?	☐ Yes	☑ No
2. Are you aware of any activity and land use limitations, such as engineering controls, land use restrictions, or institutional controls that are in place at the property and/or have been filed or recorded in a registry under federal, tribal, state or local law?	☐ Yes	☑ No
3. Do you have any specialized knowledge or experience related to the *property* or nearby properties? For example are you involved in the same line of business as the current or former occupants of the *property* or an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business?	☐ Yes	☑ No
4. If a property transaction is occurring in conjunction with this environmental assessment, does the purchase price of this *property* reasonably reflect the fair market value of the *property*? If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the *property?*	☑ Yes	☐ No
5. Are you aware of any commonly known or reasonably ascertainable information about the property that would help the environmental professional to identify conditions indicative of releases or threatened releases? For example, (a) do you know of specific chemicals that are present or once were present at the *property*? (b) do you know of spills or other chemical releases that have taken place at the *property*? (c) do you know of any environmental cleanups that have taken place at the *property*?	☐ Yes	☑ No
6. Based on your knowledge and experience related to the *property* are there any obvious indicators that point to the presence or likely presence of contamination at the *property*?	☐ Yes	☑ No

If a "Yes" response was provided to any of the above questions, please provide details below:

I certify that the information herein is true and correct to the best of my knowledge as of the date signed below.

Name (Printed/Typed): Scott Reylander

Signature: Scott Reylander Date: 11/4/2010

Project Name: Proposed Garaventa Hills Estates
Project No. P2010.000.417

ENGEO INCORPORATED

☒ 2010 Crow Canyon Place ▪ Suite 250 ▪ San Ramon, CA 94583 (925) 866-9000 ▪ Fax (888) 279-2698
☐ 2213 Plaza Drive ▪ Rocklin, CA 95765 (916) 786-8883 ▪ Fax (888) 279-2698
☐ 332 Pine Street ▪ Suite 300 ▪ San Francisco, CA 94104 (415) 284-9900 ▪ Fax (888) 279-2698
☐ 6399 San Ignacio Avenue ▪ Suite 150 ▪ San Jose, CA 95119 (408) 574-4900 ▪ Fax (888) 279-2698
☐ 580 N. Wilma Avenue▪ Suite A ▪ Ripon, CA 95366 (209) 835-0610 ▪ Fax (888) 279-2698
☐ 17675 Sierra Highway ▪ Santa Clarita, CA 91351 (661) 257-4004 ▪ Fax (888) 279-2698

ENVIRONMENTAL SITE ASSESSMENT QUESTIONNAIRE FOR "KEY SITE MANAGER"

To evaluate the potential for possible environmentally related impacts and site contamination the following information is requested. This questionnaire is to be preferably completed by the current property owner, or owner representative, leasing agent, or other person having good knowledge of the uses and physical characteristics of the property (Key Site Manager).

PART I

1. Property Address/Location and Assessor's Parcel Number (APN):

2. Current property owner (name, address, voice/fax number):

3. Date current property owner assumed title of property:

4. Current property development/improvements:

5. Past property use, development/improvements:

6. Neighboring property uses:

PART II - The following questions should be answered to the best of your knowledge.

1. Is/has the *property* or any adjoining property used/been used for industrial purposes?	☐ Yes	☑ No (Unknown)
2. Has the *property* or any adjoining property been used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility?	☐ Yes	☑ No
3. Are there currently, or have there been previously, any damaged or discarded automotive or industrial batteries, or pesticides, paints, or other chemicals in individual containers of greater than 5 gal in volume or 50 gal in the aggregate, stored on or used at the *property* or at the facility?	☐ Yes	☑ No
4. Has undocumented soil been brought onto the property at any time? If yes, estimated quantity is _____ cubic yards.	☐ Yes	☑ No
5. Has soil been brought onto the property that originated from a contaminated site or that is of an unknown origin?	☐ Yes	☐ No
6. Are there currently, or have there been previously, any pits, ponds, or lagoons located on the *property* in connection with waste treatment or waste disposal?	☐ Yes	☑ No
7. Is there currently, or has there been previously, any stained soil on the *property*?	☐ Yes	☐ No
8. Are there currently, or have there been previously, any registered or unregistered storage tanks (above or underground) located on the *property*?	☐ Yes	☐ No
9. Are there currently, or have there been previously, any vent pipes, fill pipes, or access ways indicating a fill pipe protruding from the ground on the *property* or adjacent to any structure located on the *property*?	☐ Yes	☑ No
10. Are there currently, or have there been previously, any flooring, drains, or walls located within the facility that are stained by substances other than water or are emitting foul odors?	☐ Yes	☑ No
11. Are there any domestic, irrigation or monitoring wells on the property?	☐ Yes	☑ No
12. If the *property* is served by a private well or non-public water system, have contaminants been identified in the well or system that exceed guidelines applicable to the water system or has the well been designated as contaminated by any government environmental/health agency?	☐ Yes	☑ No
13. Have you been informed of the past or current existence of *hazardous substances* or *petroleum products* or environmental violations with respect to the *property* or any facility located on the *property*?	☐ Yes	☐ No
14. Have there been any *environmental site assessments* of the *property* or facility that indicated the presence of *hazardous substances* or *petroleum products* on, or contamination of, the *property* or recommended further assessment of the *property*?	☐ Yes	☐ No
15. Have there been any past, threatened, or pending lawsuits or administrative proceedings concerning a release or threatened release of any *hazardous substance* or *petroleum products* involving the *property*?	☐ Yes	☐ No
16. Has there been any past agricultural use of the *property*, such as orchards or seed crop cultivation?	☐ Yes	☐ No
17. Have any *hazardous substances* or *petroleum products*, unidentified waste materials, tires, automotive or industrial batteries or any other waste materials been dumped above grade, buried and/or burned on the *property*?	☐ Yes	☑ No
18. Is there a transformer, capacitor, or any hydraulic equipment for which there are any records indicating the presence of PCBs?	☐ Yes	☑ No

If a "Yes" response was provided to any of the above questions, please provide details below:

I certify that the information herein is true and correct to the best of my knowledge as of the date signed below.

Name (Printed/Typed): Scott Ryglewicz

Signature: [signature] Date: 4/4/2010

APPENDIX H

Qualification of Environmental Professional

APPENDIX H

SHAWN MUNGER, CHG
PRINCIPAL GEOLOGIST

EDUCATION

BS, Geology, U.C. Davis, 1985

EXPERIENCE

Years with ENGEO: 25
Years with Other Firms: 0

REGISTRATIONS & CERTIFICATIONS

Certified Hydrogeologist, CA, 413
40 Hour HAZWOPER Training, CA
Certified Environmental Manager, NV, 1332
Registered Environmental Assessor II, CA, 20201
Professional Geologist, CA, 5810

SPECIALIZATIONS

- Environmental Assessments and Remediation
- Environmental Restoration
- Water Quality Studies
- Water Wells/Hydrogeology

Since joining ENGEO in 1985, Mr. Munger has been managing groundwater supply evaluations, hydrogeologic studies, chemical assessments, phase I and II site assessment projects, UST site investigations, risk based corrective action (RBCA), VOC remediation, and agricultural impact evaluations. He serves as Principal-in-Charge or Project Manager for environmental and hazardous materials projects involving groundwater hydrology, contaminant fate and transport, and remediation. He is Principal-in-Charge of our on-call contract with DTSC and the environmental components of our on-call contracts with the City of Sacramento and the County of Sacramento.

Selected Project Experience

Seacliff Estates—Richmond, CA
Principal in Charge. Mr. Munger provided oversight, review, and consultation during preparation of phase I and II site assessments and soil remediation. The 12-acre site was formerly part of Kaiser Shipyard No. 3 and was used for ship repair and maintenance along with scrap metal and salvage yards. The property was developed as a single-family residential subdivision.

Renaissance Square—Concord, CA
Project Manager. Mr. Munger provided consultation, data analysis, and field observation. This former automotive dealership was redeveloped as a five-story multi-family residential structure supported on slab-on-grade foundations, with two levels of below-grade parking. Petroleum hydrocarbon-impacted soil was encountered during excavation of the parking structure, which required characterization and remediation. Soil impacts were attributed to former sumps, USTs and hydraulic lifts.

Pleasant Hill BART Station—Walnut Creek, CA
Principal in Charge. Mr. Munger provided oversight, data analysis and consultation during the preparation of a phase II environmental site assessment. The property is an existing BART station that encompasses 20 acres, including the platform/station area, electrical facilities, a parking garage and additional paved parking areas.

Mills Ranch—King City, CA
Principal in Charge. Mr. Munger provided principal oversight of phase I and II environmental site assessments and risk evaluations. The approximate 80-acre property is used for agricultural cultivation and commercial uses. The proposed mixed-use development includes over 400 single-family residential lots.

Select Foods Site/Cross Creek—Hayward, CA
Principal in Charge. Mr. Munger provided principal oversight, consultation, and data analysis. The property was a former processed food facility, a drum recycling business, battery manufacturing operation and a bus assembly plant. Following completion of soil remediation under RWQCB oversight, the property was developed into a single-family residential subdivision.

Southchase Property—West Sacramento, CA
Project Manager. Mr. Munger provided environmental consultation regarding soil contamination and site characterization work. The property is a former farm headquarters with storage structures and orchards.

Westshore—Richmond, CA
Project Manager. Mr. Munger conducted phase I and II site assessments, risk evaluations and prepared a soil management plan. The property was a former automotive manufacturing plant proposed for a multi-unit condominium development, including a 6-story podium structure to include five residential floors with 269 units and one parking floor.

Union Pacific Railroad Corridor—San Jose, CA.
Project Manager. Mr. Munger prepared a phase I and II environmental assessment. Work included a site reconnaissance, historical records research and recovery of soil samples with laboratory analysis. Lead impacted soil was identified which required risk evaluation. This former 1800 lineal foot section of the former Union Pacific Railroad Corridor was proposed for mixed-use development.

Sparklizing Cleaners and Laundry—Fremont, CA
Principal in Charge. Mr. Munger provided principal review and data analysis for this former dry cleaning facility which had released tetrachloroethylene (PCE) to site soil and groundwater. The project site consists of a drycleaning facility located within a commercial/retail center. Drycleaning operations have been conducted at the facility since 1974 and have resulted in chlorinated solvent impacts to soil and groundwater beneath the site. As a result, the CRWQCB opened a Spills, Leaks, Investigations, and Cleanups (SLIC) case and the site was referred to the Alameda County Water District (ACWD) for lead agency oversight. A series of soil and groundwater investigations identified a source area beneath the drycleaner suite and an adjoining retail suite. A CAP submitted to ACWD in 2009 involves using in-situ chemical oxidation (ISCO) to remediate groundwater and vadose zone soil impacts within the source area.

Mare Island, 3rd and Connelly Utility Corridor—Vallejo, CA
Principal in Charge. Mr. Munger provided principal oversight during demolition and soil excavation activities. The project consisted of utility demolition and soil excavation activities

required to prepare for construction of a 300 – foot water and sewer utility corridor along Connelly Street between 3rd Street and Azuar Drive.

Ivy Glen (Former Tredegar)—Fremont, CA
Principal in Charge. Mr. Munger provided oversight of site characterizations, risk evaluations and groundwater monitoring for this for this former industrial facility. The property was a former industrial facility with documented soil and groundwater contamination. Risk assessments allowed redevelopment of the site as a single-family residential subdivision. Groundwater monitoring continues to date as a result of residual docs beneath the property.

County Crossings Property—Antioch, CA
Principal in Charge. Mr. Munger provided environmental consultation and data review with regard to soil and groundwater contamination. Constituents of concern include petroleum hydrocarbons, nitrates and manganese. The approximately 264 acre site includes several former industrial facilities and petroleum pipelines. Soil and groundwater at the site has been impacted with petroleum hydrocarbons, nitrates and manganese. Planned uses include commercial, residential, retail, and a BART-oriented transit village. The center, which is currently in the entitlement phase, is estimated to break ground in 2011.

Arroyo Crossing—Livermore, CA
Principal in Charge. Mr. Munger provided oversight, data analysis and regulatory consultation while ENGEO provided geotechnical and environmental engineering services for this 34-acre site. This former corporation yard and quarry site was developed into a single-family residential subdivision.

620 North Ninth Street—San Jose, CA
Principal in Charge. Mr. Munger provided oversight of soil, groundwater and soil gad characterizations, risk evaluations and remedial action plan preparation. Mr. Munger also closely interacted with RWQCB staff to achieve approval for residential development. The property is a former fruit packing plant and food preparation facility. The proposed development consists of a single-family residential subdivision.

Former SFPP Alignment—Concord, CA
Project Manager. Mr. Munger prepared a Phase I and II environmental assessment for a ± 6,500-foot corridor formerly occupied by the Southern Pacific Railroad (SPRR). Kinder Morgan petroleum pipelines existed within an easement along the property. Work included the recovery of soil and groundwater samples along the SP right of way. The site was a former ± 6,500-foot corridor formerly occupied by the Southern Pacific Railroad. Kinder Morgan petroleum pipelines existed within an easement along the property. The southern portion of the site was crossed by East Bay Municipal Utilities District water distribution lines and a multi-lane highway overpass. The corridor was developed as a self-storage facility.

Gale Ranch Middle School—San Ramon, CA
Principal in Charge. Mr. Munger provided review and supervision of a Preliminary Endangerment Assessment prepared for this school site under the oversight of DTSC. This former site was developed into a public middle school.

Highlands Ranch—Antioch, CA
Principal in Charge. Mr. Munger provided oversight, data analysis, and collaboration with RWQCB personnel. The project site consists of a 140-acre portion of the former Chevron Los Medanos Tank Farm located in Pittsburg, California. The site was historically occupied by 24 crude oil tanks and four wax ponds. Remediation of the crude oil tank and wax pond locations was conducted according to a remedial action plan (RAP) and oversight was provided by the CRWQCB. Remediation was performed over a period of four months and consisted of excavating approximately 110,000 cubic yards of impacted soil and placing the material in windrows for ex-situ bioremediation.

Hercules Property—Hercules, CA
Project Manager. Mr. Munger provided oversight of a phase I environmental site assessment, site asbestos survey, site characterization, and demolition observation/contaminant assessment. The project area consists of ± 167 acres located near and along the southeastern shore of San Pablo Bay in Hercules. The property was once a portion of a 1300-acre manufacturing facility that was operated by DuPont from 1879 to 1913 and Hercules Incorporated from 1913 to 1979. The planned development includes single/multi family residential development with some commercial components.

Gold Rush Ranch and Golf Resort—Sutter creek, CA
Principal in Charge. Mr. Munger provided principal oversight during the preparation of a preliminary endangerment report, including soil, groundwater and surface water sampling. The project site consists of 945 acres of undeveloped land located near the City of Sutter Creek, California. The proposed development plan for the site involves the Gold Rush Ranch and Golf Resort, which includes an 18-hole championship golf course, 1,334 new homes, a commercial center, and open space. The client has entered into a VCA with the Department of Toxic Substances Control (DTSC) to address historic mine tailings at the site. A PEA was prepared to evaluate human health risks associated with elevated arsenic in tailings, soil, and surface water at the site. The PEA was approved by DTSC in 2009. Based on the findings of the PEA, a removal action workplan (RAW) will be prepared to address the human health risks associated with the arsenic impacts.

1000 Howe Road—Martinez, CA
Principal in Charge. Mr. Munger provided oversight and analysis for this soil remediation project. Mr. Munger worked closely with RWQCB personnel to develop a cost effective and timely closure for site closure and approval for residential development. The site is occupied by a general engineering contractor and was a former bus leasing company. Improvements at the property included an office/warehouse structure and an equipment yard. The proposed development consists of a single-family residential subdivision.

Appendix G:

Hydrology-Related Reports

**(Hydraulic Summary of the Proposed Hawk Street Bridge,
Bay Area Hydrology Model Project Report,
Preliminary Stormwater Treatment Plan and Details,
Evaluation of Potential Hydrological Impacts to Garaventa Wetlands)**

1243 Alpine Road, Suite 108
Walnut Creek, CA 94596
Phone: 925.941.0017
Fax: 925.941.0018
www.wreco.com

Memorandum

Date: January 9, 2012

To: Eddie Sieu and Jason White - RJA

From: Han-Bin Liang and Ripen Kaur - WRECO

Project Garaventa Hills Estates Development, City of Livermore

Subject: Hydraulic Summary of the Proposed Hawk Street Bridge over Altamont Creek

Introduction

The purposes of this memorandum are to 1) present the hydraulic analysis results showing the impact of the proposed Hawk Street bridge to the 100-year flood elevations in Altamont Creek, and 2) predict the extent of floodplains for the 100-year storm event. The proposed bridge site is located in the City of Livermore, Alameda County, California (Figure 1).

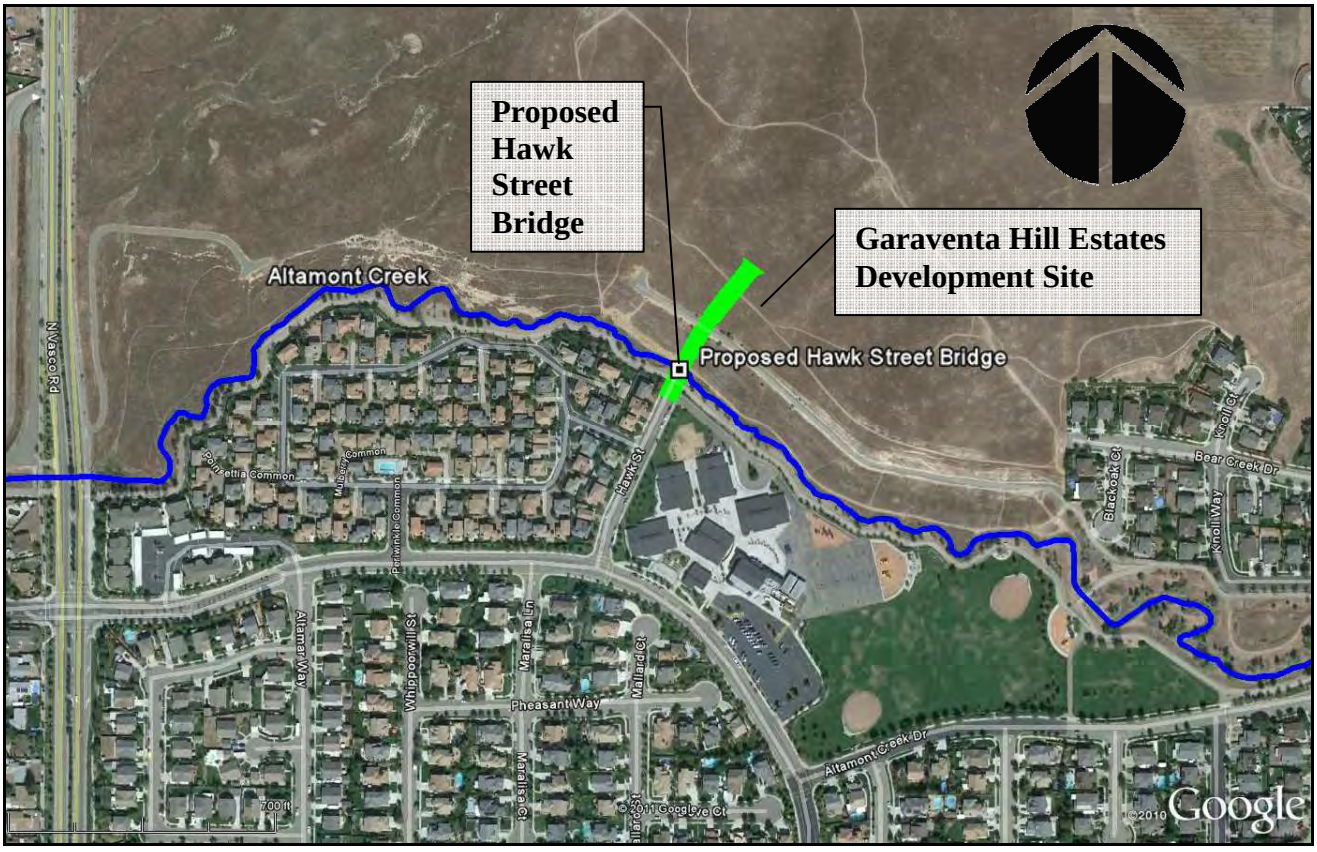


Figure 1. Project Location Map

Source: Google Earth

1243 Alpine Road, Suite 108
Walnut Creek, CA 94596
Phone: 925.941.0017
Fax: 925.941.0018
www.wreco.com

Project Description

The Hawk Street bridge over Altamont Creek is proposed with the Garaventa Hills Estates Project to connect this project to the existing development south of the channel. The Garaventa Hills Estates residential development is proposed to be constructed in the northeastern part of the city of Livermore. The site is located north of Interstate 580, east of Vasco Road, and west of Laughlin Road in the city of Livermore. Ruggeri-Jensen-Azar & Associates (RJA) is the civil engineer responsible for the site development engineering design. In the existing condition, the project site is an undeveloped parcel consisting of non-native grassland habitat. The site is bordered by open space in the north and west and is adjacent to residential development in the east and the Altamont Creek channel in the south. Altamont Creek originates in the Altamont Hills and flows south and west into the city of Livermore.

The project proposes to realign a portion of Altamont Creek in the vicinity of the proposed Hawk Street bridge. Figure 2 shows the realignment plan for the channel. Figure 3 shows the plan and profile for the proposed Hawk Street bridge. The project lies in the jurisdiction of Zone 7, Alameda County Flood Control & Water Conservation District (Zone 7). The Zone 7 basic criterion for the hydraulic design of bridges is that they be designed to pass the one percent (1%) probability of annual exceedance flood (100-year flood or Q_{100}) with 2 feet of freeboard without causing objectionable backwater, causing excessive flow velocities, or encroaching on through-traffic lanes. The scour analysis and geomorphologic assessment were not part of the scope of this study.

Hydrology

Design discharges were obtained from two different sources: the Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS) and Zone 7 (personal communication- April 18, 2011) and are listed in the table below:

Table 1. Altamont Creek Design Discharges at Hawk Street Bridge Location

Source	100-year Flow (cfs)
FEMA FIS	720
Zone 7 ACFC&WCD	1,040

The drainage area for Altamont Creek at Vasco Road is 7.39 square miles (Ayres Associates, 1996). The design flow of 1,040 cfs was adopted in the analysis per the recommendation of the Zone 7, which is the local agency that has jurisdiction over the Altamont Creek channel at and near the bridge site. Because the Zone 7's flow is higher than that of FEMA, it would be conservative to use their number.

Hydraulic Analysis

The hydraulic analysis of Altamont Creek involved a standard step backwater calculation using the United State Army Corps of Engineers' (USACE's) Hydrologic Engineering Center River Analysis System (HEC-RAS), version 4.1, to determine the water surface elevations (WSEs) during the design 100-year storm event.

1243 Alpine Road, Suite 108
Walnut Creek, CA 94596
Phone: 925.941.0017
Fax: 925.941.0018
www.wreco.com

For the hydraulic analysis, 28 cross sections along a 3,700 ft reach of Altamont Creek within the Project vicinity were cut from the surface that was created in Arc Map based on the channel cross-section survey data provided by RJA and LIDAR survey data provided by the City of Livermore. Figure 4 shows the locations of the cross sections used in the analysis. The pre-processing menu option in Arc Map was used for creating an import file for HEC-RAS. The stream centerline, main channel banks and flow paths were defined in this process using the GeoRAS tool in Arc Map. The geometry information was then imported into HEC-RAS for the hydraulic analysis. The downstream limit of the hydraulic model is approximately 150 ft downstream of the existing North Vasco Road bridge over Altamont Creek. The proposed Hawk Street bridge is approximately 2,250 ft upstream of the existing North Vasco Road bridge. The upstream limit of the hydraulic model is approximately 1,300 ft upstream of the proposed Hawk Street bridge. The design of the proposed Hawk Street bridge in the hydraulic model is based on the conceptual bridge design provided by RJA (September 20, 2011).

Manning's n values for estimating energy losses in the flow due to friction were selected for the left and right overbanks and the main channel to represent the characteristics of Altamont Creek before and after the installation of the proposed Hawk Street bridge. At the bridge location, Altamont Creek travels in the pasture with tall grass (see Photo 1). For the hydraulic analysis, Manning's n was selected based on FEMA's existing HEC-2 model and a site visit. A Manning's n value of 0.045 was selected to represent the left and right overbank areas with high grass. Based on aerial photography, the low flow channel of Altamont Creek winds through a pasture area. The low flow channel has minimal vegetation, and there were no signs of rifts or deep pools during the site visit. A Manning's n value of 0.035 was selected to represent the low flow channel. Photo 1 shows the existing channel condition in the vicinity of the bridge site.

Photo 1. Altamont Creek in the Vicinity of the Proposed Bridge Site

1243 Alpine Road, Suite 108
Walnut Creek, CA 94596
Phone: 925.941.0017
Fax: 925.941.0018
www.wreco.com

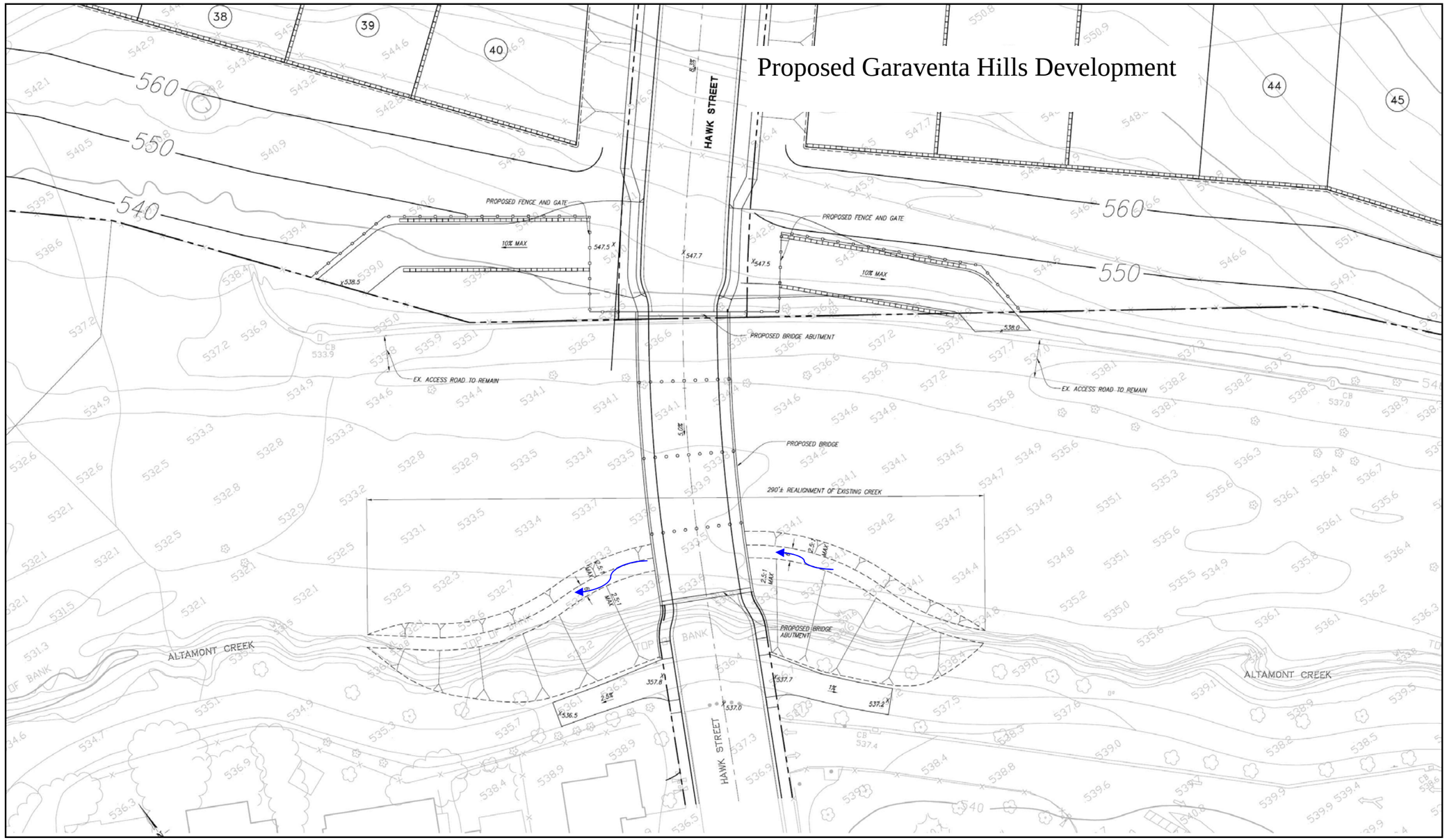


Figure 2. Altamont Creek Realignment Near Garaventa Hills Estates Development **Source: RJA 2012**

1243 Alpine Road, Suite 108
Walnut Creek, CA 94596
Phone: 925.941.0017
Fax: 925.941.0018
www.wreco.com

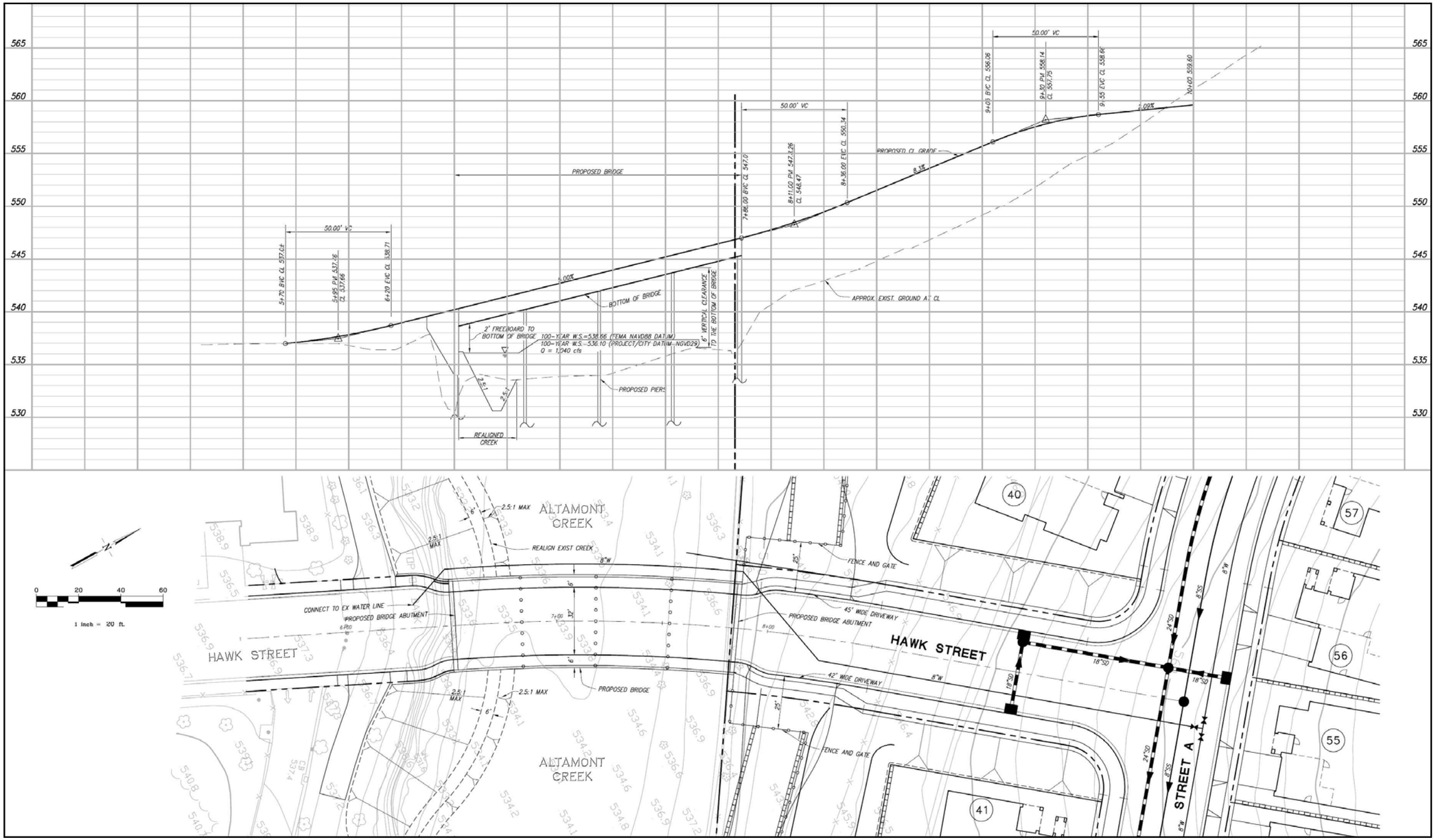


Figure 3. Preliminary Bridge Plan and Profile of the Hawk Street Bridge over Altamont Creek **Source: RJA 2012**

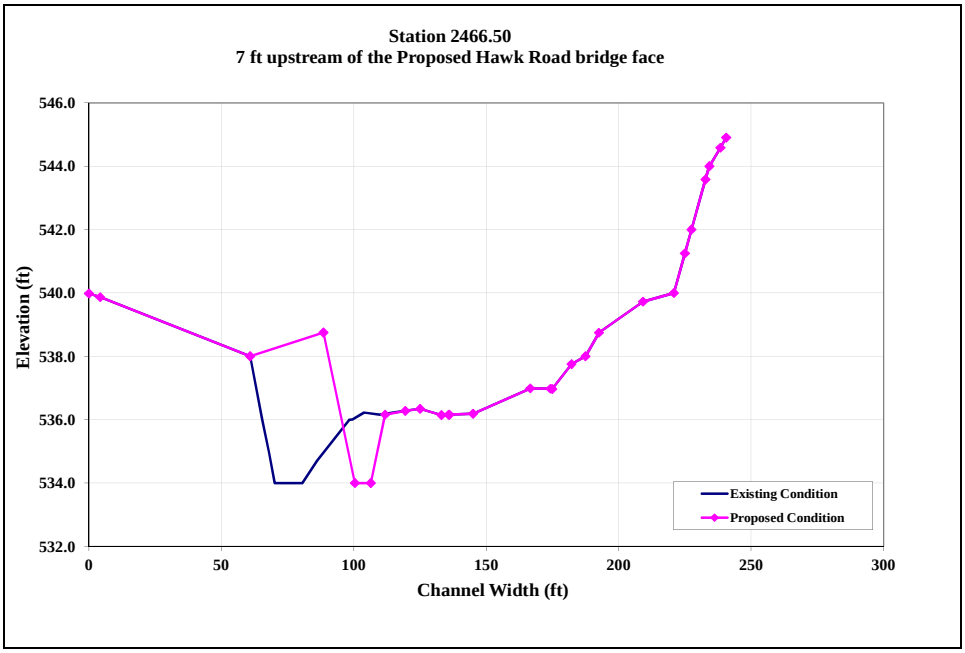
.

1243 Alpine Road, Suite 108
Walnut Creek, CA 94596
Phone: 925.941.0017
Fax: 925.941.0018
www.wreco.com

Figure 4. Cross Section Locations Used in the Hydraulic Analysis for Altamont Creek

1243 Alpine Road, Suite 108
Walnut Creek, CA 94596
Phone: 925.941.0017
Fax: 925.941.0018
www.wreco.com

Figure 5 shows the cross section used for the existing and proposed conditions at Station 2375 (see Figure 4), which is 40 ft downstream of the Hawk Street bridge, as used in the hydraulic analysis.



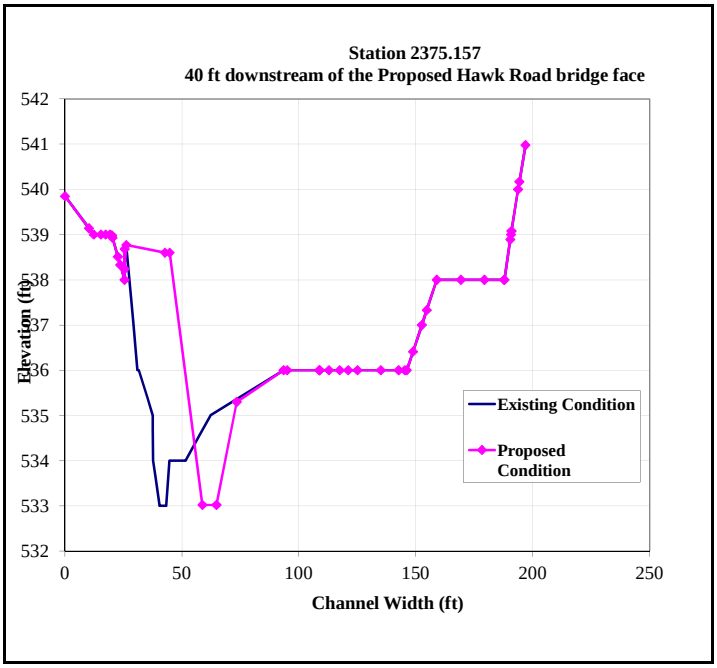


Figure 5. Cross Section Comparison between Existing and Proposed Conditions at Model Stations: 2466 and 2375

1243 Alpine Road, Suite 108
Walnut Creek, CA 94596
Phone: 925.941.0017
Fax: 925.941.0018
www.wreco.com

The downstream boundary condition was defined as the WSE downstream of the Vasco Road bridge, which is 523.2 ft North American Vertical Datum (NAVD), as estimated from FEMA's HEC-2 model run for the 1,040 cfs flow.

Water Surface Elevations

The 100-year WSEs for the existing and proposed conditions are summarized in Table 1.

Table 2. Hydraulic Summary

HEC-RAS Model Station	Distance from Proposed Hawk Street Bridge Faces (ft)	Water Surface Elevation	
		Existing (ft)	Proposed (ft)
3715	1,241 ft upstream	546.12	546.12
2712	238 ft upstream	540.25	540.25
2595	121 ft upstream	539.33	539.46
2488	14 ft upstream	538.01	538.83
2467	7 ft upstream	537.98	538.66
2488	22 ft downstream	537.81	537.69
2375	40 ft downstream	537.68	537.68

Detailed HEC-RAS results are attached with this memorandum in Appendix A. Per the analysis, the proposed bridge would raise the WSE 7 ft upstream of the bridge by approximately 0.70 ft. This increase is due to the fill proposed in the realigned section of the channel, which reduces the conveyance capacity of the channel. Although the proposed project will increase the WSE under the proposed bridge in the proposed condition, the design WSE would be contained within the banks of the channel (see Figure 6). The soffit elevation of the bridge is 540.76 ft NAVD88, and the WSE at the cross section 7 ft upstream of the proposed bridge is 538.66 ft. Therefore, even though there is an increase in the WSE due to the construction of the bridge, the proposed bridge would meet the Zone 7 Water Agency's criterion of passing the 100-year flood with 2 ft of freeboard. Moreover, the proposed realignment of Altamont Creek and installation of Hawk Street bridge would only have a local impact on the design 100-year WSE (see Figure 7). The difference in the 100-year WSE at the cross sections at HEC-RAS model station 2712 (approximately 238 ft upstream of the proposed Hawk Street bridge face) would be less than 0.1 ft, which would be considered an insignificant elevation difference.

WRECO also evaluated the various widths for the low flow channel to determine the width that would provide no increase in the WSE due to the proposed bridge. Based on the calculations, the proposed realigned channel needs to be 30 ft wide in order for the water surface to remain at the existing condition levels.

The results from the hydraulic analyses indicate that the hydraulic grade line profile in the proposed condition would be contained within the floodway in the vicinity of the bridge site. There would be a local increase in the water surface elevation at the bridge site due to the proposed bridge construction.

1243 Alpine Road, Suite 108
Walnut Creek, CA 94596
Phone: 925.941.0017
Fax: 925.941.0018
www.wreco.com

However, the requirement of at least 2 ft of freeboard is met under the bridge soffit for the design flow of 1,040 cfs.

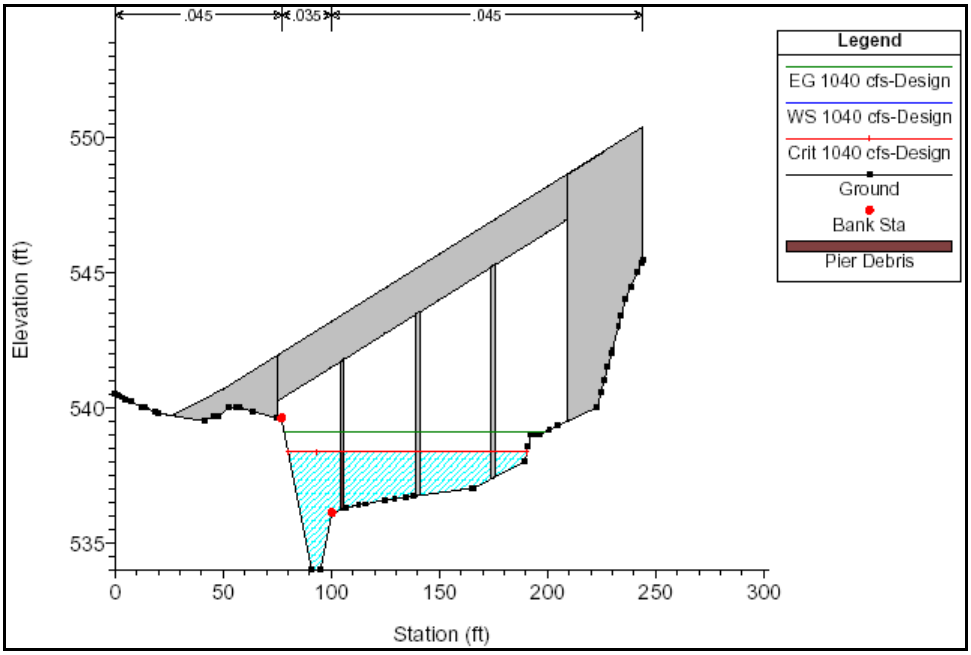


Figure 6. HEC-RAS Cross Section at the Upstream Face of the Bridge

Floodplain Analysis

Another objective of the memorandum was to determine the extent of the floodplain for the 100-year storm event using the 1,040 cfs of flood flow, provided by Zone 7. After performing the steady state hydraulic modeling with HEC-RAS, the flood profile was imported into Arc Map. The floodplain was mapped using the post processing tool in Arc Map. The floodplain for the Altamont Creek with the proposed Hawk Street Bridge is shown in Figure 8. The floodplain concluded in this study is not identical to the one provided in the FEMA FIRM (Appendix B). The following could be the causes of the discrepancies in floodplain boundaries between the floodplains presented in the current study and the FEMA FIRM:

- The floodplain boundaries in the current study are based on more recent survey than the FEMA FIRM.
- The 100-year flow used in the current study is 1,040 cfs, which is higher than the FEMA FIS flow of 720 cfs. Therefore, the water surface elevations for the base flood are higher compared with the elevations in the FEMA FIRM.

WRECO's analysis showed that the adjacent development south of the Altamont Creek between the Vasco Road and Hawk Street will not be in 100-year floodplain as currently shown in the FEMA's FIRM. The current FEMA FIRM is no longer valid and the city or the developer may need to apply for the Letter of Map Revision (LOMR) to update the FEMA FIRM. WRECO's analysis can be used to support the LOMR.

1243 Alpine Road, Suite 108
Walnut Creek, CA 94596
Phone: 925.941.0017
Fax: 925.941.0018
www.wreco.com

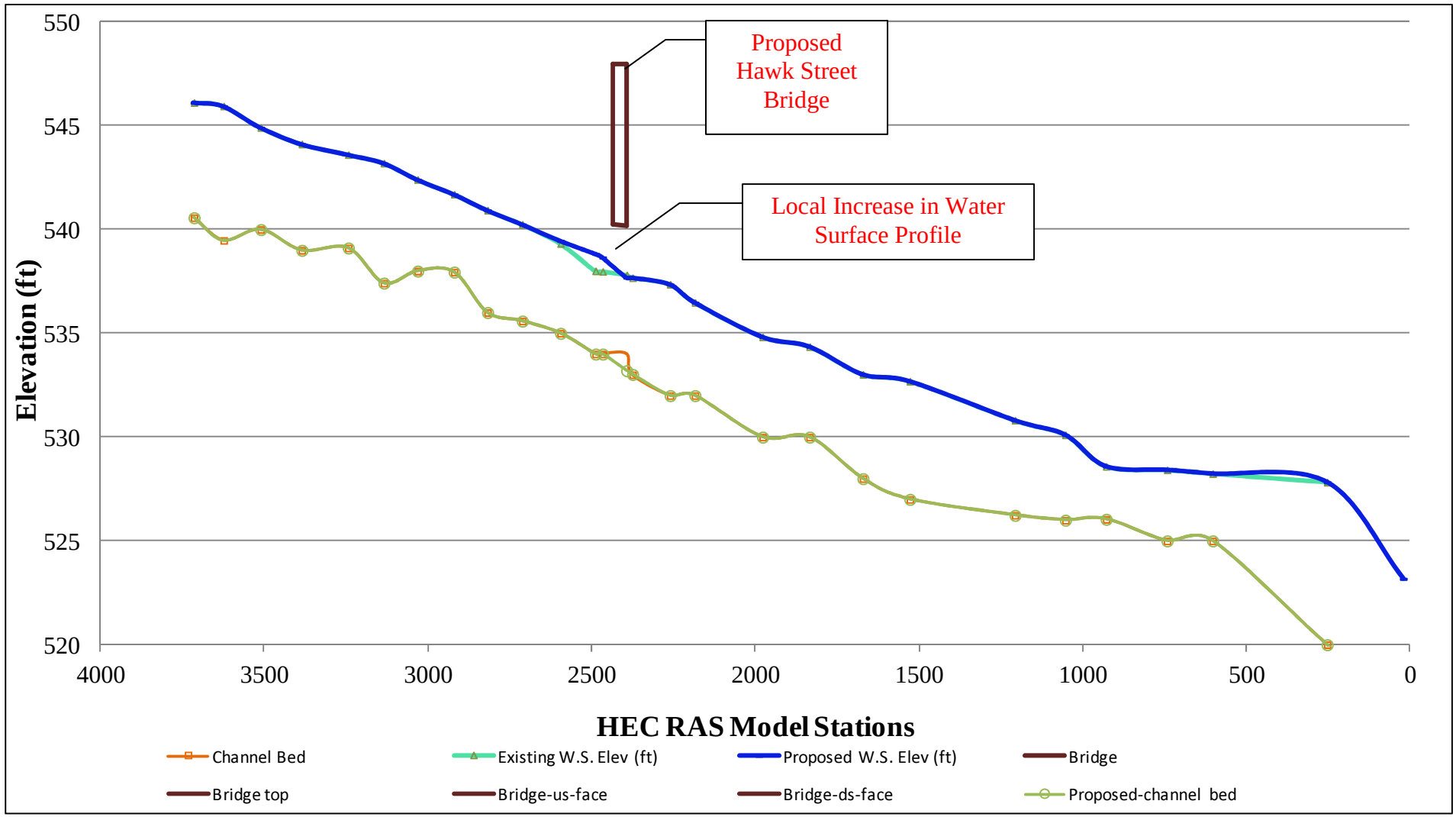


Figure 7. Water Surface Elevation Comparison for the Existing and Proposed Conditions

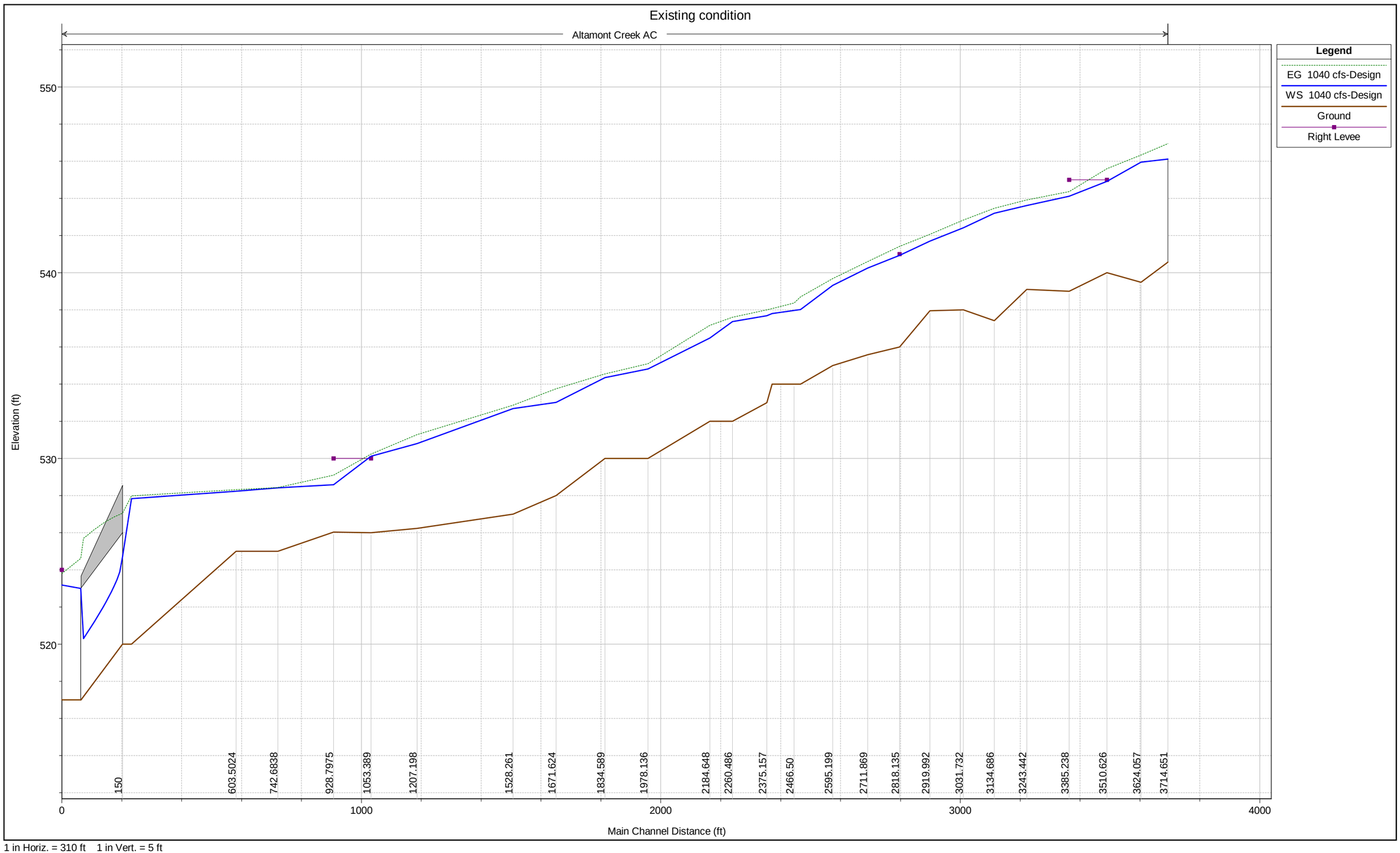
1243 Alpine Road, Suite 108
Walnut Creek, CA 94596
Phone: 925.941.0017
Fax: 925.941.0018
www.wreco.com

Figure 8. Floodplain for 100-year Event (1,040 cfs) with the Proposed Hawk Street Bridge over Altamont Creek.

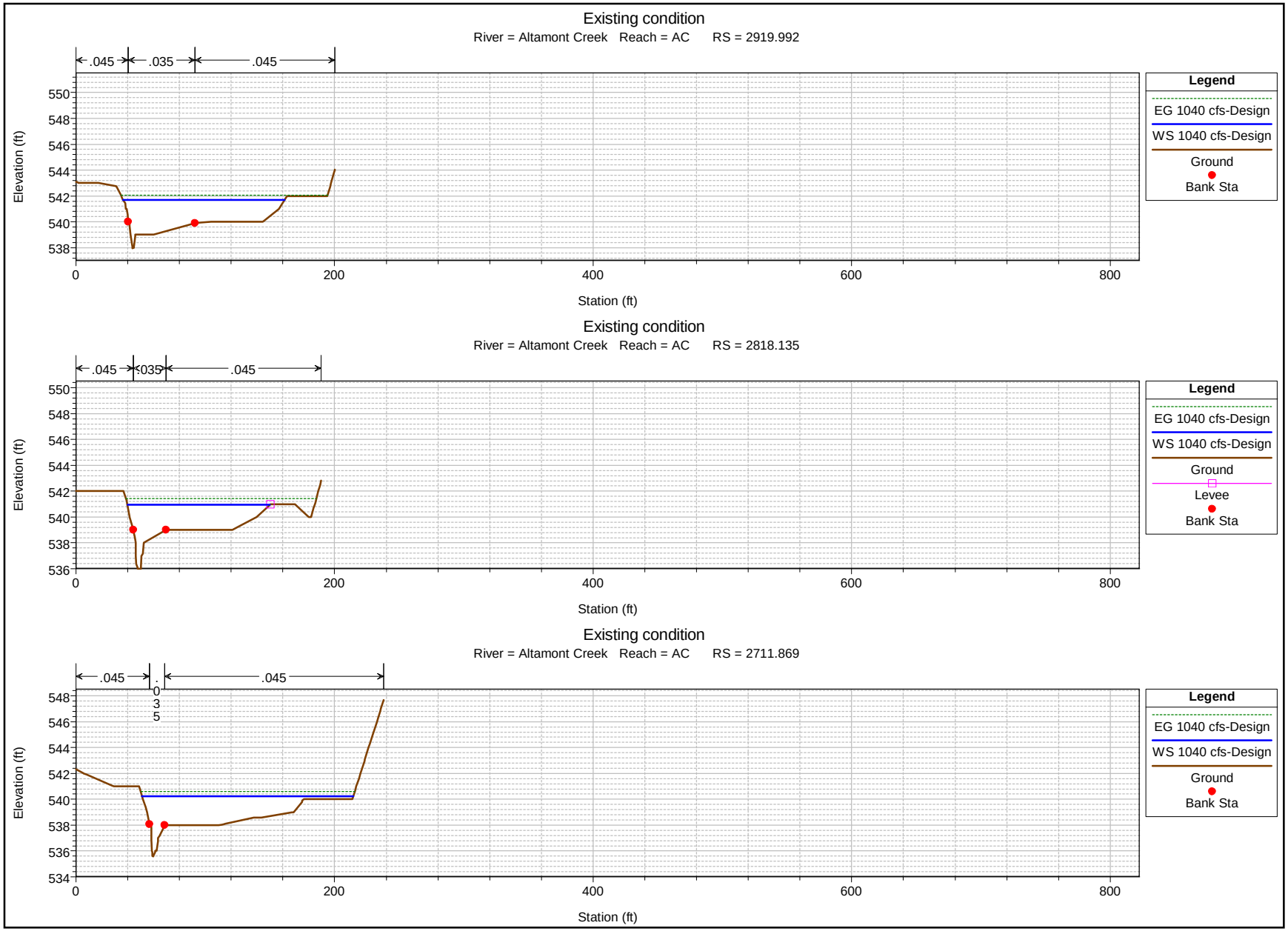
1243 Alpine Road, Suite 108
Walnut Creek, CA 94596
Phone: 925.941.0017
Fax: 925.941.0018
www.wreco.com

Appendix A - Hydraulics Analysis Results

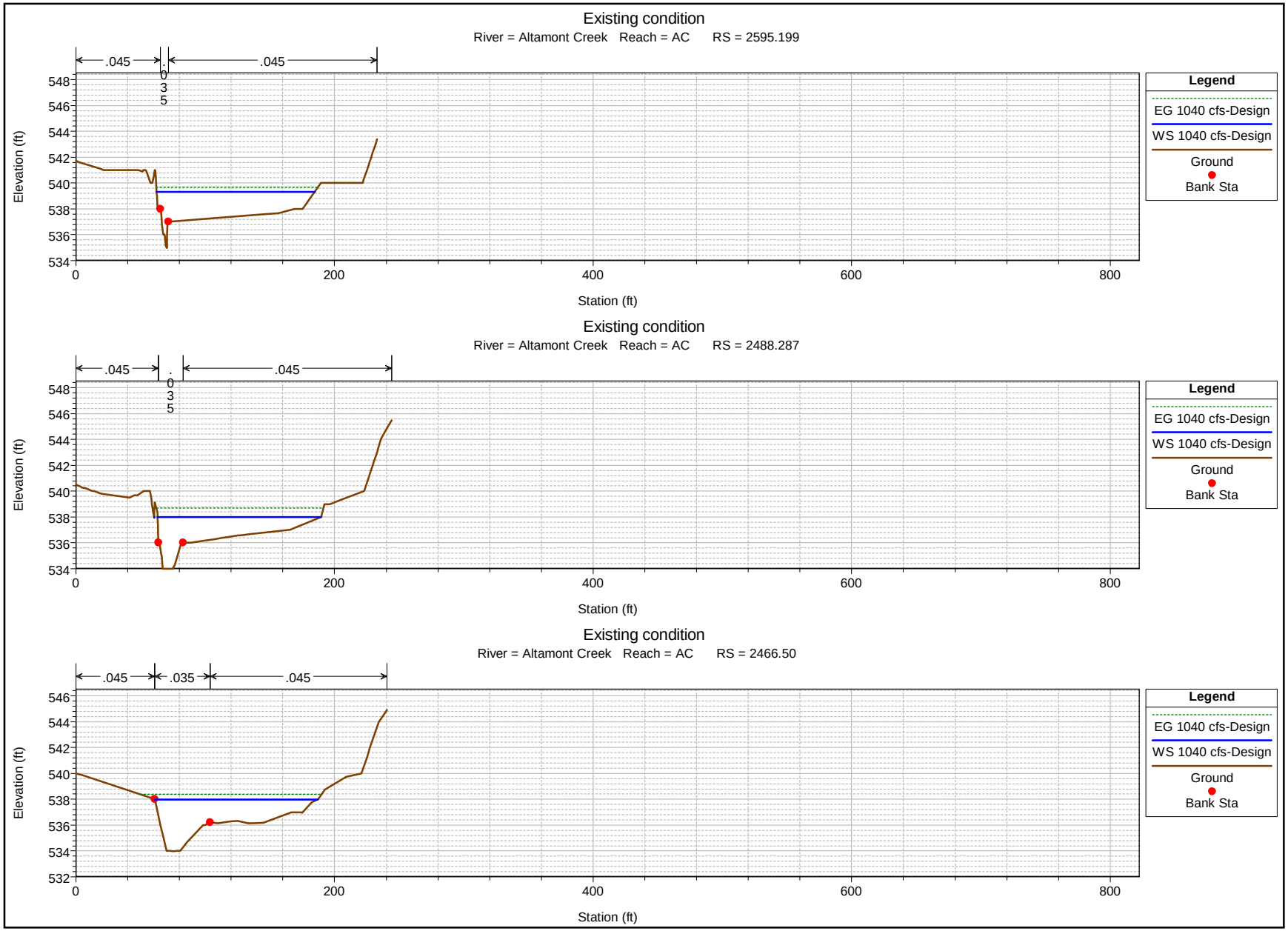
Existing condition



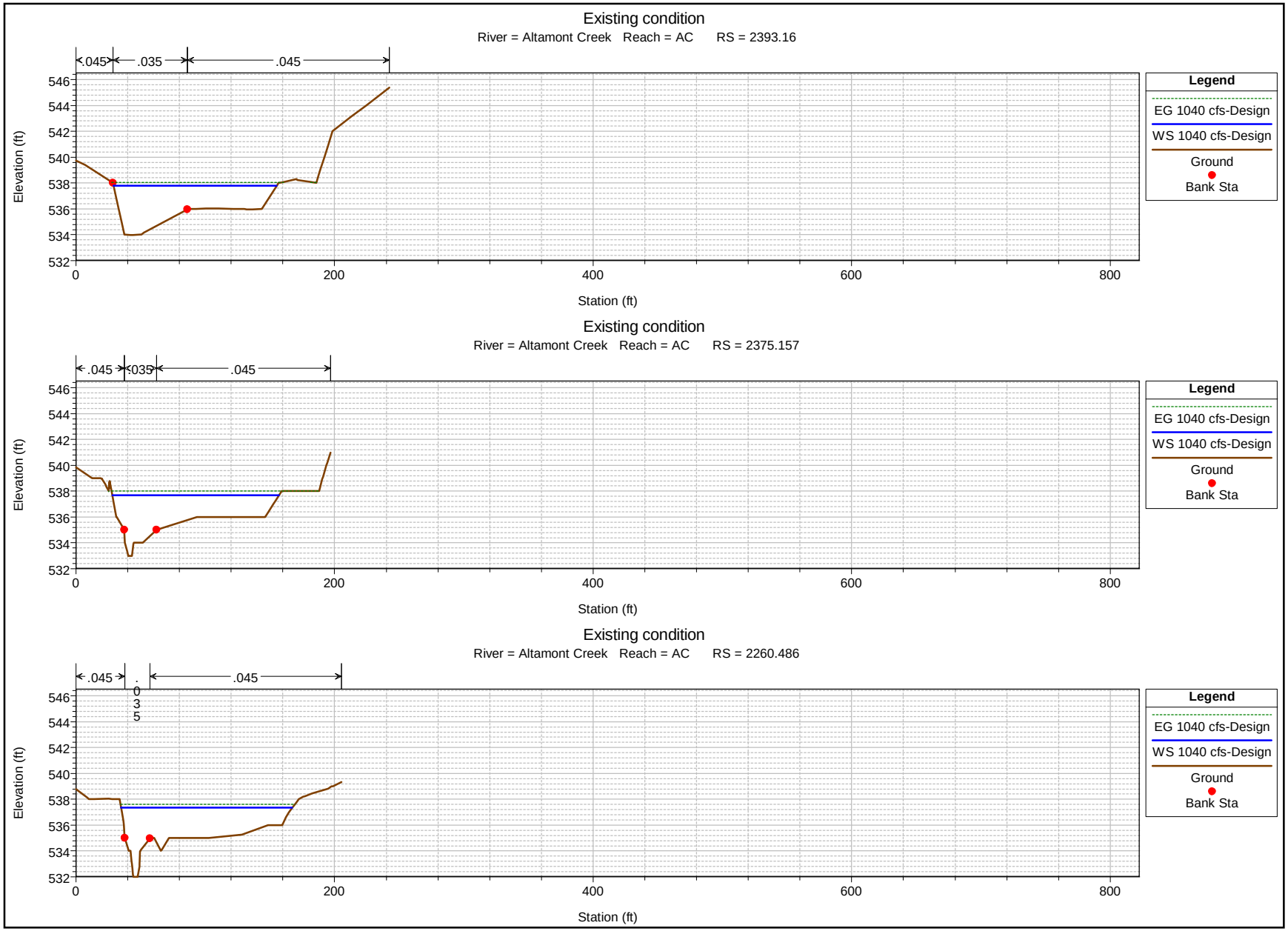
1 in Horiz. = 310 ft 1 in Vert. = 5 ft



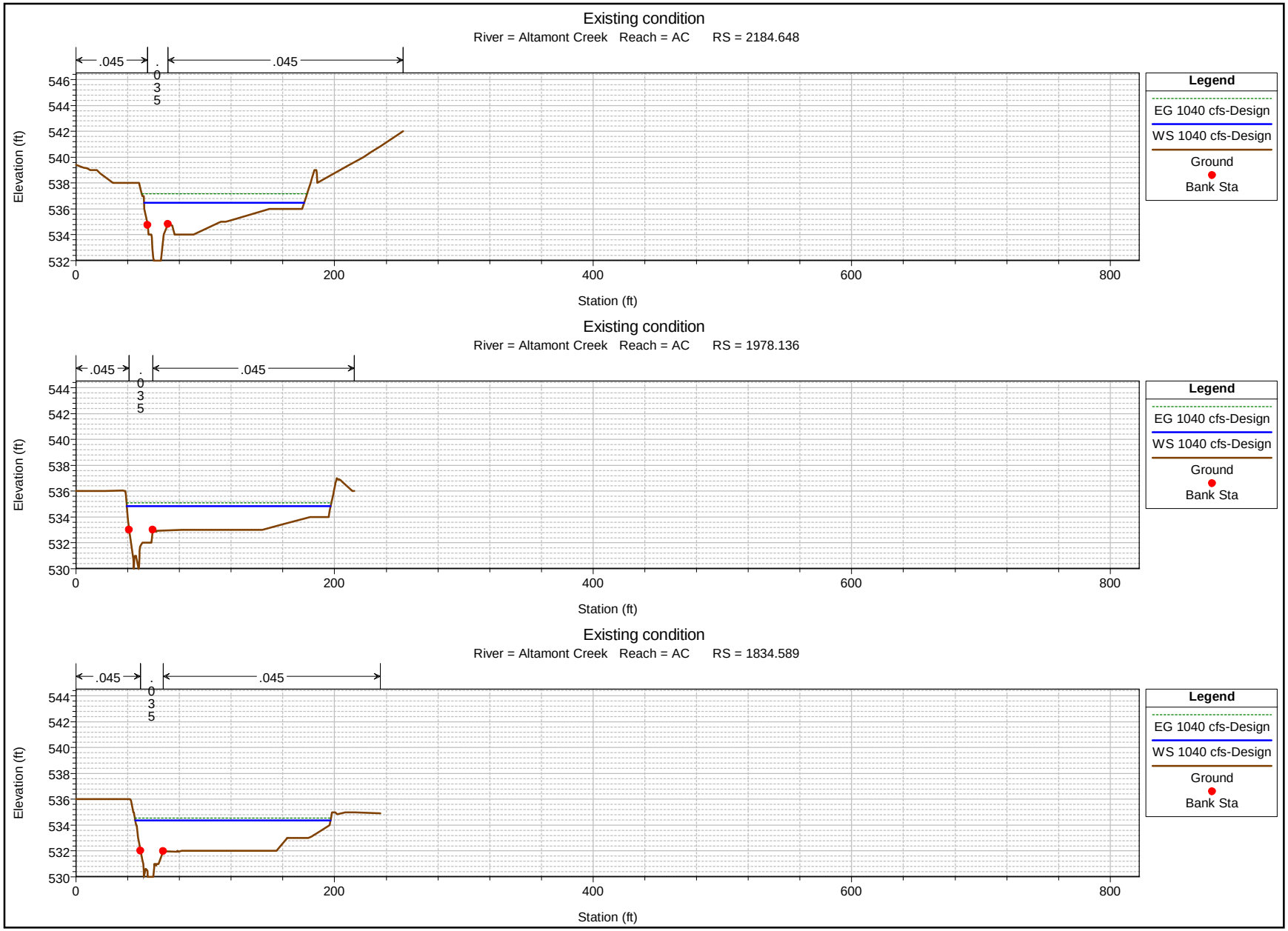
1 in Horiz. = 110 ft 1 in Vert. = 11 ft



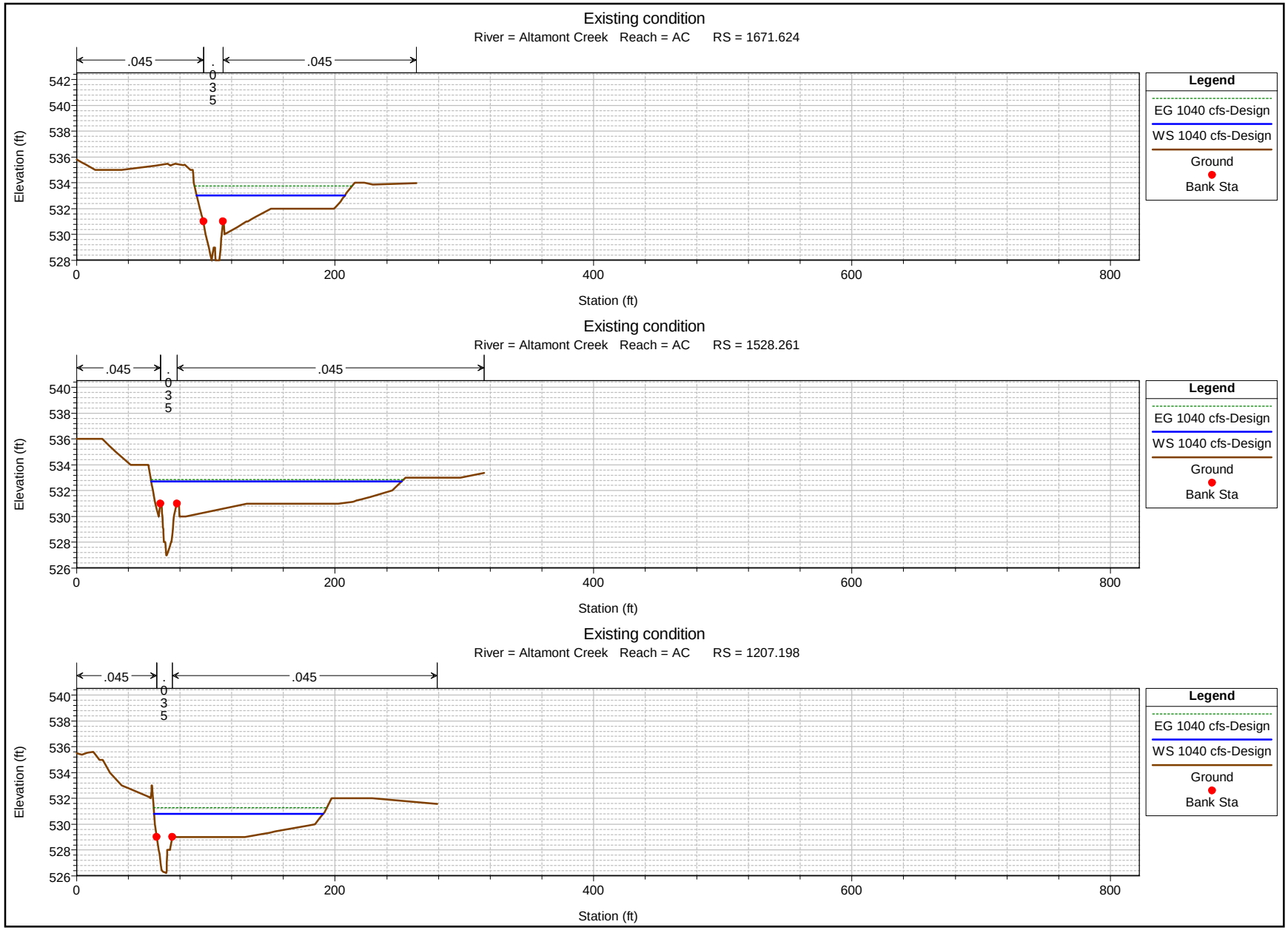
1 in Horiz. = 110 ft 1 in Vert. = 11 ft



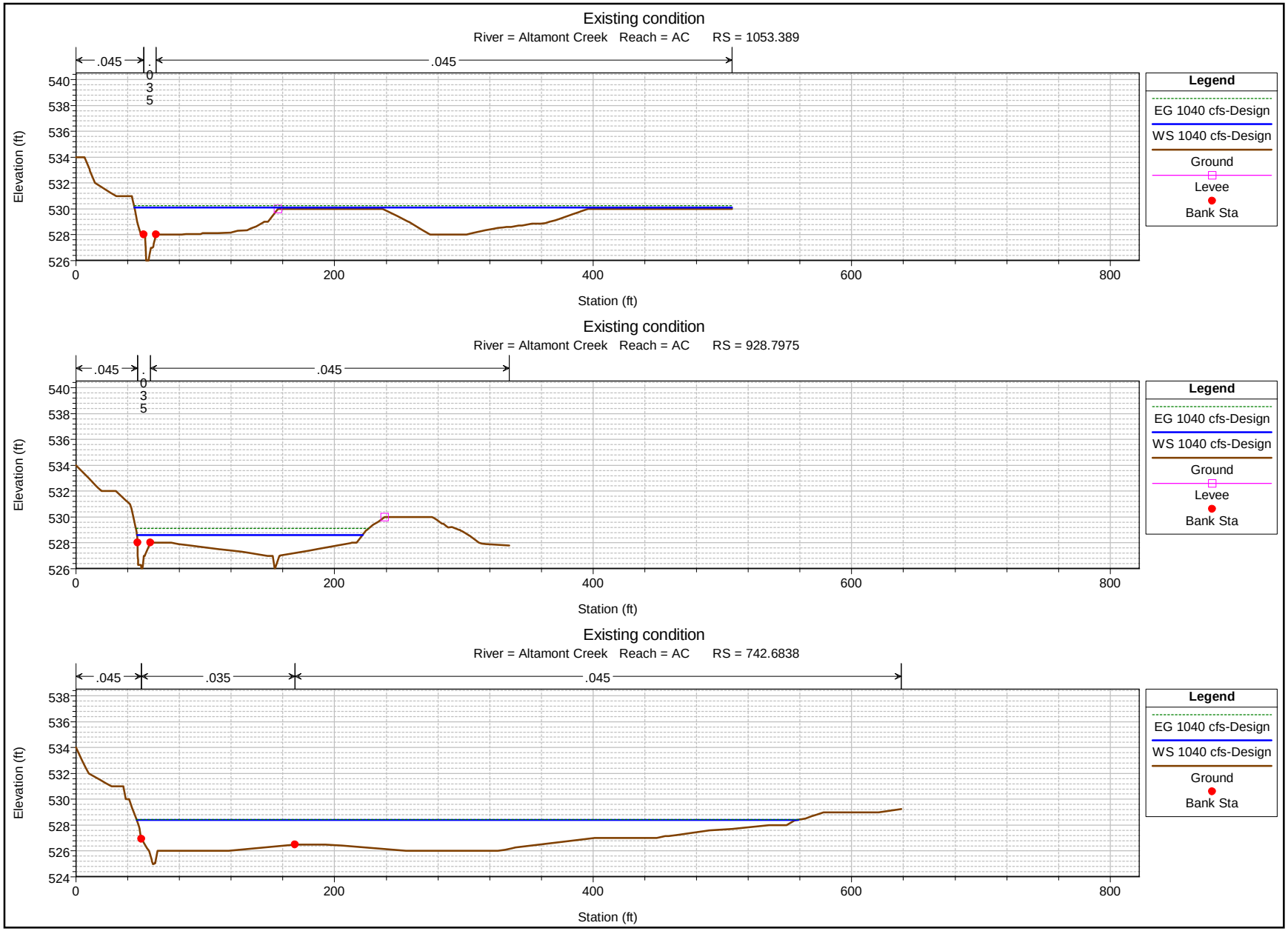
1 in Horiz. = 110 ft 1 in Vert. = 11 ft



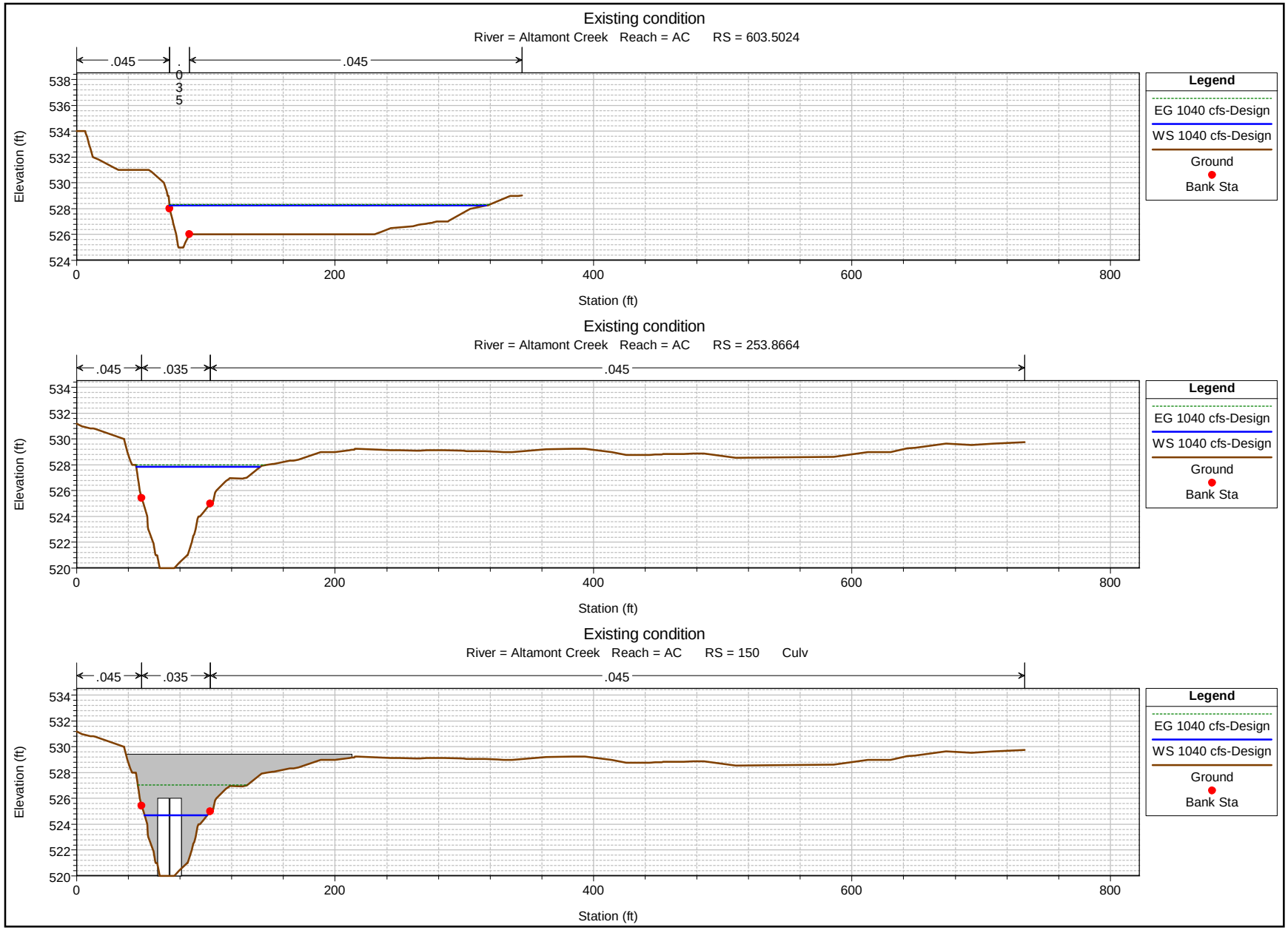
1 in Horiz. = 110 ft 1 in Vert. = 11 ft



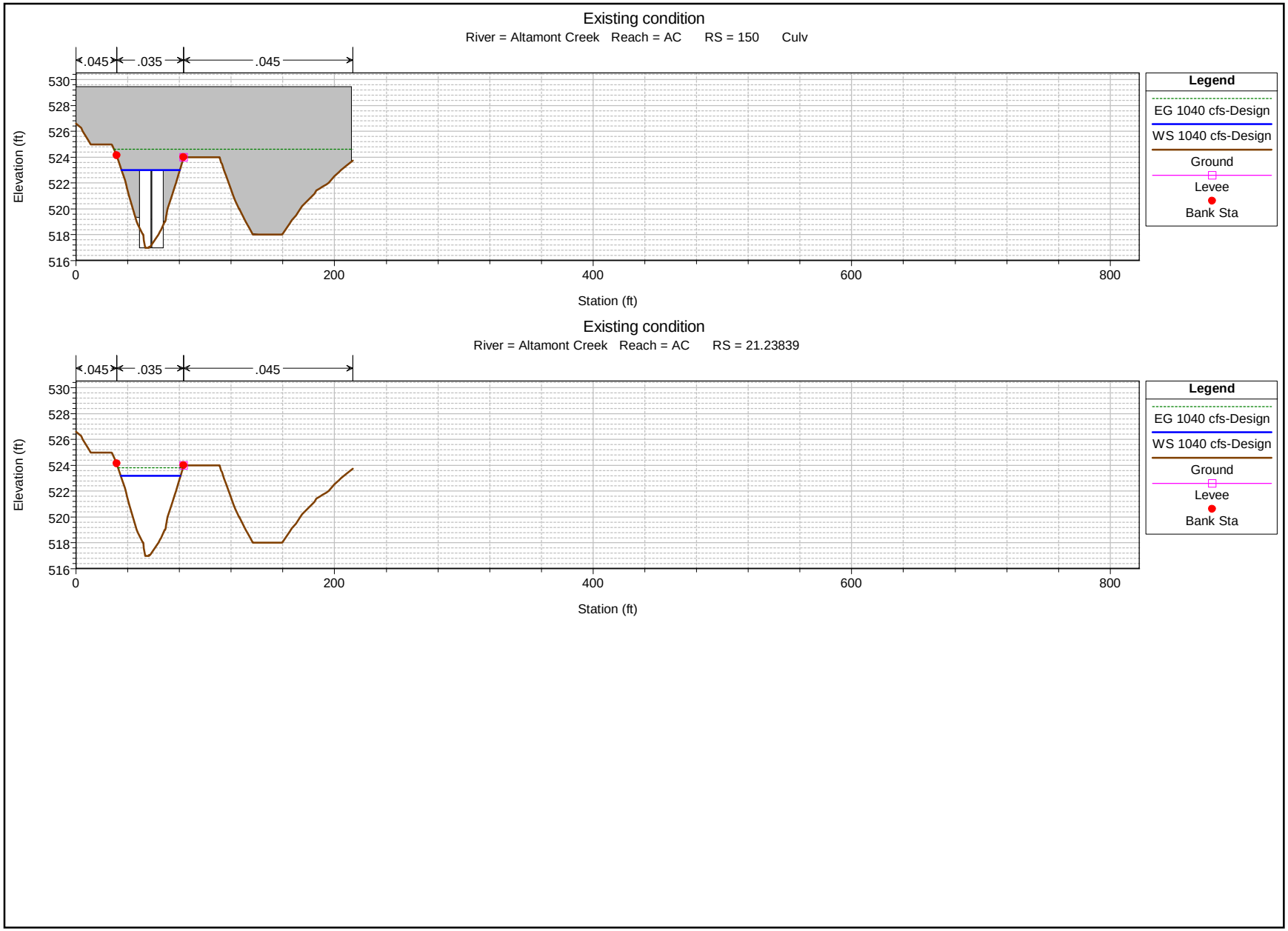
1 in Horiz. = 110 ft 1 in Vert. = 11 ft



1 in Horiz. = 110 ft 1 in Vert. = 11 ft



1 in Horiz. = 110 ft 1 in Vert. = 11 ft



1 in Horiz. = 110 ft 1 in Vert. = 11 ft

HEC-RAS Plan: Exist River: Altamont Creek Reach: AC Profile: 1040 cfs-Design

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
AC	3714.651	1040 cfs-Design	1040.00	540.57	546.12	545.73	546.96	0.006738	7.51	159.16	84.37	0.73
AC	3624.057	1040 cfs-Design	1040.00	539.48	545.95	545.51	546.34	0.004403	6.12	255.53	134.38	0.54
AC	3510.626	1040 cfs-Design	1040.00	540.00	544.92	544.92	545.61	0.009268	8.93	197.79	118.39	0.80
AC	3385.238	1040 cfs-Design	1040.00	539.00	544.12	543.50	544.36	0.002695	4.80	324.50	178.23	0.46
AC	3243.442	1040 cfs-Design	1040.00	539.11	543.61		543.92	0.003557	4.85	264.12	139.76	0.52
AC	3134.686	1040 cfs-Design	1040.00	537.42	543.20		543.48	0.004501	5.75	269.51	126.94	0.49
AC	3031.732	1040 cfs-Design	1040.00	538.00	542.41		542.83	0.008921	7.54	218.16	125.50	0.76
AC	2919.992	1040 cfs-Design	1040.00	537.95	541.70		542.07	0.005281	5.52	234.85	124.94	0.62
AC	2818.135	1040 cfs-Design	1040.00	536.00	540.93	540.59	541.42	0.007344	6.98	209.52	110.00	0.72
AC	2711.869	1040 cfs-Design	1040.00	535.59	540.25		540.61	0.007247	7.23	252.85	163.31	0.70
AC	2595.199	1040 cfs-Design	1040.00	535.00	539.33		539.68	0.008623	6.42	224.00	122.35	0.65
AC	2488.287	1040 cfs-Design	1040.00	534.00	538.01	538.01	538.71	0.008925	8.58	199.68	126.37	0.83
AC	2466.50	1040 cfs-Design	1040.00	534.00	537.98		538.37	0.004752	5.80	238.38	126.04	0.61
AC	2393.16	1040 cfs-Design	1040.00	534.00	537.81		538.07	0.002864	4.57	280.24	126.38	0.47
AC	2375.157	1040 cfs-Design	1040.00	533.00	537.68		538.00	0.003542	5.79	272.32	128.83	0.53
AC	2260.486	1040 cfs-Design	1040.00	532.00	537.36		537.60	0.003056	5.24	299.15	132.41	0.48
AC	2184.648	1040 cfs-Design	1040.00	532.00	536.49	536.49	537.17	0.010177	8.80	196.05	123.88	0.85
AC	1978.136	1040 cfs-Design	1040.00	530.00	534.83		535.11	0.005076	5.88	277.73	157.72	0.58
AC	1834.589	1040 cfs-Design	1040.00	530.00	534.36		534.56	0.002841	4.90	326.50	150.96	0.46
AC	1671.624	1040 cfs-Design	1040.00	528.00	533.02	533.02	533.76	0.008606	8.88	195.29	114.64	0.78
AC	1528.261	1040 cfs-Design	1040.00	527.00	532.69		532.86	0.003080	4.96	355.88	193.68	0.45
AC	1207.198	1040 cfs-Design	1040.00	526.23	530.81		531.29	0.008838	7.95	217.88	130.88	0.76
AC	1053.389	1040 cfs-Design	1040.00	526.00	530.11	529.77	530.24	0.004499	5.45	447.45	462.37	0.54
AC	928.7975	1040 cfs-Design	1040.00	526.04	528.59	528.59	529.10	0.024314	8.20	187.75	174.45	1.12
AC	742.6838	1040 cfs-Design	1040.00	525.00	528.42		528.44	0.000434	1.54	918.43	511.96	0.18
AC	603.5024	1040 cfs-Design	1040.00	525.00	528.24		528.32	0.001909	3.19	461.29	245.02	0.37
AC	253.8664	1040 cfs-Design	1040.00	520.00	527.83	523.81	527.98	0.000566	3.21	358.70	95.54	0.23
AC	150		Culvert									
AC	21.23839	1040 cfs-Design	1040.00	517.00	523.18	521.84	523.80	0.004303	6.32	164.63	46.10	0.59

Proposed condition

Altamont Creek AC

Legend

EG 1040 cfs-Design

WS 1040 cfs-Design

Ground

Left Levee

Right Levee

Elevation (ft)

550

540

530

520

150 North Vasco Lan...

603.5024

742.6838

928.7975

1053.389

1207.198

1528.261

1671.624

1834.589

1978.136

2184.648

2260.486

2375.157

2400 Proposed Hawk Street Bridge

2595.199

2711.869

2818.135

2919.992

3031.732

3134.686

3243.442

3385.238

3510.626

3624.057

3714.651

0

1000

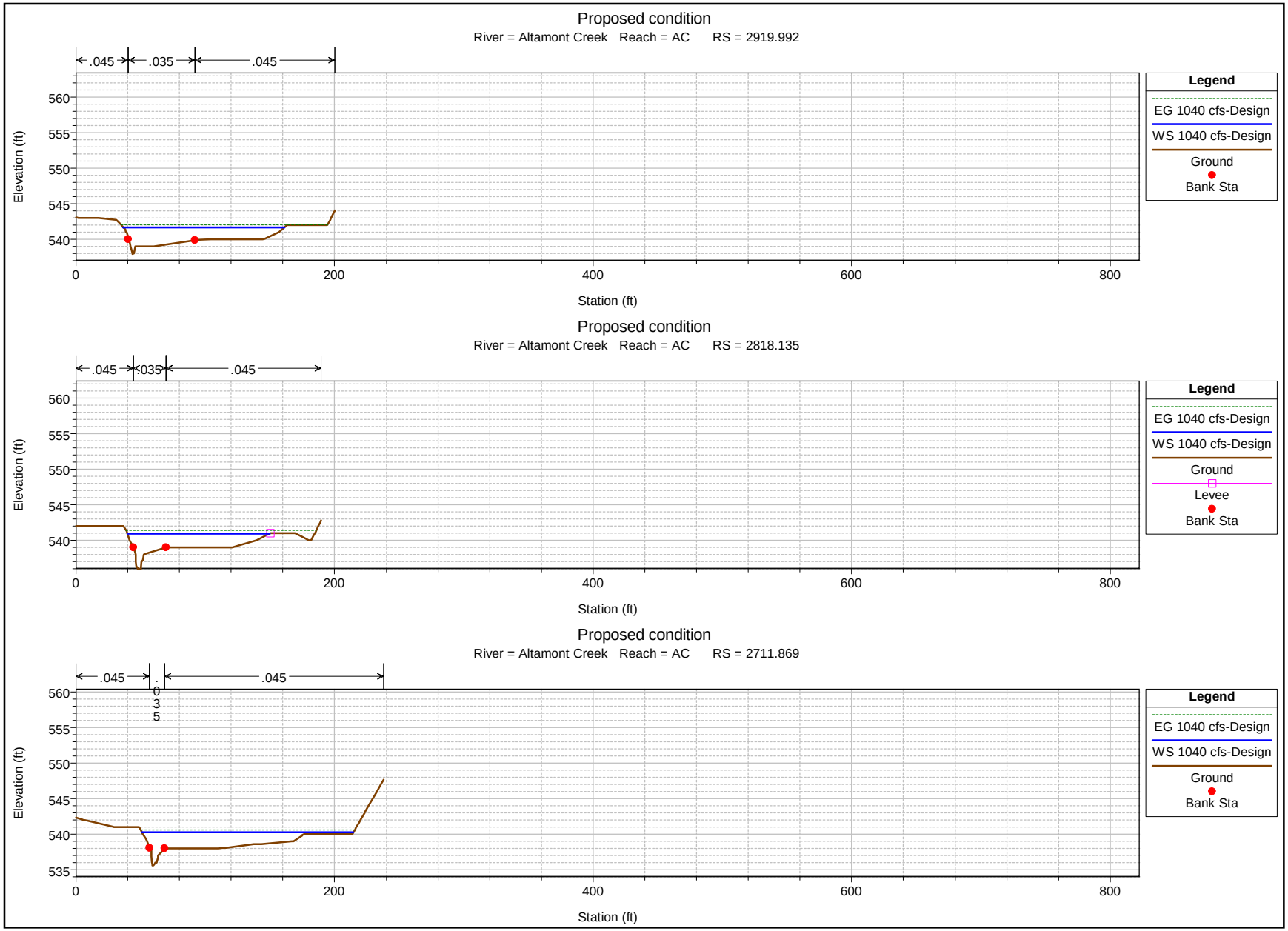
2000

3000

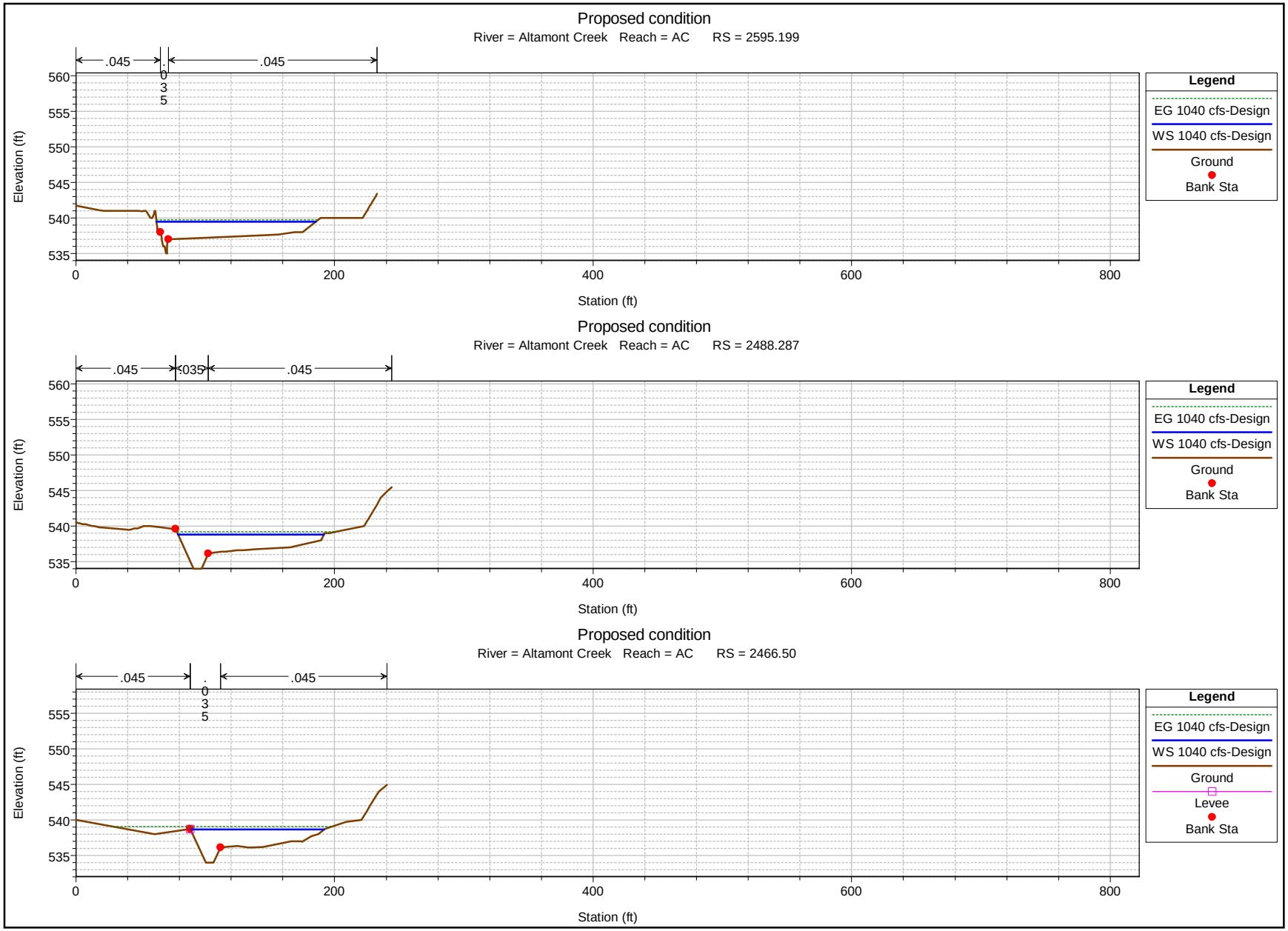
4000

Main Channel Distance (ft)

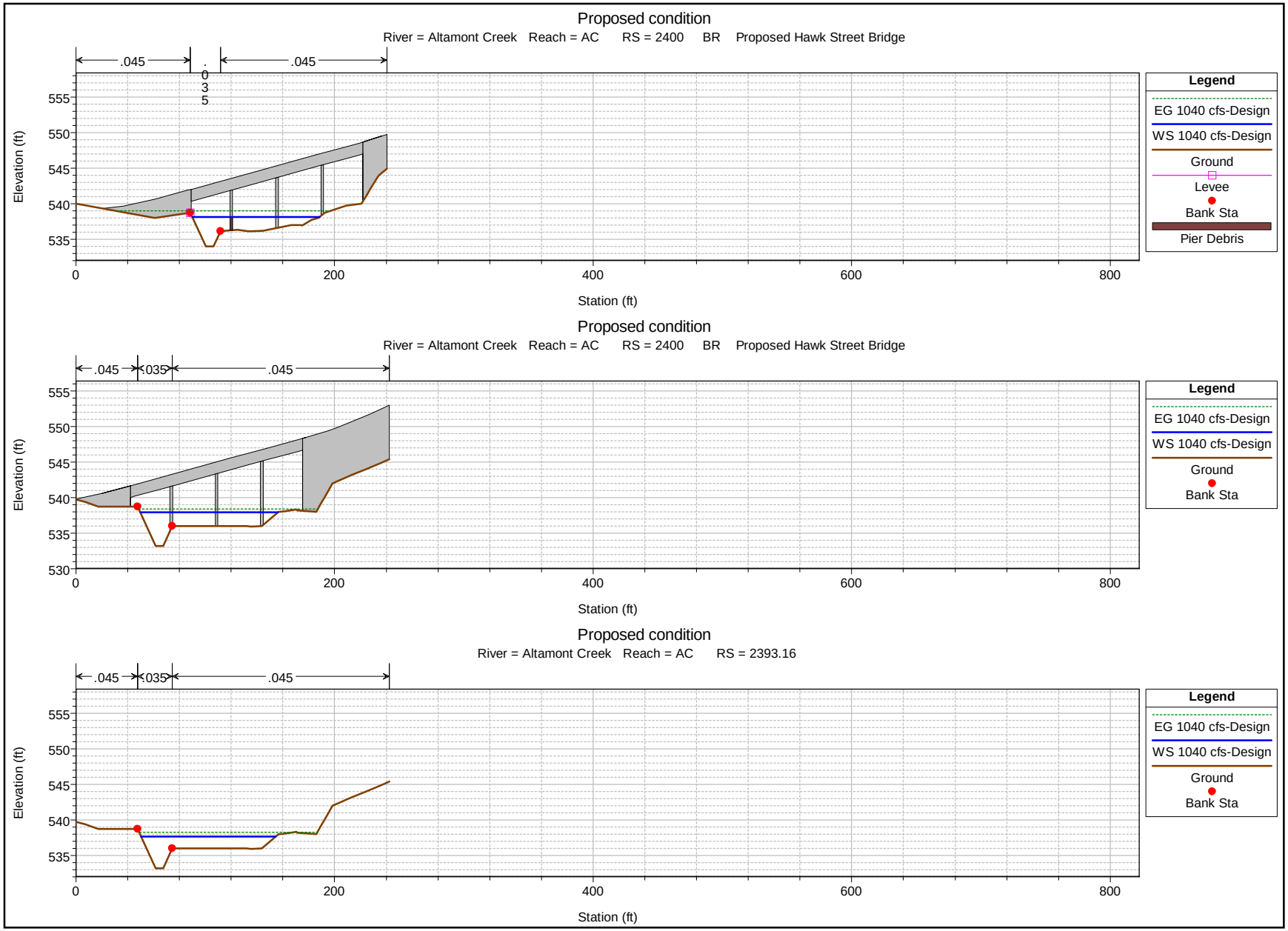
1 in Horiz. = 310 ft 1 in Vert. = 5 ft



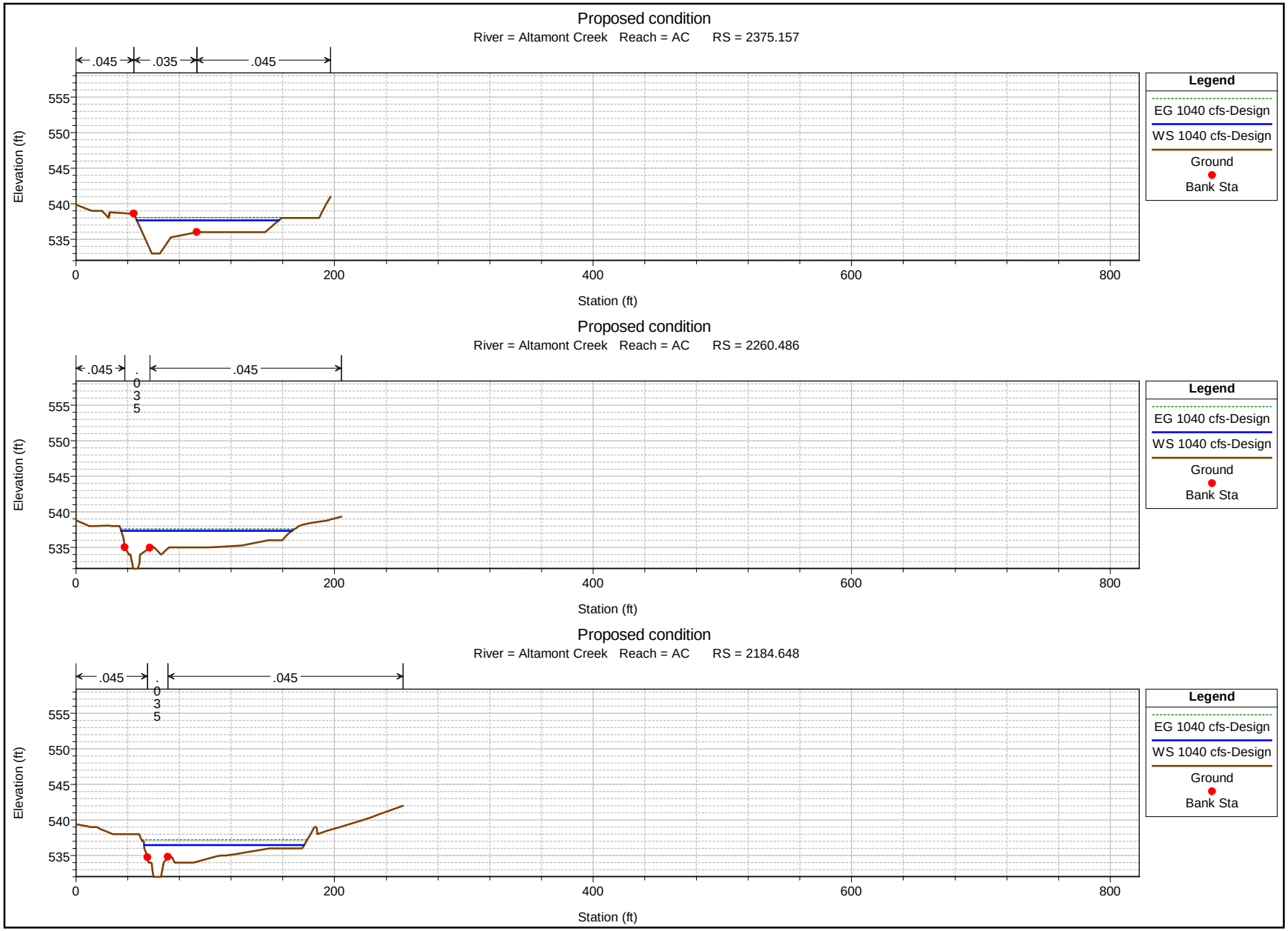
1 in Horiz. = 110 ft 1 in Vert. = 20 ft



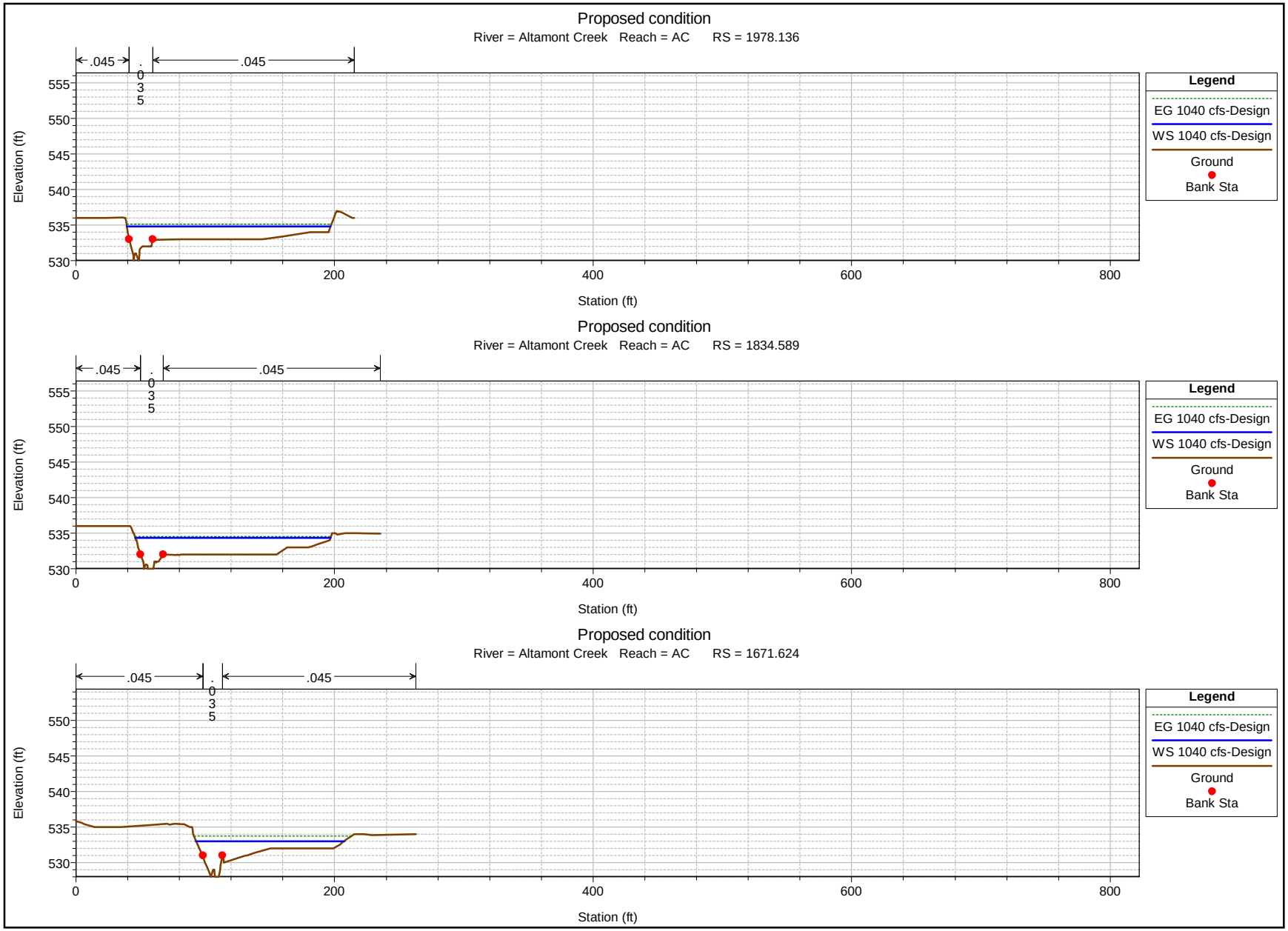
1 in Horiz. = 110 ft 1 in Vert. = 20 ft



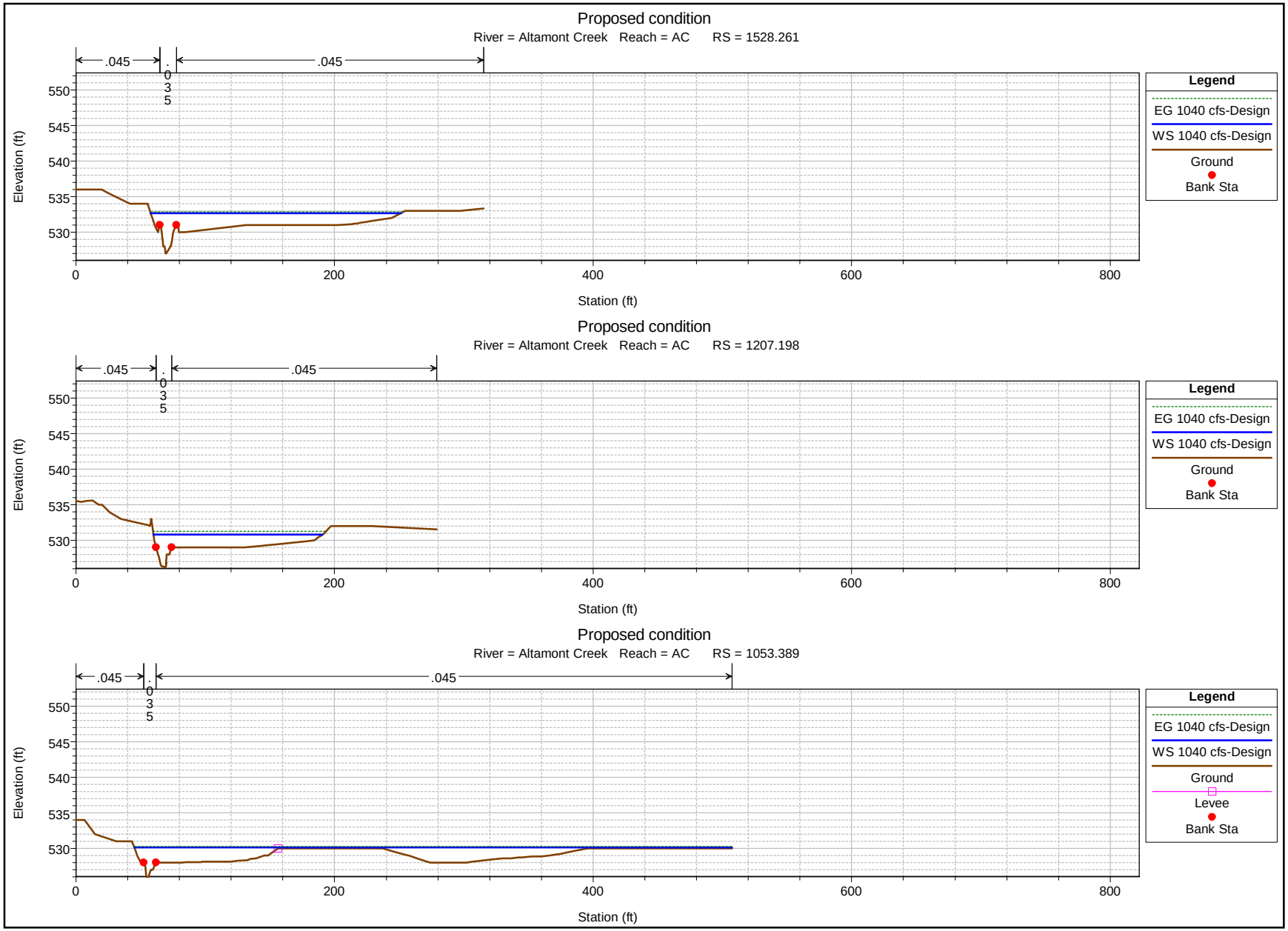
1 in Horiz. = 110 ft 1 in Vert. = 20 ft



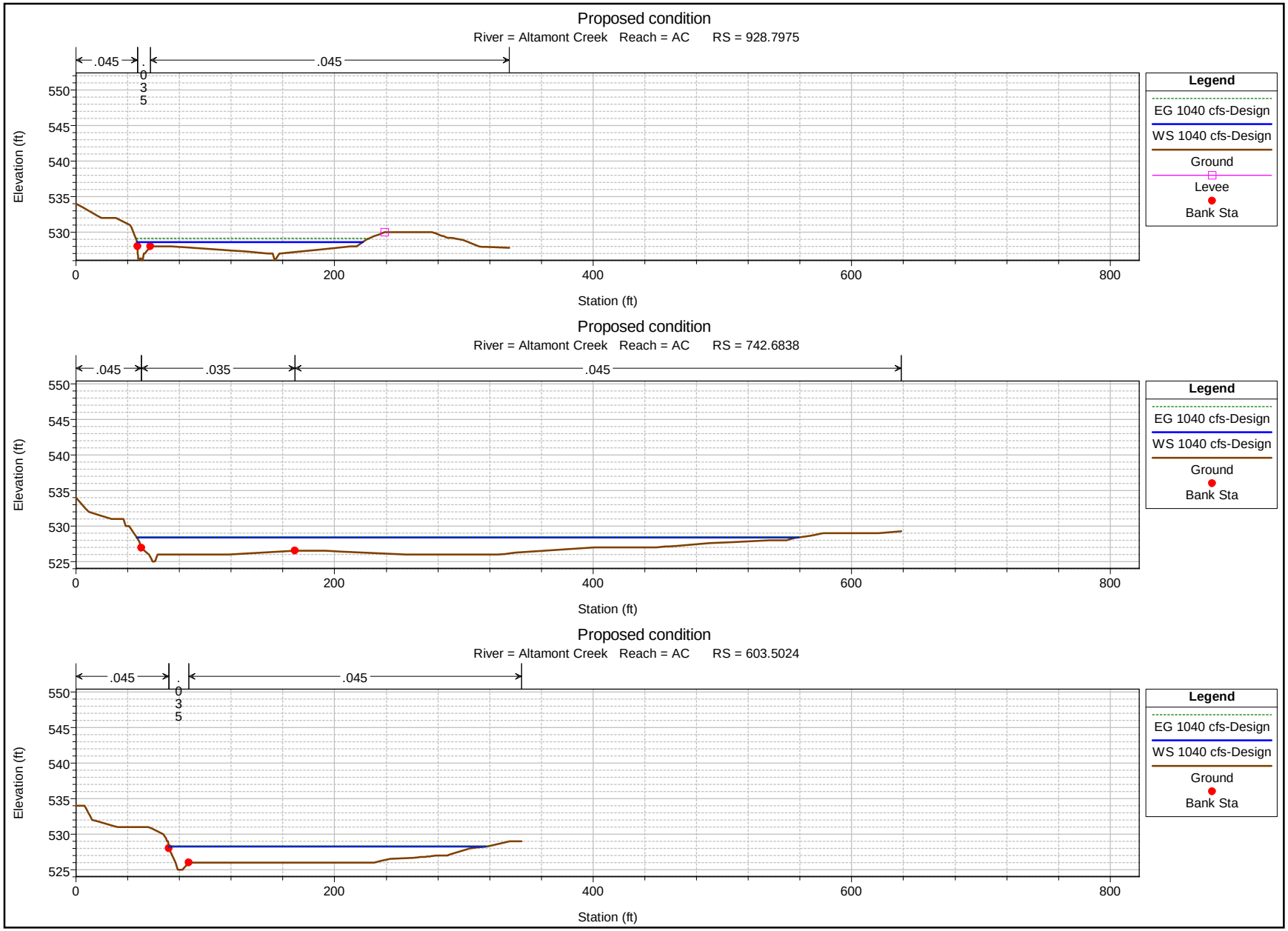
1 in Horiz. = 110 ft 1 in Vert. = 20 ft



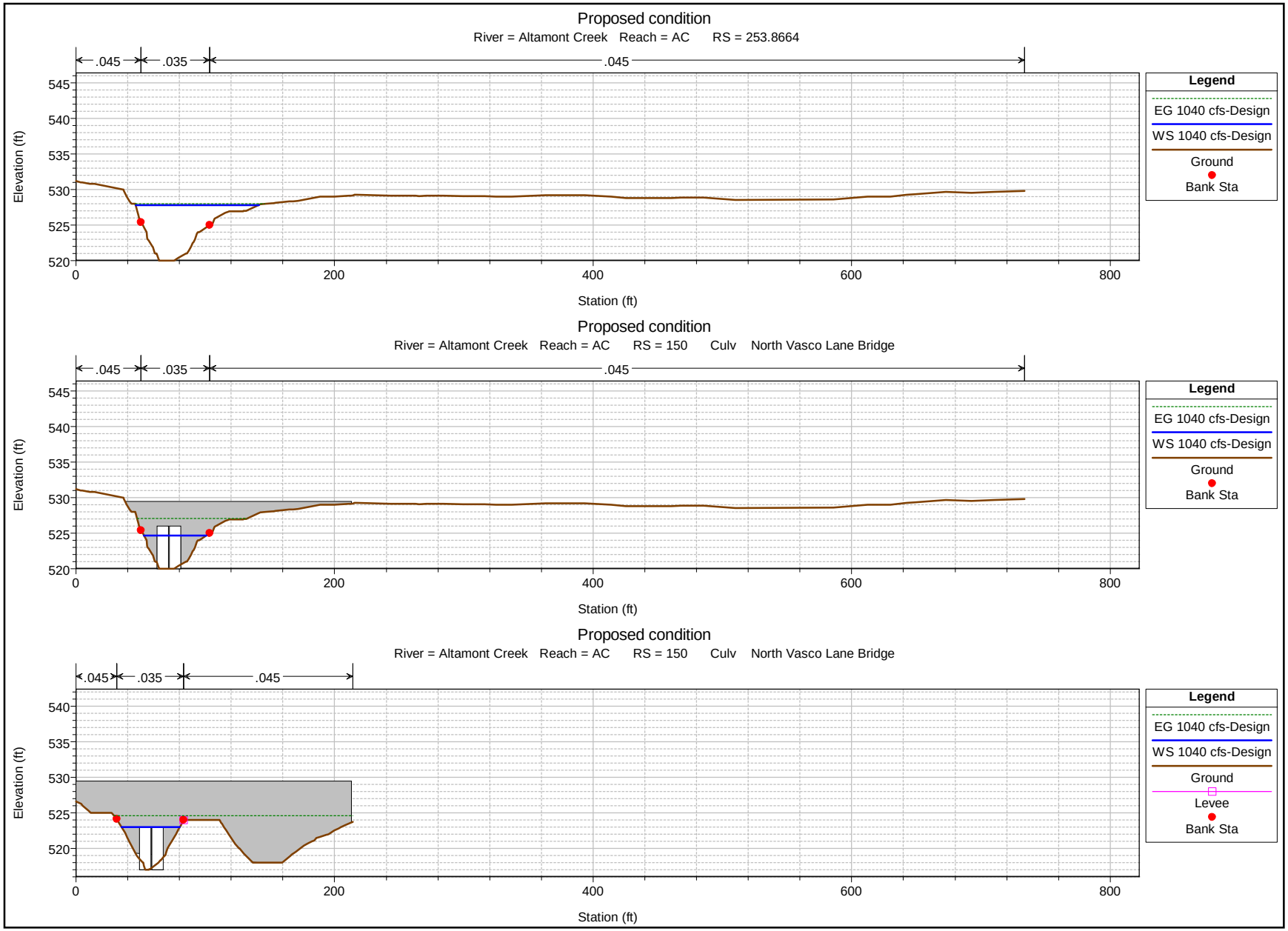
1 in Horiz. = 110 ft 1 in Vert. = 20 ft



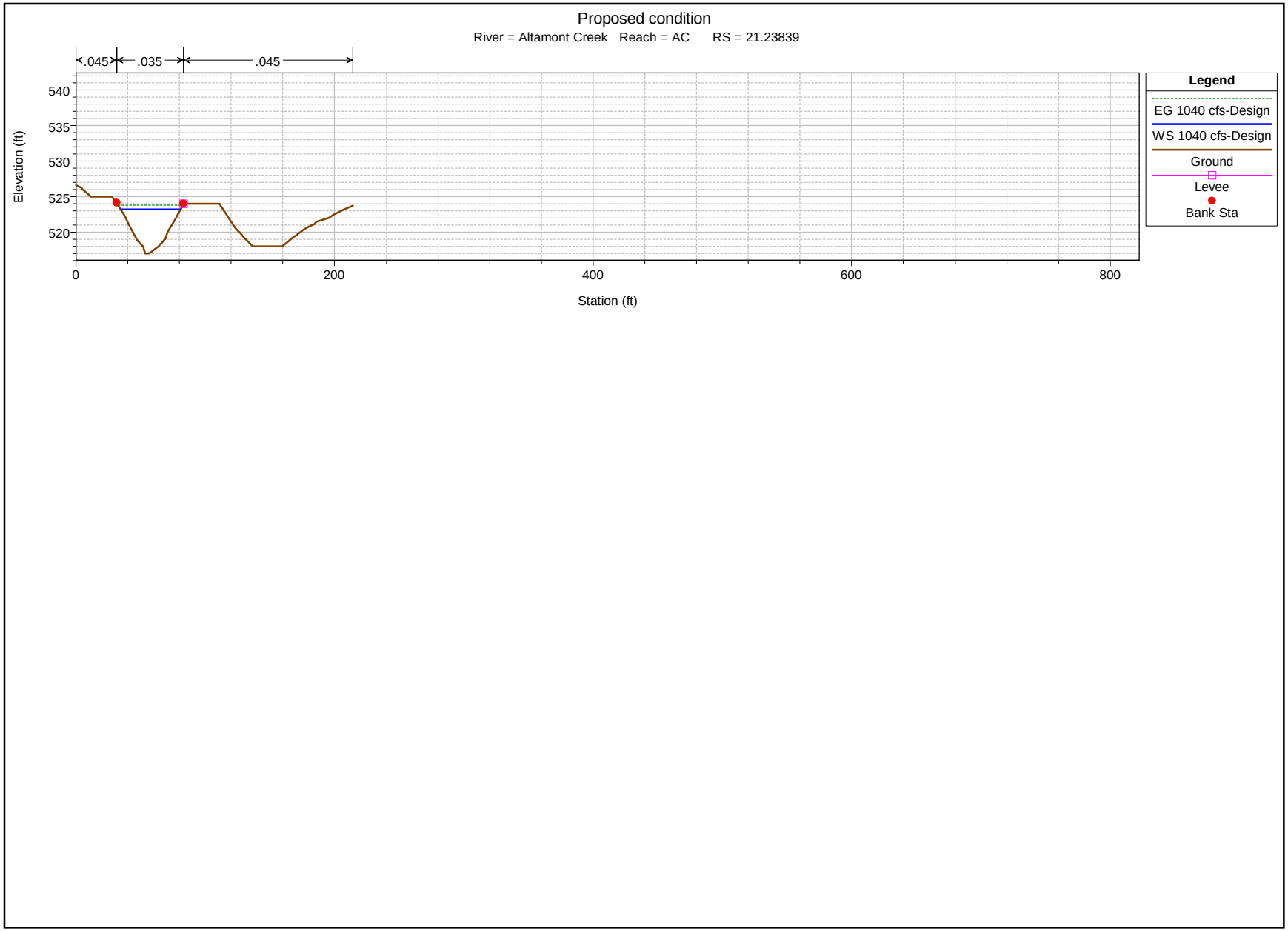
1 in Horiz. = 110 ft 1 in Vert. = 20 ft



1 in Horiz. = 110 ft 1 in Vert. = 20 ft



1 in Horiz. = 110 ft 1 in Vert. = 20 ft



1 in Horiz. = 110 ft 1 in Vert. = 20 ft

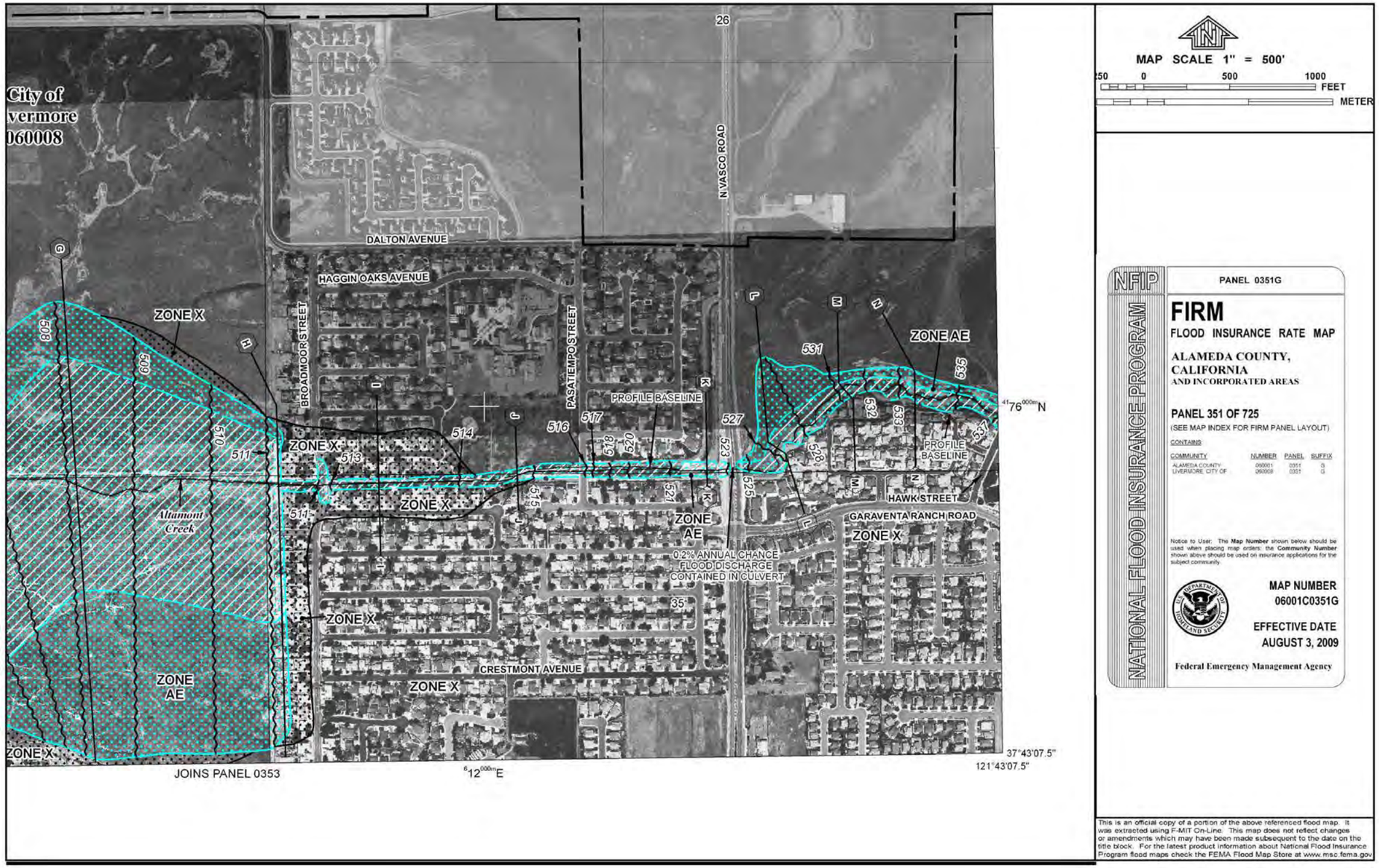
HEC-RAS Plan: Prop River: Altamont Creek Reach: AC Profile: 1040 cfs-Design

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
AC	3714.651	1040 cfs-Design	1040.00	540.57	546.12	545.73	546.96	0.006738	7.51	159.16	84.37	0.73
AC	3624.057	1040 cfs-Design	1040.00	539.48	545.95	545.51	546.34	0.004403	6.12	255.53	134.38	0.54
AC	3510.626	1040 cfs-Design	1040.00	540.00	544.92	544.92	545.61	0.009268	8.93	197.79	118.39	0.80
AC	3385.238	1040 cfs-Design	1040.00	539.00	544.12	543.50	544.36	0.002695	4.80	324.50	178.23	0.46
AC	3243.442	1040 cfs-Design	1040.00	539.11	543.61		543.92	0.003557	4.85	264.12	139.76	0.52
AC	3134.686	1040 cfs-Design	1040.00	537.42	543.20		543.48	0.004501	5.75	269.51	126.94	0.49
AC	3031.732	1040 cfs-Design	1040.00	538.00	542.41		542.83	0.008921	7.54	218.16	125.50	0.76
AC	2919.992	1040 cfs-Design	1040.00	537.95	541.70		542.07	0.005281	5.52	234.85	124.94	0.62
AC	2818.135	1040 cfs-Design	1040.00	536.00	540.93	540.59	541.42	0.007354	6.98	209.43	109.99	0.72
AC	2711.869	1040 cfs-Design	1040.00	535.59	540.25		540.61	0.007153	7.19	253.93	163.35	0.69
AC	2595.199	1040 cfs-Design	1040.00	535.00	539.46		539.76	0.006973	5.94	239.71	123.34	0.59
AC	2488.287	1040 cfs-Design	1040.00	534.00	538.83		539.18	0.004342	6.02	248.63	112.82	0.58
AC	2466.50	1040 cfs-Design	1040.00	534.00	538.66	538.11	539.06	0.005086	6.38	229.30	103.19	0.63
AC	2400		Bridge									
AC	2393.16	1040 cfs-Design	1040.00	533.20	537.69		538.26	0.007556	7.47	199.75	104.11	0.75
AC	2375.157	1040 cfs-Design	1040.00	533.02	537.68		538.10	0.005052	5.79	224.57	109.92	0.62
AC	2260.486	1040 cfs-Design	1040.00	532.00	537.36		537.60	0.003056	5.24	299.15	132.41	0.48
AC	2184.648	1040 cfs-Design	1040.00	532.00	536.49	536.49	537.17	0.010177	8.80	196.05	123.88	0.85
AC	1978.136	1040 cfs-Design	1040.00	530.00	534.83		535.11	0.005076	5.88	277.73	157.72	0.58
AC	1834.589	1040 cfs-Design	1040.00	530.00	534.36		534.56	0.002841	4.90	326.50	150.96	0.46
AC	1671.624	1040 cfs-Design	1040.00	528.00	533.02	533.02	533.76	0.008606	8.88	195.29	114.64	0.78
AC	1528.261	1040 cfs-Design	1040.00	527.00	532.69		532.86	0.003080	4.96	355.88	193.68	0.45
AC	1207.198	1040 cfs-Design	1040.00	526.23	530.81		531.29	0.008838	7.95	217.88	130.88	0.76
AC	1053.389	1040 cfs-Design	1040.00	526.00	530.11	529.77	530.24	0.004499	5.45	447.45	462.37	0.54
AC	928.7975	1040 cfs-Design	1040.00	526.04	528.59	528.59	529.10	0.024314	8.20	187.75	174.45	1.12
AC	742.6838	1040 cfs-Design	1040.00	525.00	528.42		528.44	0.000434	1.54	918.43	511.96	0.18
AC	603.5024	1040 cfs-Design	1040.00	525.00	528.24		528.32	0.001909	3.19	461.29	245.02	0.37
AC	253.8664	1040 cfs-Design	1040.00	520.00	527.83	523.81	527.98	0.000566	3.21	358.70	95.54	0.23
AC	150		Culvert									
AC	21.23839	1040 cfs-Design	1040.00	517.00	523.18	521.84	523.80	0.004303	6.32	164.63	46.10	0.59

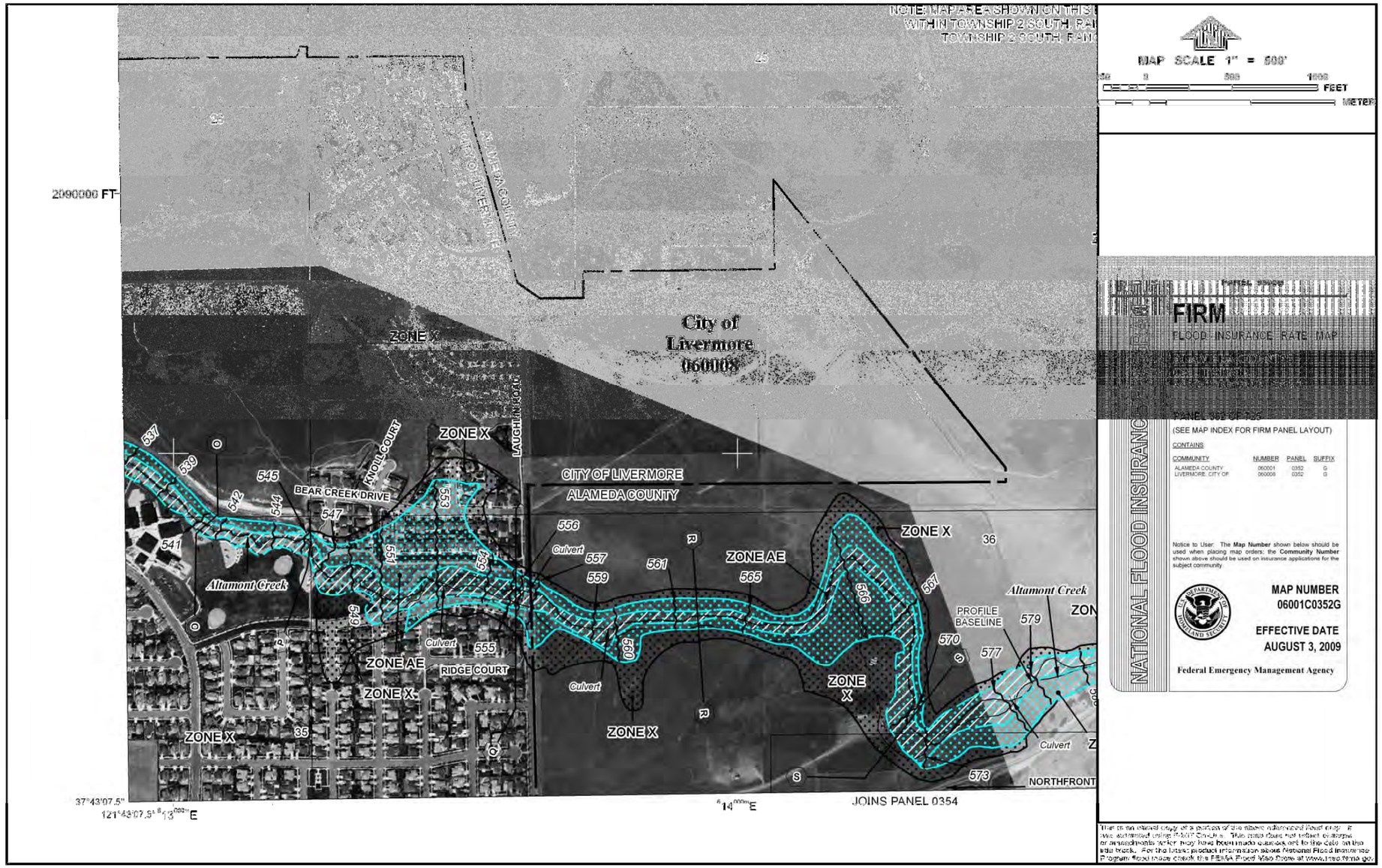
1243 Alpine Road, Suite 108
Walnut Creek, CA 94596
Phone: 925.941.0017
Fax: 925.941.0018
www.wreco.com

Appendix B- FEMA FIRM

1243 Alpine Road, Suite 108
Walnut Creek, CA 94596
Phone: 925.941.0017
Fax: 925.941.0018
www.wreco.com



1243 Alpine Road, Suite 108
Walnut Creek, CA 94596
Phone: 925.941.0017
Fax: 925.941.0018
www.wreco.com



Bay Area Hydrology Model
PROJECT REPORT

Project Name: 101094
Site Address:
City : Livermore
Report Date : 11/8/2010
Gage : LIVERMORE
Data Start : 1959/10/01
Data End : 2004/09/30
Precip Scale: 1.00
BAHM Version:

PREDEVELOPED LAND USE

Name : Basin 1
Bypass: No

GroundWater: No

Pervious Land Use	Acres
C D,Grass,Flat(0-5%)	1.89
C D,Grass,Mod(5-10%)	10.99
C D,Grass,Ste(10-20)	17.8
C D,Grass,Very(>20%)	1.02

Impervious Land Use	Acres

Element Flows To:
Surface **Interflow** **Groundwater**

Name : Basin 1
Bypass: No

GroundWater: No

Pervious Land Use	Acres
C D,Urban,Flat(0-5%)	6.39
C D,Grass,Very(>20%)	7
C D,Grass,Ste(10-20)	7.19

Impervious Land Use	Acres
Roads,Flat(0-5%)	5.21
Roads,Mod(5-10%)	0.32
Roof Area	5.59

Element Flows To:

Surface **Interflow** **Groundwater**
Trapezoidal Pond 1, Trapezoidal Pond 1,

Name : Trapezoidal Pond 1
Bottom Length: 120ft.
Bottom Width: 120ft.
Depth : 4ft.
Volume at riser head : 1.1577ft.
Side slope 1: 3 To 1
Side slope 2: 3 To 1
Side slope 3: 3 To 1
Side slope 4: 3 To 1
Discharge Structure
Riser Height: 3 ft.
Riser Diameter: 18 in.
NotchType : Rectangular
Notch Width : 1.498 ft.
Notch Height: 0.107 ft.
Orifice 1 Diameter: 3.5029 in. **Elevation:** 0 ft.

Element Flows To:
Outlet 1 **Outlet 2**

Pond Hydraulic Table

Stage(ft)	Area(acr)	Volume(acr-ft)	Dschrg(cfs)	Infilt(cfs)
0.000	0.331	0.000	0.000	0.000
0.044	0.332	0.015	0.068	0.000
0.089	0.334	0.030	0.096	0.000
0.133	0.335	0.044	0.118	0.000
0.178	0.336	0.059	0.136	0.000
0.222	0.338	0.074	0.152	0.000
0.267	0.339	0.089	0.166	0.000
0.311	0.341	0.104	0.180	0.000
0.356	0.342	0.120	0.192	0.000
0.400	0.344	0.135	0.204	0.000
0.444	0.345	0.150	0.215	0.000
0.489	0.347	0.166	0.225	0.000
0.533	0.348	0.181	0.235	0.000
0.578	0.350	0.197	0.245	0.000
0.622	0.351	0.212	0.254	0.000
0.667	0.353	0.228	0.263	0.000
0.711	0.355	0.244	0.272	0.000
0.756	0.356	0.259	0.280	0.000
0.800	0.358	0.275	0.288	0.000
0.844	0.359	0.291	0.296	0.000
0.889	0.361	0.307	0.304	0.000
0.933	0.362	0.323	0.311	0.000
0.978	0.364	0.339	0.319	0.000
1.022	0.365	0.355	0.326	0.000
1.067	0.367	0.372	0.333	0.000
1.111	0.368	0.388	0.340	0.000
1.156	0.370	0.404	0.346	0.000

1.200	0.371	0.421	0.353	0.000
1.244	0.373	0.438	0.360	0.000
1.289	0.375	0.454	0.366	0.000
1.333	0.376	0.471	0.372	0.000
1.378	0.378	0.488	0.378	0.000
1.422	0.379	0.504	0.384	0.000
1.467	0.381	0.521	0.390	0.000
1.511	0.382	0.538	0.396	0.000
1.556	0.384	0.555	0.402	0.000
1.600	0.386	0.572	0.408	0.000
1.644	0.387	0.590	0.413	0.000
1.689	0.389	0.607	0.419	0.000
1.733	0.390	0.624	0.424	0.000
1.778	0.392	0.641	0.430	0.000
1.822	0.394	0.659	0.435	0.000
1.867	0.395	0.676	0.440	0.000
1.911	0.397	0.694	0.446	0.000
1.956	0.398	0.712	0.451	0.000
2.000	0.400	0.729	0.456	0.000
2.044	0.402	0.747	0.461	0.000
2.089	0.403	0.765	0.466	0.000
2.133	0.405	0.783	0.471	0.000
2.178	0.406	0.801	0.476	0.000
2.222	0.408	0.819	0.480	0.000
2.267	0.410	0.837	0.485	0.000
2.311	0.411	0.856	0.490	0.000
2.356	0.413	0.874	0.495	0.000
2.400	0.415	0.892	0.499	0.000
2.444	0.416	0.911	0.504	0.000
2.489	0.418	0.929	0.508	0.000
2.533	0.420	0.948	0.513	0.000
2.578	0.421	0.967	0.517	0.000
2.622	0.423	0.985	0.522	0.000
2.667	0.425	1.004	0.526	0.000
2.711	0.426	1.023	0.531	0.000
2.756	0.428	1.042	0.535	0.000
2.800	0.430	1.061	0.539	0.000
2.844	0.431	1.080	0.544	0.000
2.889	0.433	1.100	0.548	0.000
2.933	0.435	1.119	0.592	0.000
2.978	0.436	1.138	0.679	0.000
3.022	0.438	1.158	0.782	0.000
3.067	0.440	1.177	0.990	0.000
3.111	0.441	1.197	1.283	0.000
3.156	0.443	1.216	1.643	0.000
3.200	0.445	1.236	2.057	0.000
3.244	0.447	1.256	2.520	0.000
3.289	0.448	1.276	3.027	0.000
3.333	0.450	1.296	3.574	0.000
3.378	0.452	1.316	4.158	0.000
3.422	0.453	1.336	4.778	0.000
3.467	0.455	1.356	5.431	0.000
3.511	0.457	1.376	6.116	0.000
3.556	0.459	1.397	6.831	0.000
3.600	0.460	1.417	7.575	0.000
3.644	0.462	1.438	8.347	0.000
3.689	0.464	1.458	9.146	0.000

3.733	0.466	1.479	9.970	0.000
3.778	0.467	1.500	10.82	0.000
3.822	0.469	1.520	11.70	0.000
3.867	0.471	1.541	12.59	0.000
3.911	0.473	1.562	13.52	0.000
3.956	0.474	1.583	14.46	0.000
4.000	0.476	1.604	15.43	0.000
4.044	0.478	1.626	16.42	0.000

MITIGATED LAND USE

ANALYSIS RESULTS

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	5.24361
5 year	10.372552
10 year	13.772435
25 year	15.247335

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	2.97888
5 year	9.501734
10 year	12.75277
25 year	14.318348

Yearly Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1961	5.112	2.307
1962	2.277	0.467
1963	5.734	1.036
1964	7.422	8.237
1965	1.690	3.754
1966	4.275	3.728
1967	3.920	0.530
1968	23.400	18.829
1969	5.138	7.253
1970	9.772	8.009
1971	7.911	2.812
1972	7.107	5.102
1973	0.028	0.466
1974	14.471	12.368
1975	9.034	2.918
1976	4.388	0.996
1977	0.001	0.358
1978	0.005	0.319
1979	8.278	2.979
1980	9.078	1.437
1981	6.684	4.672
1982	1.474	2.285
1983	13.655	12.849
1984	10.539	9.419

1985	5.098	2.611
1986	2.447	1.168
1987	13.993	13.889
1988	3.148	4.302
1989	0.234	0.382
1990	0.594	0.413
1991	2.609	1.548
1992	4.839	4.456
1993	5.244	2.448
1994	6.707	5.390
1995	2.441	0.529
1996	12.464	11.678
1997	14.133	12.702
1998	8.208	7.549
1999	12.337	9.525
2000	6.663	1.768
2001	4.717	5.849
2002	0.377	0.422
2003	2.457	0.511
2004	7.634	9.645
2005	12.996	13.557

Ranked Yearly Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	23.3999	18.8286
2	14.4709	13.8888
3	14.1333	13.5565
4	13.9930	12.8489
5	13.6548	12.7015
6	12.9963	12.3681
7	12.4644	11.6777
8	12.3374	9.6446
9	10.5394	9.5247
10	9.7719	9.4191
11	9.0782	8.2367
12	9.0337	8.0089
13	8.2781	7.5493
14	8.2084	7.2525
15	7.9108	5.8491
16	7.6337	5.3899
17	7.4215	5.1020
18	7.1068	4.6724
19	6.7072	4.4561
20	6.6844	4.3023
21	6.6634	3.7539
22	5.7341	3.7282
23	5.2436	2.9789
24	5.1384	2.9184
25	5.1115	2.8120
26	5.0978	2.6109
27	4.8394	2.4476
28	4.7168	2.3070
29	4.3876	2.2846
30	4.2745	1.7683
31	3.9201	1.5476
32	3.1478	1.4371

33	2.6086	1.1683
34	2.4572	1.0358
35	2.4468	0.9956
36	2.4414	0.5299
37	2.2769	0.5288
38	1.6904	0.5108
39	1.4741	0.4666
40	0.5937	0.4662
41	0.3772	0.4225
42	0.2337	0.4127
43	0.0275	0.3823
44	0.0055	0.3581
45	0.0015	0.3193

POC #1
The Facility PASSED

The Facility PASSED.

Flow(CFS)	Predev	Dev	Percentage	Pass/Fail
0.5244	1495	1313	87	Pass
0.6582	1311	682	52	Pass
0.7920	1157	574	49	Pass
0.9258	1038	514	49	Pass
1.0596	941	468	49	Pass
1.1935	862	428	49	Pass
1.3273	774	394	50	Pass
1.4611	715	359	50	Pass
1.5949	667	325	48	Pass
1.7287	613	301	49	Pass
1.8626	562	273	48	Pass
1.9964	522	260	49	Pass
2.1302	487	237	48	Pass
2.2640	454	220	48	Pass
2.3978	417	197	47	Pass
2.5316	379	187	49	Pass
2.6655	353	177	50	Pass
2.7993	326	166	50	Pass
2.9331	298	159	53	Pass
3.0669	279	149	53	Pass
3.2007	262	141	53	Pass
3.3346	244	131	53	Pass
3.4684	235	129	54	Pass
3.6022	216	123	56	Pass
3.7360	201	118	58	Pass
3.8698	192	111	57	Pass
4.0037	178	105	58	Pass
4.1375	167	99	59	Pass
4.2713	153	94	61	Pass
4.4051	147	85	57	Pass
4.5389	135	79	58	Pass
4.6727	128	72	56	Pass
4.8066	115	68	59	Pass
4.9404	108	65	60	Pass
5.0742	100	64	64	Pass
5.2080	93	61	65	Pass

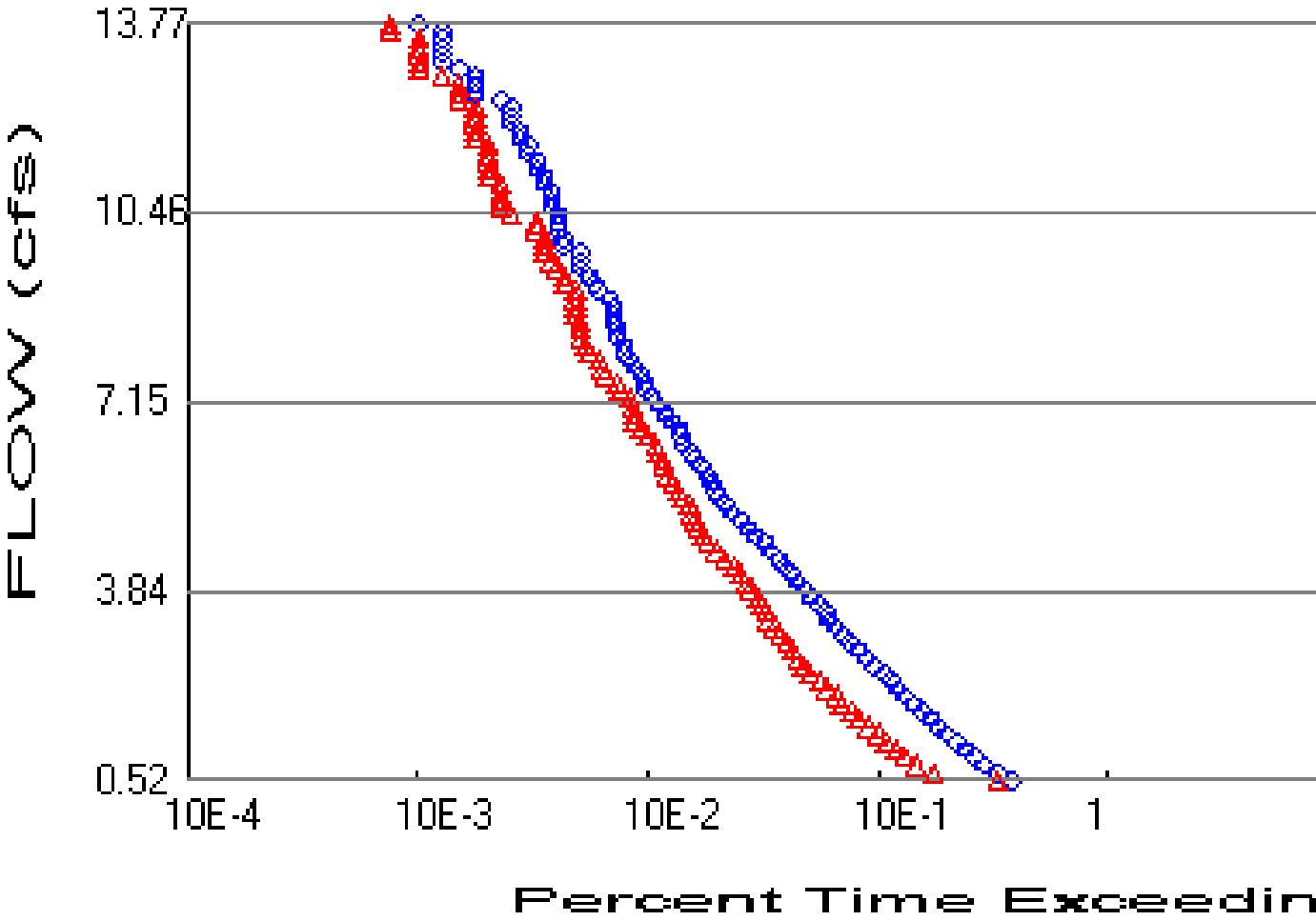
5.3418	86	60	69	Pass
5.4757	81	55	67	Pass
5.6095	77	53	68	Pass
5.7433	75	51	68	Pass
5.8771	72	48	66	Pass
6.0109	67	46	68	Pass
6.1448	63	46	73	Pass
6.2786	61	44	72	Pass
6.4124	56	43	76	Pass
6.5462	55	39	70	Pass
6.6800	54	37	68	Pass
6.8139	50	34	68	Pass
6.9477	47	34	72	Pass
7.0815	45	34	75	Pass
7.2153	41	33	80	Pass
7.3491	39	30	76	Pass
7.4829	38	29	76	Pass
7.6168	37	26	70	Pass
7.7506	35	25	71	Pass
7.8844	33	24	72	Pass
8.0182	31	22	70	Pass
8.1520	31	21	67	Pass
8.2859	29	20	68	Pass
8.4197	29	20	68	Pass
8.5535	28	20	71	Pass
8.6873	28	19	67	Pass
8.8211	28	19	67	Pass
8.9550	27	19	70	Pass
9.0888	24	19	79	Pass
9.2226	23	17	73	Pass
9.3564	22	17	77	Pass
9.4902	20	16	80	Pass
9.6240	20	15	75	Pass
9.7579	20	14	70	Pass
9.8917	17	14	82	Pass
10.0255	17	14	82	Pass
10.1593	16	13	81	Pass
10.2931	16	13	81	Pass
10.4270	16	10	62	Pass
10.5608	15	9	60	Pass
10.6946	15	9	60	Pass
10.8284	15	9	60	Pass
10.9622	14	9	64	Pass
11.0961	14	8	57	Pass
11.2299	13	8	61	Pass
11.3637	13	8	61	Pass
11.4975	12	8	66	Pass
11.6313	12	8	66	Pass
11.7652	11	7	63	Pass
11.8990	11	7	63	Pass
12.0328	10	7	70	Pass
12.1666	10	7	70	Pass
12.3004	10	7	70	Pass
12.4342	9	6	66	Pass
12.5681	7	6	85	Pass
12.7019	7	6	85	Pass
12.8357	7	5	71	Pass

12.9695	6	4	66	Pass
13.1033	5	4	80	Pass
13.2372	5	4	80	Pass
13.3710	5	4	80	Pass
13.5048	5	4	80	Pass
13.6386	5	3	60	Pass
13.7724	4	3	75	Pass

Perlnd and Implnd Changes

No changes have been made.

This program and accompanying documentation are provided 'as-is' without warranty of any kind. The entire risk regarding the performance and results of this program is assumed by End User. Clear Creek Solutions Inc. and the governmental licensee or sublicensees disclaim all warranties, either expressed or implied, including but not limited to implied warranties of program and accompanying documentation. In no event shall Clear Creek Solutions Inc, Applied Marine Sciences Incorporated, the Alameda County Flood Control and Water Conservation District, EOA Incorporated, member agencies of the Alameda Countywide Clean Water Program, member agencies of the San Mateo Countywide Water Pollution Prevention Program, member agencies of the Santa Clara Valley Urban Runoff Pollution Prevention Program or any other LOU Participants or authorized representatives of LOU Participants be liable for any damages whatsoever (including without limitation to damages for loss of business profits, loss of business information, business interruption, and the like) arising out of the use of, or inability to use this program even if Clear Creek Solutions Inc., Applied Marine Sciences Incorporated, the Alameda County Flood Control and Water Conservation District, EOA Incorporated or any member agencies of the LOU Participants or their authorized representatives have been advised of the possibility of such damages. Software Copyright © by Clear Creek Solutions, Inc. 2005-2007; All Rights Reserved.


13.77
10.46
7.15
3.84
0.52
FLOW (cfs)
10E-4
10E-3
10E-2
10E-1
1
Percent Time Exceedin

VESTING TENTATIVE MAP

PRELIMINARY STORMWATER TREATMENT PLAN

GARAVENTA HILLS

CITY OF LIVERMORE, ALAMEDA COUNTY, CALIFORNIA
FOR: RL COMMUNITIES

RJA
RUGGERI-JENSEN-AZAR
ENGINEERS ▪ PLANNERS ▪ SURVEYORS
4690 CHABOT DRIVE, SUITE 200 PLEASANTON, CA 94588
PHONE: (925) 227-9100 FAX: (925) 227-9300

DATE: SEPTEMBER 16, 2011 JOB NO. 101094 C-7

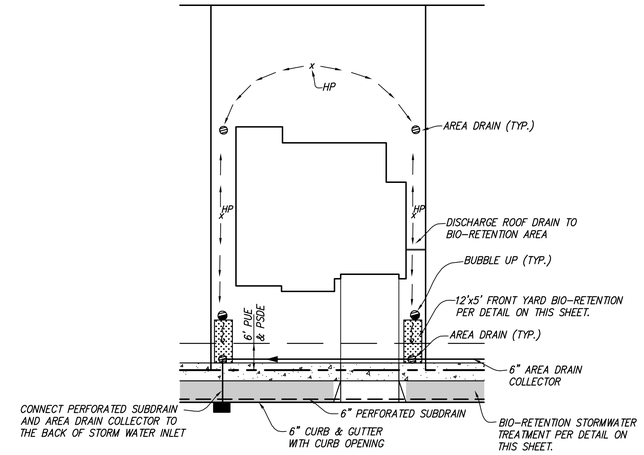
G:\JOBS\101\101094\TEXT-MAP\C7-101094TM-SWTP.DWG 1/24/2012 4:37:55 PM ROGER FONG

STORM WATER TREATMENT CALCULATIONS

DMA	SURFACE	IMPERVIOUS AREA (SF)	BMP USED	SIZING FACTOR	REQUIRED SURFACE AREA	SURFACE AREA PROVIDED
DMA 1	DRIVEWAY	3,557	BIO-RETENTION AREA	–	–	–
	PAVEMENT	8,270	BIO-RETENTION AREA	–	–	–
	ROOF	17,100	BIO-RETENTION AREA	–	–	–
	SIDEWALK	1,992	BIO-RETENTION AREA	–	–	–
	TOTAL	30,919	–	0.04	1,237	1,568
DMA 2	DRIVEWAY	2,934	BIO-RETENTION AREA	–	–	–
	PAVEMENT	7,051	BIO-RETENTION AREA	–	–	–
	ROOF	15,183	BIO-RETENTION AREA	–	–	–
	SIDEWALK	1,385	BIO-RETENTION AREA	–	–	–
	TOTAL	27,003	–	0.04	1,080	1,460
DMA 3	DRIVEWAY	2,509	BIO-RETENTION AREA	–	–	–
	PAVEMENT	6,946	BIO-RETENTION AREA	–	–	–
	ROOF	12,036	BIO-RETENTION AREA	–	–	–
	SIDEWALK	1,669	BIO-RETENTION AREA	–	–	–
	TOTAL	2,316	–	0.04	926	1,354
DMA 4	DRIVEWAY	NA	BIO-RETENTION AREA	–	–	–
	PAVEMENT	5,365	BIO-RETENTION AREA	–	–	–
	ROOF	NA	BIO-RETENTION AREA	–	–	–
	SIDEWALK	995	BIO-RETENTION AREA	–	–	–
	TOTAL	6,360	–	0.04	254	1,167
DMA 5	DRIVEWAY	2,373	BIO-RETENTION AREA	–	–	–
	PAVEMENT	5,746	BIO-RETENTION AREA	–	–	–
	ROOF	12,777	BIO-RETENTION AREA	–	–	–
	SIDEWALK	1,491	BIO-RETENTION AREA	–	–	–
	TOTAL	22,387	–	0.04	895	1,291
DMA 6	DRIVEWAY	1,965	BIO-RETENTION AREA	–	–	–
	PAVEMENT	5,401	BIO-RETENTION AREA	–	–	–
	ROOF	10,132	BIO-RETENTION AREA	–	–	–
	SIDEWALK	1,292	BIO-RETENTION AREA	–	–	–
	TOTAL	18,790	–	0.04	752	1,165
DMA 7	DRIVEWAY	1,452	BIO-RETENTION AREA	–	–	–
	PAVEMENT	7,326	BIO-RETENTION AREA	–	–	–
	ROOF	7,730	BIO-RETENTION AREA	–	–	–
	SIDEWALK	1,489	BIO-RETENTION AREA	–	–	–
	TOTAL	17,997	–	0.04	720	1,395
DMA 8	DRIVEWAY	2,044	BIO-RETENTION AREA	–	–	–
	PAVEMENT	6,390	BIO-RETENTION AREA	–	–	–
	ROOF	10,132	BIO-RETENTION AREA	–	–	–
	SIDEWALK	1,394	BIO-RETENTION AREA	–	–	–
	TOTAL	19,960	–	0.04	798	1,354
DMA 9	DRIVEWAY	1,383	BIO-RETENTION AREA	–	–	–
	PAVEMENT	6,341	BIO-RETENTION AREA	–	–	–
	ROOF	7,461	BIO-RETENTION AREA	–	–	–
	SIDEWALK	1,512	BIO-RETENTION AREA	–	–	–
	TOTAL	16,697	–	0.04	668	1,586
DMA 10	DRIVEWAY	1,198	BIO-RETENTION AREA	–	–	–
	PAVEMENT	3,595	BIO-RETENTION AREA	–	–	–
	ROOF	5,067	BIO-RETENTION AREA	–	–	–
	SIDEWALK	778	BIO-RETENTION AREA	–	–	–
	TOTAL	10,638	–	0.04	426	732
DMA 11	DRIVEWAY	1,316	BIO-RETENTION AREA	–	–	–
	PAVEMENT	8,923	BIO-RETENTION AREA	–	–	–
	ROOF	7,482	BIO-RETENTION AREA	–	–	–
	SIDEWALK	1,187	BIO-RETENTION AREA	–	–	–
	TOTAL	18,908	–	0.04	756	1,869
DMA 12	DRIVEWAY	699	BIO-RETENTION AREA	–	–	–
	PAVEMENT	7,454	BIO-RETENTION AREA	–	–	–
	ROOF	2,400	BIO-RETENTION AREA	–	–	–
	SIDEWALK	1,886	BIO-RETENTION AREA	–	–	–
	TOTAL	12,439	–	0.04	498	501
DMA 13	DRIVEWAY	1,636	BIO-RETENTION AREA	–	–	–
	PAVEMENT	5,731	BIO-RETENTION AREA	–	–	–
	ROOF	10,132	BIO-RETENTION AREA	–	–	–
	SIDEWALK	1,281	BIO-RETENTION AREA	–	–	–
	TOTAL	18,780	–	0.04	751	1,182
DMA 14	DRIVEWAY	4,604	BIO-RETENTION AREA	–	–	–
	PAVEMENT	11,505	BIO-RETENTION AREA	–	–	–
	ROOF	19,269	BIO-RETENTION AREA	–	–	–
	SIDEWALK	2,760	BIO-RETENTION AREA	–	–	–
	TOTAL	37,598	–	0.04	1,504	2,462
DMA 15	DRIVEWAY	898	BIO-RETENTION AREA	–	–	–
	PAVEMENT	9,635	BIO-RETENTION AREA	–	–	–
	ROOF	5,568	BIO-RETENTION AREA	–	–	–
	SIDEWALK	2,250	BIO-RETENTION AREA	–	–	–
	TOTAL	18,351	–	0.04	734	2,834
DMA 16	DRIVEWAY	1,979	BIO-RETENTION AREA	–	–	–
	PAVEMENT	6,167	BIO-RETENTION AREA	–	–	–
	ROOF	10,131	BIO-RETENTION AREA	–	–	–
	SIDEWALK	1,287	BIO-RETENTION AREA	–	–	–
	TOTAL	19,564	–	0.04	783	963
DMA 17	DRIVEWAY	NA	BIO-RETENTION AREA	–	–	–
	PAVEMENT	1,716	BIO-RETENTION AREA	–	–	–
	ROOF	NA	BIO-RETENTION AREA	–	–	–
	SIDEWALK	312	BIO-RETENTION AREA	–	–	–
	TOTAL	2,208	–	0.04	81	211
DMA 18	DRIVEWAY	NA	BIO-RETENTION AREA	–	–	–
	PAVEMENT	1,692	BIO-RETENTION AREA	–	–	–
	ROOF	NA	BIO-RETENTION AREA	–	–	–
	SIDEWALK	314	BIO-RETENTION AREA	–	–	–
	TOTAL	2,006	–	0.04	80	214
DMA 19	DRIVEWAY	1,077	BIO-RETENTION AREA	–	–	–
	PAVEMENT	9,576	BIO-RETENTION AREA	–	–	–
	ROOF	4,564	BIO-RETENTION AREA	–	–	–
	SIDEWALK	2,247	BIO-RETENTION AREA	–	–	–
	TOTAL	17,464	–	0.04	699	2,788
DMA 20	DRIVEWAY	2,767	BIO-RETENTION AREA	–	–	–
	PAVEMENT	12,162	BIO-RETENTION AREA	–	–	–
	ROOF	13,030	BIO-RETENTION AREA	–	–	–
	SIDEWALK	2,953	BIO-RETENTION AREA	–	–	–
	TOTAL	20,912	–	0.04	836	3,108
DMA 21	DRIVEWAY	NA	BIO-RETENTION AREA	–	–	–
	PAVEMENT	1,608	BIO-RETENTION AREA	–	–	–
	ROOF	NA	BIO-RETENTION AREA	–	–	–
	SIDEWALK	396	BIO-RETENTION AREA	–	–	–
	TOTAL	2,004	–	0.04	80	567
DMA 22	DRIVEWAY	NA	BIO-RETENTION AREA	–	–	–
	PAVEMENT	1,599	BIO-RETENTION AREA	–	–	–
	ROOF	NA	BIO-RETENTION AREA	–	–	–
	SIDEWALK	404	BIO-RETENTION AREA	–	–	–
	TOTAL	2,003	–	0.04	80	558
DMA 23	DRIVEWAY	1,472	BIO-RETENTION AREA	–	–	–
	PAVEMENT	4,988	BIO-RETENTION AREA	–	–	–
	ROOF	8,319	BIO-RETENTION AREA	–	–	–
	SIDEWALK	1,090	BIO-RETENTION AREA	–	–	–
	TOTAL	15,869	–	0.04	635	1,079
DMA 24	DRIVEWAY	1,941	BIO-RETENTION AREA	–	–	–
	PAVEMENT	12,141	BIO-RETENTION AREA	–	–	–
	ROOF	9,031	BIO-RETENTION AREA	–	–	–
	SIDEWALK	1,159	BIO-RETENTION AREA	–	–	–
	TOTAL	24,272	–	0.04	971	4,395
DMA 25	DRIVEWAY	482	BIO-RETENTION AREA	–	–	–
	PAVEMENT	2,011	BIO-RETENTION AREA	–	–	–
	ROOF	2,903	BIO-RETENTION AREA	–	–	–
	SIDEWALK	410	BIO-RETENTION AREA	–	–	–
	TOTAL	5,808	–	0.04	232	475
DMA 26	DRIVEWAY	NA	BIO-RETENTION AREA	–	–	–
	PAVEMENT	2,149	BIO-RETENTION AREA	–	–	–
	ROOF	NA	BIO-RETENTION AREA	–	–	–
	SIDEWALK	571	BIO-RETENTION AREA	–	–	–
	TOTAL	2,720	–	0.04	109	785

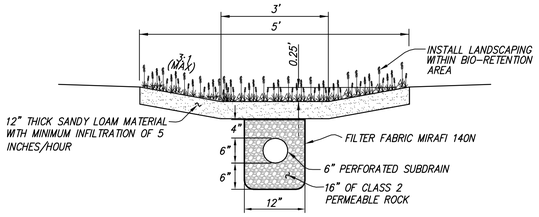
NOTES:

1. THE ABOVE CALCULATIONS ARE BASED ON THE ALAMEDA COUNTYWIDE CLEAN WATER PROGRAM, C.3 STORMWATER TECHNICAL GUIDANCE, DATED AUGUST 2006, AND THE FOLLOWING CRITERIA:
   a. 0.2 INCHES/HOUR RAINFALL INTENSITY ON 100% IMPERVIOUS AREA.
   b. SOIL FOR TREATMENT MEDIUM WITH A 5 INCHES/HOUR INFILTRATION RATE.
   c. A TREATMENT MEDIUM OF 0.04.
2. SIZING FACTOR SIZING FACTOR OF 0.04 NOTED ABOVE IS CALCULATED BASED ON THE FOLLOWING CRITERIA:
   a. SIZING FACTOR=(0.2 IN/HR)/(5 IN/HR)=0.04.



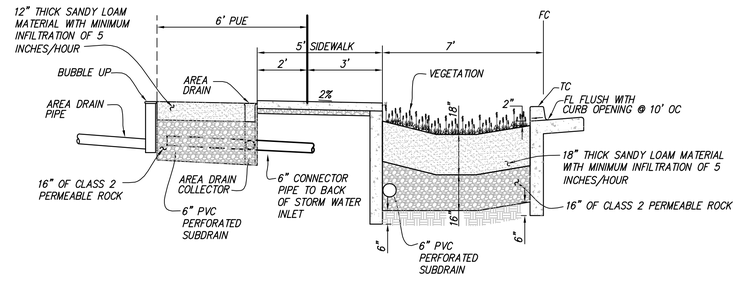
FRONT YARD BIO-RETENTION

NOT TO SCALE



FRONT YARD BIO-RETENTION DETAIL

NOT TO SCALE



TYPICAL BIO-RETENTION TREATMENT DETAIL

NOT TO SCALE

VESTING TENTATIVE MAP

PRELIMINARY STORMWATER TREATMENT DETAILS

GARAVENTA HILLS

CITY OF LIVERMORE, ALAMEDA COUNTY, CALIFORNIA
FOR: RL COMMUNITIES

RUGGERI-JENSEN-AZAR
ENGINEERS ▪ PLANNERS ▪ SURVEYORS
4690 CHABOT DRIVE, SUITE 200 PLEASANTON, CA 94588
PHONE: (925) 227-9100 FAX: (925) 227-9300

DATE: SEPTEMBER 16, 2011 JOB NO. 101094

G:\JOBS\101094\TEXT-MAP\C8-101094TM-SWTP.DWG 1/24/2012 4:38:24 PM ROGER FONG

Project No.
9451.000.000

March 7, 2012

Rebecca Gorton
Lamphier-Gregory
1944 Embarcadero
Oakland, CA 94606

Subject: Garaventa Hills
Livermore, California

EVALUATION OF POTENTIAL HYDROLOGIC IMPACTS TO GARAVENTA WETLANDS

Reference: Hanes and Stromberg, 1998, Hydrology of Vernal Pools on Non-Volcanic Soils in the Sacramento Valley, Ecology, Conservation, and Management of Vernal Pool Ecosystems – Proceedings from a 1996 Conference. California Native Plant Society, Sacramento, CA. Pages 38-49.

Dear Ms. Gorton:

The following document evaluates and discusses potential hydrological impacts to the Garaventa Wetlands resulting from the proposed Garaventa Hills development. The purpose is to discuss impacts that may result from the development, evaluate the significance of potential impacts, and offer recommendations for minimizing any significant impacts to the seasonal wetlands. The letter is to be used in the environmental review process.

INTRODUCTION

The Garaventa Hills project is a proposed 76-lot residential subdivision on 31.7 acres in the City of Livermore, Alameda County, California. The existing site is on a hill that is predominantly grass with sandstone outcroppings. The proposed improvements include the construction of residential lots, roads, utilities, drainage facilities, and grading operations.

The project is located on uplands that are immediately adjacent to the Garaventa Wetlands Preserve and Altamont Creek. The Garaventa Wetlands Preserve is administered by the Livermore Area Recreation and Parks District. These wetlands are characterized as seasonal alkali wetlands and vernal pools. Vernal pools are described as seasonal wetlands that are dry during part of the year. This is sensitive habitat to the fairy shrimp and other special status species. The discussion to follow focuses on the potential of the project to impact the vernal pools with respect to hydrology. More specifically, how alterations to existing drainage patterns may affect the quantity and timing of precipitation that enters the wetlands and is needed to maintain a functioning system.

The geology found at the site is predominantly classified by the NRCS as being Briones or Cierbo Sandstone. The watershed consists of shallow soils on top of sandstone creating relatively impervious hydrologic surface conditions, which facilitates a rapid response time and minimal infiltration. Precipitation falling on the site drains quickly in the form of surface flows and is not stored onsite for any significant amount of time.

POTENTIAL IMPACTS

During the environmental review process, two primary issues of concern were identified that may cause negative impacts to the wetlands. First, since the development is in close proximity to the vernal pools, pollutants from the project may be transported to the wetlands by surface runoff and subsurface flows.

A second potential impact of concern is the decrease of flows entering the wetlands due to the alteration of drainage patterns. The project proposes to treat onsite stormwater runoff with a single detention basin located at the south edge of the project. In order to accomplish this, proposed adjustments to the onsite drainage patterns will convey runoff from impervious areas to the basin. Approximately 4.6 acres of onsite tributary area that contributes to the wetlands from north side of the project will be redirected southward to the detention basin, as will roughly 2.6 acres that currently drain to vernal pools from the western edge of the parcel be re-routed to the detention basin. The concern is that by diverting flows from these tributary areas away from the wetlands, that water entering the pools may be reduced enough to significantly impact the hydrologic function of the wetlands.

CONCLUSIONS

The developer of Garaventa Hills is proposing two site plan features to address the issue of pollutants leaving the project and entering the wetlands. The first is the implementation of natural areas along the west and north edges of the parcel to act as a buffer between the development and the wetlands. These areas will act as a barrier to sediments and other pollutants from leaving the project and entering the vernal pools and also maintains the interface between the upland areas and the wetlands. In addition, all stormwater from disturbed areas will be routed to the detention/bioretention basin for treatment prior to being discharged into Altamont Creek. We concur that the combination of buffer areas and the storm drain layout with a bioretention pond reduces the potential of the project to significantly increase pollutant loads to the wetlands.

Hanes and Stromberg (1998) researched the hydrology of vernal pools in the Sacramento Valley that are similar in nature to the Garaventa Wetlands. They found that direct precipitation is by far the most important source of water to the vernal pools. They also concluded that significant watershed contributions to the wetlands rarely occurs and generally occurs during wet times when the pools are already full. This does not influence the ability of the pools to fill with water. Direct precipitation events in early winter are the primary source of water for the vernal pools.

For this reason, the contribution of surface water to the wetlands is not significantly impacted by the alterations to watershed drainage patterns that are proposed as part of the project. Furthermore, since the watershed characteristics facilitate rapid stormwater discharge from the site with minimal infiltration and limited capacity to store groundwater, the subsurface hydrology of wetlands is also not significantly affected by the development.

The natural buffer area proposed between the development and the wetlands will help maintain the function of the water exchange between the pools and the adjacent uplands and is essential for the integrity of the natural system.

RECOMMENDATIONS

Even though the completed project will not result in significant hydrologic impacts to the wetlands, we recommend the following measures be implemented to minimize potential negative impacts. Careful attention should be given to the implementation of storm water Best Management Practices (BMP's) during construction to avoid the potential for sediments and other pollutants to enter the wetlands. Fencing and signage should be installed that identifies the limits of the wetlands and provides a physical barrier so that construction equipment does not disturb the wetlands. It is advised to limit grading activities in close proximity to the pools to dry times of the year to minimize the possibility of sedimentation impacting the wetlands. It is further recommended that the natural vegetated buffer area at the perimeter of the project be fully stabilized during the early phases of construction to act as a protective barrier for the vernal pools during the course of construction.

If you have any questions or concerns regarding the contents of this letter, please call and we will be glad to discuss them with you.

Sincerely,

ENGEO Incorporated

Sean Cleary, PE, QSD James E. Moore, Jr., PE

sc/jem/cjn:eval

Appendix H:

Traffic Study Attachments

APPENDIX

TRANSPORTATION AND CIRCULATION

CONTENTS

This appendix contains detailed intersection vehicle level of service calculations using Traffix 8.0 ©. It should be noted that all six intersection numbers in the EIR are preceded by "40" in the calculation sheets. For example, Intersection 1 in the EIR (North Vasco Road & Garaventa Ranch Road) is Intersection 401 in this appendix for the calculations.

These appendices also contain original intersection turning movement count data for vehicles and bicyclists, as well as pedestrian crossing data at the intersections. Finally, 24-hour vehicle volume counts for the 3 locations are contained in the appendix.

The transportation and circulation appendix was prepared by Kittelson and Associates (formerly Dowling Associates).

.

Existing (2011) AM Peak Hour – No Project

Detailed Intersection Level of Service Calculations from TRAFFIX ©

Garaventa Hills EIR (Project 172670)
Existing (2011) - AM Peak Hour
Kittelson and Associates, Inc.

Scenario Report

Scenario:	2011 AM Existing
Command:	2011 AM Existing
Volume:	2011 AM Peak Existing
Geometry:	Existing
Impact Fee:	None
Trip Generation:	None
Trip Distribution:	None
Paths:	Default Path
Routes:	Default Route
Configuration:	AM Peak

Garaventa Hills EIR (Project 172670)
Existing (2011) - AM Peak Hour
Kittelson and Associates, Inc.

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
#401 N. Vasco Rd/ Garaventa Ranch R	C	30.0	0.453	C	30.0	0.453	+ 0.000 D/V
#402 Laughlin Rd/ Bear Creek Dr	A	8.8	0.034	A	8.8	0.034	+ 0.000 D/V
#403 Hawk St/ Garaventa Ranch Rd	B	11.2	0.053	B	11.2	0.053	+ 0.000 D/V
#404 Laughlin Rd/ Altamont Creek Dr	A	9.2	0.052	A	9.2	0.052	+ 0.000 D/V
#405 Laughlin Rd/ Northfront Rd	D	26.2	0.904	D	26.2	0.904	+ 0.000 V/C
#406 Garaventa Ranch Rd/ Altamont C	A	9.9	0.364	A	9.9	0.364	+ 0.000 V/C

2011 AM Existing Tue Mar 27, 2012 15:58:38 Page 3-1

Garaventa Hills EIR (Project 172670)
Existing (2011) - AM Peak Hour
Kittelson and Associates, Inc.

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #401 N. Vasco Rd/ Garaventa Ranch Rd

Cycle (sec):	138	Critical Vol./Cap.(X):	0.453
Loss Time (sec):	12	Average Delay (sec/veh):	30.0
Optimal Cycle:	39	Level Of Service:	C

Street Name:	N Vasco Rd						Garaventa Ranch Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1	1 0	1 0	0	1 0	1 0	0	1 0
Volume Module: >> Count Date: 1 Dec 2011 << 7:45-8:45 AM												
Base Vol:	49	456	59	56	734	12	1	114	26	109	134	43
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	49	456	59	56	734	12	1	114	26	109	134	43
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	55	509	66	63	820	13	1	127	29	122	150	48
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	55	509	66	63	820	13	1	127	29	122	150	48
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	55	509	66	63	820	13	1	127	29	122	150	48
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.82	0.95	0.95	0.95	0.95	0.97	0.97	0.95	0.96	0.96
Lanes:	1.00	2.00	1.00	1.00	1.97	0.03	1.00	0.81	0.19	1.00	0.76	0.24
Final Sat.:	1805	3610	1560	1805	3545	58	1805	1503	343	1805	1384	444
Capacity Analysis Module:												
Vol/Sat:	0.03	0.14	0.04	0.03	0.23	0.23	0.00	0.08	0.08	0.07	0.11	0.11
Crit Moves:	****				****			****		****		
Green/Cycle:	0.07	0.46	0.46	0.11	0.51	0.51	0.00	0.19	0.19	0.15	0.33	0.33
Volume/Cap:	0.45	0.30	0.09	0.30	0.45	0.45	0.32	0.45	0.45	0.45	0.32	0.32
Delay/Veh:	64.6	23.2	20.8	57.0	21.7	21.7	116.4	50.8	50.8	54.8	34.6	34.6
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	64.6	23.2	20.8	57.0	21.7	21.7	116.4	50.8	50.8	54.8	34.6	34.6
LOS by Move:	E	C	C+	E+	C+	C+	F	D	D	D-	C-	C-
HCM2kAvgQ:	3	7	2	3	12	12	0	6	6	5	6	6

Note: Queue reported is the number of cars per lane.

Traffix 8.0.0715 (c) 2008 Dowling Assoc. Licensed to DOWLING ASSOC., OAKLAND

```
2011 AM Existing          Tue Mar 27, 2012 15:58:38                 Page 4-1
------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                       Existing (2011) - AM Peak Hour
                       Kittelson and Associates, Inc.
------------------------------------------------------------------------------
                     Level Of Service Computation Report
           2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #402 Laughlin Rd/ Bear Creek Dr
******************************************************************************
Average Delay (sec/veh):      2.3       Worst Case Level Of Service: A[  8.8]
******************************************************************************
Street Name:           Laughlin Rd                    Bear Creek Dr
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  1  0  0    0  0  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 1 Dec 2011 << 7:30-8:30 AM
Base Vol:       9   24     0     0   62     0     0    0    23     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    9   24     0     0   62     0     0    0    23     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.69 0.69  0.69  0.69 0.69  0.69  0.69 0.69  0.69  0.69 0.69  0.69
PHF Volume:    13   35     0     0   90     0     0    0    34     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   13   35     0     0   90     0     0    0    34     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   90 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx    90  xxxx xxxx xxxxx
Potent Cap.: 1517 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   973  xxxx xxxx xxxxx
Move Cap.:   1517 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   973  xxxx xxxx xxxxx
Volume/Cap:  0.01 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  0.03  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   0.1  xxxx xxxx xxxxx
Control Del:  7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   8.8 xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     A     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx              8.8           xxxxxx
ApproachLOS:         *                *                A                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

```
2011 AM Existing           Tue Mar 27, 2012 15:58:38                 Page 5-1
-------------------------------------------------------------------------------
                     Garaventa Hills EIR (Project 172670)
                        Existing (2011) - AM Peak Hour
                        Kittelson and Associates, Inc.
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #403 Hawk St/ Garaventa Ranch Rd
*******************************************************************************
Average Delay (sec/veh):      1.5       Worst Case Level Of Service: B[ 11.2]
*******************************************************************************
Street Name:             Hawk St                     Garaventa Ranch Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 1 Dec 2011 << 7:30-8:30 AM
Base Vol:       0    0     0     5    0    23    37  153     0     0  185    11
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0     5    0    23    37  153     0     0  185    11
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.60 0.60  0.60  0.60 0.60  0.60  0.60 0.60  0.60  0.60 0.60  0.60
PHF Volume:     0    0     0     8    0    38    62  256     0     0  309    18
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0     8    0    38    62  256     0     0  309    18
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   698  698   319   328 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   410  367   727  1243 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   393  348   727  1243 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.02 0.00  0.05  0.05 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.2 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.0 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  631 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.2 xxxxx   0.2 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 11.2 xxxxx   8.0 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:    xxxxxx           11.2           xxxxxx          xxxxxx
ApproachLOS:         *             B                *               *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```

```
2011 AM Existing           Tue Mar 27, 2012 15:58:38                  Page 6-1
------------------------------------------------------------------------------
                     Garaventa Hills EIR (Project 172670)
                        Existing (2011) - AM Peak Hour
                        Kittelson and Associates, Inc.
------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #404 Laughlin Rd/ Altamont Creek Dr
******************************************************************************
Average Delay (sec/veh):      3.6       Worst Case Level Of Service: A[  9.2]
******************************************************************************
Street Name:           Laughlin Rd                    Altamont Creek Dr
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 1 Dec 2011 << 7:15-8:15 AM
Base Vol:      29   16     0     0   59    39    13    0    41     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   29   16     0     0   59    39    13    0    41     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82
PHF Volume:    35   19     0     0   72    48    16    0    50     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   35   19     0     0   72    48    16    0    50     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  119 xxxx xxxxx  xxxx xxxx xxxxx   186  186    96  xxxx xxxx xxxxx
Potent Cap.: 1481 xxxx xxxxx  xxxx xxxx xxxxx   808  712   966  xxxx xxxx xxxxx
Move Cap.:   1481 xxxx xxxxx  xxxx xxxx xxxxx   793  695   966  xxxx xxxx xxxxx
Volume/Cap:  0.02 xxxx  xxxx  xxxx xxxx  xxxx  0.02 0.00  0.05  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  918 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.2 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  9.2 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    A     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx              9.2           xxxxxx
ApproachLOS:         *                *               A              *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

```
2011 AM Existing           Tue Mar 27, 2012 15:58:38                 Page 7-1
-------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                       Existing (2011) - AM Peak Hour
                       Kittelson and Associates, Inc.
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
              2000 HCM 4-Way Stop Method (Base Volume Alternative)
*******************************************************************************
Intersection #405 Laughlin Rd/ Northfront Rd
*******************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):         0.904
Loss Time (sec):       0              Average Delay (sec/veh):        26.2
Optimal Cycle:         0              Level Of Service:                  D
*******************************************************************************
Street Name:           Laughlin Rd                    Northfront Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     0    0     0     0    0     0     0    0     0     0    0     0
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 1 Dec 2011 << 7:30-8:30 AM
Base Vol:       0    0     0    63    0    56    19  166     0     0  667    27
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0    63    0    56    19  166     0     0  667    27
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.96 0.96  0.96  0.96 0.96  0.96  0.96 0.96  0.96  0.96 0.96  0.96
PHF Volume:     0    0     0    66    0    59    20  174     0     0  698    28
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0    0     0    66    0    59    20  174     0     0  698    28
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    0    0     0    66    0    59    20  174     0     0  698    28
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.00 0.00  0.00  0.53 0.00  0.47  0.10 0.90  0.00  0.00 0.96  0.04
Final Sat.:     0    0     0   322    0   286    71  621     0     0  772    31
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx xxxx  xxxx  0.20 xxxx  0.20  0.28 0.28  xxxx  xxxx 0.90  0.90
Crit Moves:                                ****       ****              ****
Delay/Veh:    0.0  0.0   0.0  10.0  0.0  10.0   9.9  9.9   0.0   0.0 33.3  33.3
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0  0.0   0.0  10.0  0.0  10.0   9.9  9.9   0.0   0.0 33.3  33.3
LOS by Move:    *    *     *     B    *     B     A    A     *     *    D     D
ApproachDel:    xxxxxx             10.0              9.9             33.3
Delay Adj:       xxxxx             1.00              1.00            1.00
ApprAdjDel:     xxxxxx             10.0              9.9             33.3
LOS by Appr:         *                B                A               D
AllWayAvgQ:   0.0  0.0   0.0   0.2  0.2   0.2   0.4  0.4   0.4   5.8  5.8   5.8
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```

2011 AM Existing Tue Mar 27, 2012 15:58:38 Page 8-1

Garaventa Hills EIR (Project 172670)
Existing (2011) - AM Peak Hour
Kittelson and Associates, Inc.

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #406 Garaventa Ranch Rd/ Altamont Creek Dr

Cycle (sec):	100	Critical Vol./Cap.(X):	0.364
Loss Time (sec):	0	Average Delay (sec/veh):	9.9
Optimal Cycle:	0	Level Of Service:	A

Street Name:	Garaventa Ranch Rd						Altamont Creek Dr					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1	0 1	0	1 0	0 0	0	0 0	0 0	0	0 1!	0 0
Volume Module: >> Count Date: 1 Dec 2011 << 7:45-8:45 AM												
Base Vol:	0	162	28	60	105	0	0	0	0	27	0	73
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	162	28	60	105	0	0	0	0	27	0	73
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
PHF Volume:	0	252	44	93	163	0	0	0	0	42	0	114
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	252	44	93	163	0	0	0	0	42	0	114
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	252	44	93	163	0	0	0	0	42	0	114
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	1.00	0.36	0.64	0.00	0.00	0.00	0.00	0.27	0.00	0.73
Final Sat.:	0	692	799	267	467	0	0	0	0	190	0	514
Capacity Analysis Module:												
Vol/Sat:	xxxx	0.36	0.05	0.35	0.35	xxxx	xxxx	xxxx	xxxx	0.22	xxxx	0.22
Crit Moves:		****			****					****		
Delay/Veh:	0.0	10.6	7.3	10.2	10.2	0.0	0.0	0.0	0.0	9.0	0.0	9.0
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	10.6	7.3	10.2	10.2	0.0	0.0	0.0	0.0	9.0	0.0	9.0
LOS by Move:	*	B	A	B	B	*	*	*	*	A	*	A
ApproachDel:		10.1			10.2			xxxxxx			9.0	
Delay Adj:		1.00			1.00			xxxxx			1.00	
ApprAdjDel:		10.1			10.2			xxxxxx			9.0	
LOS by Appr:		B			B			*			A	
AllWayAvgQ:	0.0	0.5	0.1	0.5	0.5	0.5	0.0	0.0	0.0	0.2	0.2	0.2

Note: Queue reported is the number of cars per lane.

Existing (2011) PM Peak Hour – No Project

Detailed Intersection Level of Service Calculations from TRAFFIX ©

Garaventa Hills EIR (Project 172670)
Existing (2011) - PM Peak Hour
Kittelson and Associates, Inc.

Scenario Report

Scenario:	2011 PM Existing
Command:	2011 PM Existing
Volume:	2011 PM Peak Existing
Geometry:	Existing
Impact Fee:	None
Trip Generation:	None
Trip Distribution:	None
Paths:	Default Path
Routes:	Default Route
Configuration:	PM Peak

2011 PM Existing Tue Mar 27, 2012 16:08:52 Page 2-1

Garaventa Hills EIR (Project 172670)
Existing (2011) - PM Peak Hour
Kittelson and Associates, Inc.

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
#401 N. Vasco Rd/ Garaventa Ranch R	A	7.5	0.492	A	7.5	0.492	+ 0.000 D/V
#402 Laughlin Rd/ Bear Creek Dr	A	8.7	0.013	A	8.7	0.013	+ 0.000 D/V
#403 Hawk St/ Garaventa Ranch Rd	B	10.5	0.112	B	10.5	0.112	+ 0.000 D/V
#404 Laughlin Rd/ Altamont Creek Dr	A	9.2	0.035	A	9.2	0.035	+ 0.000 D/V
#405 Laughlin Rd/ Northfront Rd	B	11.0	0.553	B	11.0	0.553	+ 0.000 V/C
#406 Garaventa Ranch Rd/ Altamont C	A	8.3	0.190	A	8.3	0.190	+ 0.000 V/C

2011 PM Existing Tue Mar 27, 2012 16:08:52 Page 3-1

Garaventa Hills EIR (Project 172670)
Existing (2011) - PM Peak Hour
Kittelson and Associates, Inc.

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #401 N. Vasco Rd/ Garaventa Ranch Rd

Cycle (sec):	138	Critical Vol./Cap.(X):	0.492
Loss Time (sec):	12	Average Delay (sec/veh):	7.5
Optimal Cycle:	41	Level Of Service:	A

Street Name:	N Vasco Rd						Garaventa Ranch Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1	1 0	1 0	0	1 0	1 0	0	1 0
Volume Module: >> Count Date: 1 Dec 2011 << 3:30-4:30 PM												
Base Vol:	6	1387	63	13	460	1	4	6	14	46	12	20
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	6	1387	63	13	460	1	4	6	14	46	12	20
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
PHF Volume:	6	1452	66	14	482	1	4	6	15	48	13	21
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	6	1452	66	14	482	1	4	6	15	48	13	21
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	6	1452	66	14	482	1	4	6	15	48	13	21
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.85	0.95	0.95	0.95	0.95	0.90	0.88	0.95	0.91	0.90
Lanes:	1.00	2.00	1.00	1.00	1.99	0.01	1.00	0.30	0.70	1.00	0.37	0.63
Final Sat.:	1805	3610	1615	1805	3602	8	1805	506	1181	1805	645	1075
Capacity Analysis Module:												
Vol/Sat:	0.00	0.40	0.04	0.01	0.13	0.13	0.00	0.01	0.01	0.03	0.02	0.02
Crit Moves:		****		****				****		****		
Green/Cycle:	0.02	0.82	0.82	0.02	0.81	0.81	0.01	0.03	0.03	0.05	0.07	0.07
Volume/Cap:	0.16	0.49	0.05	0.49	0.16	0.16	0.27	0.49	0.49	0.49	0.27	0.27
Delay/Veh:	68.4	3.9	2.4	80.5	2.8	2.8	77.5	75.0	75.0	67.3	61.9	61.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	68.4	3.9	2.4	80.5	2.8	2.8	77.5	75.0	75.0	67.3	61.9	61.9
LOS by Move:	E	A	A	F	A	A	E	E	E	E	E	E
HCM2kAvgQ:	0	10	1	1	2	2	0	2	2	3	2	2

Note: Queue reported is the number of cars per lane.

```
2011 PM Existing           Tue Mar 27, 2012 16:08:52                 Page 4-1
------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                       Existing (2011) - PM Peak Hour
                       Kittelson and Associates, Inc.
------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #402 Laughlin Rd/ Bear Creek Dr
******************************************************************************
Average Delay (sec/veh):      1.7       Worst Case Level Of Service: A[  8.7]
******************************************************************************
Street Name:           Laughlin Rd                    Bear Creek Dr
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 1 Dec 2011 << 2:45-3:45 PM
Base Vol:      17   59     0     0   36     2     2    0     8     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   17   59     0     0   36     2     2    0     8     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.84 0.84  0.84  0.84 0.84  0.84  0.84 0.84  0.84  0.84 0.84  0.84
PHF Volume:    20   70     0     0   43     2     2    0    10     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   20   70     0     0   43     2     2    0    10     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   45 xxxx xxxxx  xxxx xxxx xxxxx   155  155    44  xxxx xxxx xxxxx
Potent Cap.: 1576 xxxx xxxxx  xxxx xxxx xxxxx   841  740  1032  xxxx xxxx xxxxx
Move Cap.:   1576 xxxx xxxxx  xxxx xxxx xxxxx   833  731  1032  xxxx xxxx xxxxx
Volume/Cap:  0.01 xxxx  xxxx  xxxx xxxx  xxxx  0.00 0.00  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  985 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  8.7 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    A     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx              8.7           xxxxxx
ApproachLOS:         *                *               A                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

```
2011 PM Existing           Tue Mar 27, 2012 16:08:52                  Page 5-1
-------------------------------------------------------------------------------
                     Garaventa Hills EIR (Project 172670)
                        Existing (2011) - PM Peak Hour
                        Kittelson and Associates, Inc.
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #403 Hawk St/ Garaventa Ranch Rd
*******************************************************************************
Average Delay (sec/veh):      2.7       Worst Case Level Of Service: B[ 10.5]
*******************************************************************************
Street Name:             Hawk St                     Garaventa Ranch Rd
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 1 Dec 2011 << 2:15-3:15 PM
Base Vol:       0    0     0     7    0    50    33   95     0     0  116    17
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0     7    0    50    33   95     0     0  116    17
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.55 0.55  0.55  0.55 0.55  0.55  0.55 0.55  0.55  0.55 0.55  0.55
PHF Volume:     0    0     0    13    0    91    60  173     0     0  212    31
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0    13    0    91    60  173     0     0  212    31
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   521  521   227   243 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   519  463   817  1336 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   501  441   817  1336 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.03 0.00  0.11  0.05 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.8 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  758 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.5 xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 10.5 xxxxx   7.8 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:    xxxxxx             10.5           xxxxxx           xxxxxx
ApproachLOS:         *              B                *                *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```

```
2011 PM Existing           Tue Mar 27, 2012 16:08:52                 Page 6-1
------------------------------------------------------------------------------
                     Garaventa Hills EIR (Project 172670)
                        Existing (2011) - PM Peak Hour
                        Kittelson and Associates, Inc.
------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #404 Laughlin Rd/ Altamont Creek Dr
******************************************************************************
Average Delay (sec/veh):      4.0       Worst Case Level Of Service: A[  9.2]
******************************************************************************
Street Name:           Laughlin Rd                    Altamont Creek Dr
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 1 Dec 2011 << 4:30 - 5:30 PM
Base Vol:      34   47     0     0   30    18    27    0    24     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   34   47     0     0   30    18    27    0    24     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.94 0.94  0.94  0.94 0.94  0.94  0.94 0.94  0.94  0.94 0.94  0.94
PHF Volume:    36   50     0     0   32    19    29    0    26     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   36   50     0     0   32    19    29    0    26     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   51 xxxx xxxxx  xxxx xxxx xxxxx   164  164    42  xxxx xxxx xxxxx
Potent Cap.: 1568 xxxx xxxxx  xxxx xxxx xxxxx   831  732  1035  xxxx xxxx xxxxx
Move Cap.:   1568 xxxx xxxxx  xxxx xxxx xxxxx   816  715  1035  xxxx xxxx xxxxx
Volume/Cap:  0.02 xxxx  xxxx  xxxx xxxx  xxxx  0.04 0.00  0.02  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  906 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.2 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  9.2 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    A     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx              9.2           xxxxxx
ApproachLOS:         *                *               A                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

```
2011 PM Existing           Tue Mar 27, 2012 16:08:52                 Page 7-1
------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                       Existing (2011) - PM Peak Hour
                       Kittelson and Associates, Inc.
------------------------------------------------------------------------------
                     Level Of Service Computation Report
            2000 HCM 4-Way Stop Method (Base Volume Alternative)
******************************************************************************
Intersection #405 Laughlin Rd/ Northfront Rd
******************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):         0.553
Loss Time (sec):       0              Average Delay (sec/veh):        11.0
Optimal Cycle:         0              Level Of Service:                  B
******************************************************************************
Street Name:           Laughlin Rd                    Northfront Rd
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     0    0     0     0    0     0     0    0     0     0    0     0
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 1 Dec 2011 << 4:45-5:45 PM
Base Vol:       0    0     0    23    0    31    61  382     0     0   76    44
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0    23    0    31    61  382     0     0   76    44
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.94 0.94  0.94  0.94 0.94  0.94  0.94 0.94  0.94  0.94 0.94  0.94
PHF Volume:     0    0     0    24    0    33    65  406     0     0   81    47
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0    0     0    24    0    33    65  406     0     0   81    47
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    0    0     0    24    0    33    65  406     0     0   81    47
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.00 0.00  0.00  0.43 0.00  0.57  0.14 0.86  0.00  0.00 0.63  0.37
Final Sat.:     0    0     0   287    0   387   117  734     0     0  520   301
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx xxxx  xxxx  0.09 xxxx  0.09  0.55 0.55  xxxx  xxxx 0.16  0.16
Crit Moves:                   ****              ****                   ****
Delay/Veh:    0.0  0.0   0.0   8.2  0.0   8.2  12.2 12.2   0.0   0.0  8.0   8.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0  0.0   0.0   8.2  0.0   8.2  12.2 12.2   0.0   0.0  8.0   8.0
LOS by Move:    *    *     *     A    *     A     B    B     *     *    A     A
ApproachDel:    xxxxxx             8.2             12.2             8.0
Delay Adj:       xxxxx             1.00            1.00             1.00
ApprAdjDel:     xxxxxx             8.2             12.2             8.0
LOS by Appr:         *              A                B                A
AllWayAvgQ:   0.0  0.0   0.0   0.1  0.1   0.1   1.2  1.2   1.2   0.2  0.2   0.2
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

```
2011 PM Existing           Tue Mar 27, 2012 16:08:52                 Page 8-1
-------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                       Existing (2011) - PM Peak Hour
                       Kittelson and Associates, Inc.
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
            2000 HCM 4-Way Stop Method (Base Volume Alternative)
*******************************************************************************
Intersection #406 Garaventa Ranch Rd/ Altamont Creek Dr
*******************************************************************************
Cycle (sec):         100                Critical Vol./Cap.(X):         0.190
Loss Time (sec):       0                Average Delay (sec/veh):         8.3
Optimal Cycle:         0                Level Of Service:                  A
*******************************************************************************
Street Name:        Garaventa Ranch Rd               Altamont Creek Dr
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     0    0     0     0    0     0     0    0     0     0    0     0
Lanes:        0  0  1  0  1    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 1 Dec 2011 << 2:15-3:15 PM
Base Vol:       0  104    29    35   77     0     0    0     0    33    0    42
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  104    29    35   77     0     0    0     0    33    0    42
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.75 0.75  0.75  0.75 0.75  0.75  0.75 0.75  0.75  0.75 0.75  0.75
PHF Volume:     0  139    39    47  103     0     0    0     0    44    0    56
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0  139    39    47  103     0     0    0     0    44    0    56
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    0  139    39    47  103     0     0    0     0    44    0    56
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.00 1.00  1.00  0.31 0.69  0.00  0.00 0.00  0.00  0.43 0.01  0.56
Final Sat.:     0  731   854   246  542     0     0    0     0   343    0   437
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx 0.19  0.05  0.19 0.19  xxxx  xxxx xxxx  xxxx  0.13 0.00  0.13
Crit Moves:       ****        ****                                      ****
Delay/Veh:    0.0  8.6   7.0   8.5  8.5   0.0   0.0  0.0   0.0   8.0  8.0   8.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0  8.6   7.0   8.5  8.5   0.0   0.0  0.0   0.0   8.0  8.0   8.0
LOS by Move:    *    A     A     A    A     *     *    *     *     A    A     A
ApproachDel:       8.3             8.5           xxxxxx             8.0
Delay Adj:        1.00             1.00           xxxxx             1.00
ApprAdjDel:        8.3             8.5           xxxxxx             8.0
LOS by Appr:         A               A                *               A
AllWayAvgQ:   0.0  0.2   0.0   0.2  0.2   0.2   0.0  0.0   0.0   0.1  0.1   0.1
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```

Existing (2011) AM Peak Hour Plus Project

Detailed Intersection Level of Service Calculations from TRAFFIX ©

Garaventa Hills EIR (Project 172670)
Existing (2011) + Project - AM Peak Hour
Kittelson and Associates, Inc.

Scenario Report

Scenario:	2011 AM Existing + Project
Command:	2011 AM Existing + Project
Volume:	2011 AM Peak Existing + Project
Geometry:	Existing
Impact Fee:	None
Trip Generation:	None
Trip Distribution:	None
Paths:	Default Path
Routes:	Default Route
Configuration:	AM Peak

Garaventa Hills EIR (Project 172670)
Existing (2011) + Project - AM Peak Hour
Kittelson and Associates, Inc.

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in	
#401 N. Vasco Rd/ Garaventa Ranch R	C	30.5	0.461	C	30.5	0.461	+ 0.000	D/V
#402 Laughlin Rd/ Bear Creek Dr	A	8.9	0.055	A	8.9	0.055	+ 0.000	D/V
#403 Hawk St/ Garaventa Ranch Rd	B	12.5	0.090	B	12.5	0.090	+ 0.000	D/V
#404 Laughlin Rd/ Altamont Creek Dr	A	9.3	0.053	A	9.3	0.053	+ 0.000	D/V
#405 Laughlin Rd/ Northfront Rd	D	27.2	0.914	D	27.2	0.914	+ 0.000	V/C
#406 Garaventa Ranch Rd/ Altamont C	B	10.1	0.380	B	10.1	0.380	+ 0.000	V/C

2011 AM Existing + Project Tue Mar 27, 2012 16:08:39 Page 3-1

Garaventa Hills EIR (Project 172670)
Existing (2011) + Project - AM Peak Hour
Kittelson and Associates, Inc.

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #401 N. Vasco Rd/ Garaventa Ranch Rd

Cycle (sec):	138	Critical Vol./Cap.(X):	0.461
Loss Time (sec):	12	Average Delay (sec/veh):	30.5
Optimal Cycle:	39	Level Of Service:	C

Street Name:	N Vasco Rd						Garaventa Ranch Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1 1	0	1 0	0 1	0	1 0	0 1	0
Volume Module: >> Count Date: 1 Dec 2011 << 7:45-8:45 AM												
Base Vol:	49	456	61	56	734	12	1	115	26	119	138	44
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	49	456	61	56	734	12	1	115	26	119	138	44
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PHF Volume:	55	509	68	63	820	13	1	128	29	133	154	49
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	55	509	68	63	820	13	1	128	29	133	154	49
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	55	509	68	63	820	13	1	128	29	133	154	49
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.82	0.95	0.95	0.95	0.95	0.97	0.97	0.95	0.96	0.96
Lanes:	1.00	2.00	1.00	1.00	1.97	0.03	1.00	0.82	0.18	1.00	0.76	0.24
Final Sat.:	1805	3610	1560	1805	3545	58	1805	1506	340	1805	1386	442
Capacity Analysis Module:												
Vol/Sat:	0.03	0.14	0.04	0.03	0.23	0.23	0.00	0.09	0.09	0.07	0.11	0.11
Crit Moves:	****				****			****		****		
Green/Cycle:	0.07	0.46	0.46	0.11	0.50	0.50	0.00	0.19	0.19	0.16	0.34	0.34
Volume/Cap:	0.46	0.31	0.10	0.31	0.46	0.46	0.32	0.46	0.46	0.46	0.32	0.32
Delay/Veh:	64.9	23.9	21.4	57.2	22.4	22.4	116.4	51.1	51.1	53.7	33.8	33.8
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	64.9	23.9	21.4	57.2	22.4	22.4	116.4	51.1	51.1	53.7	33.8	33.8
LOS by Move:	E	C	C+	E+	C+	C+	F	D-	D-	D-	C-	C-
HCM2kAvgQ:	3	7	2	3	12	12	0	6	6	5	6	6

Note: Queue reported is the number of cars per lane.

```
2011 AM Existing + Project Tue Mar 27, 2012 16:08:39                    Page 4-1
------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                  Existing (2011) + Project - AM Peak Hour
                       Kittelson and Associates, Inc.
------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #402 Laughlin Rd/ Bear Creek Dr
******************************************************************************
Average Delay (sec/veh):      3.0       Worst Case Level Of Service: A[  8.9]
******************************************************************************
Street Name:            Laughlin Rd                    Bear Creek Dr
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  1  0  0    0  0  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 1 Dec 2011 << 7:30-8:30 AM
Base Vol:      10   24     0     0   62     0     0    0    37     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   10   24     0     0   62     0     0    0    37     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.69 0.69  0.69  0.69 0.69  0.69  0.69 0.69  0.69  0.69 0.69  0.69
PHF Volume:    15   35     0     0   90     0     0    0    54     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   15   35     0     0   90     0     0    0    54     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   90 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx    90  xxxx xxxx xxxxx
Potent Cap.: 1517 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   973  xxxx xxxx xxxxx
Move Cap.:   1517 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   973  xxxx xxxx xxxxx
Volume/Cap:  0.01 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  0.06  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   0.2  xxxx xxxx xxxxx
Control Del:  7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   8.9 xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     A     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx              8.9           xxxxxx
ApproachLOS:         *                *                A                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

```
2011 AM Existing + Project Tue Mar 27, 2012 16:08:39                    Page 5-1
------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                  Existing (2011) + Project - AM Peak Hour
                       Kittelson and Associates, Inc.
------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #403 Hawk St/ Garaventa Ranch Rd
******************************************************************************
Average Delay (sec/veh):      2.2       Worst Case Level Of Service: B[ 12.5]
******************************************************************************
Street Name:             Hawk St                    Garaventa Ranch Rd
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 1 Dec 2011 << 7:30-8:30 AM
Base Vol:       0    0     0    16    0    39    40  153     0     0  185    17
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0    16    0    39    40  153     0     0  185    17
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.60 0.60  0.60  0.60 0.60  0.60  0.60 0.60  0.60  0.60 0.60  0.60
PHF Volume:     0    0     0    27    0    65    67  256     0     0  309    28
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0    27    0    65    67  256     0     0  309    28
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   713  713   324   338 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   401  360   722  1233 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   384  339   722  1233 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.07 0.00  0.09  0.05 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.2 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.1 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  575 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.6 xxxxx   0.2 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 12.5 xxxxx   8.1 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:    xxxxxx             12.5           xxxxxx           xxxxxx
ApproachLOS:         *                B                *                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

```
2011 AM Existing + Project Tue Mar 27, 2012 16:08:39                    Page 6-1
------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                  Existing (2011) + Project - AM Peak Hour
                       Kittelson and Associates, Inc.
------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #404 Laughlin Rd/ Altamont Creek Dr
******************************************************************************
Average Delay (sec/veh):      3.4       Worst Case Level Of Service: A[  9.3]
******************************************************************************
Street Name:           Laughlin Rd                    Altamont Creek Dr
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 1 Dec 2011 << 7:15-8:15 AM
Base Vol:      29   17     0     0   71    41    13    0    41     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   29   17     0     0   71    41    13    0    41     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82  0.82 0.82  0.82
PHF Volume:    35   21     0     0   86    50    16    0    50     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   35   21     0     0   86    50    16    0    50     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  136 xxxx xxxxx  xxxx xxxx xxxxx   203  203   111  xxxx xxxx xxxxx
Potent Cap.: 1460 xxxx xxxxx  xxxx xxxx xxxxx   790  697   947  xxxx xxxx xxxxx
Move Cap.:   1460 xxxx xxxxx  xxxx xxxx xxxxx   775  680   947  xxxx xxxx xxxxx
Volume/Cap:  0.02 xxxx  xxxx  xxxx xxxx  xxxx  0.02 0.00  0.05  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  899 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.2 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  9.3 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    A     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx              9.3           xxxxxx
ApproachLOS:         *                *               A              *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

```
2011 AM Existing + Project Tue Mar 27, 2012 16:08:39                    Page 7-1
------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                  Existing (2011) + Project - AM Peak Hour
                       Kittelson and Associates, Inc.
------------------------------------------------------------------------------
                      Level Of Service Computation Report
              2000 HCM 4-Way Stop Method (Base Volume Alternative)
******************************************************************************
Intersection #405 Laughlin Rd/ Northfront Rd
******************************************************************************
Cycle (sec):         100                Critical Vol./Cap.(X):         0.914
Loss Time (sec):       0                Average Delay (sec/veh):        27.2
Optimal Cycle:         0                Level Of Service:                  D
******************************************************************************
Street Name:           Laughlin Rd                     Northfront Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     0    0     0     0    0     0     0    0     0     0    0     0
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 1 Dec 2011 << 7:30-8:30 AM
Base Vol:       0    0     0    73    0    58    19  166     0     0  667    28
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0    73    0    58    19  166     0     0  667    28
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.96 0.96  0.96  0.96 0.96  0.96  0.96 0.96  0.96  0.96 0.96  0.96
PHF Volume:     0    0     0    76    0    61    20  174     0     0  698    29
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0    0     0    76    0    61    20  174     0     0  698    29
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    0    0     0    76    0    61    20  174     0     0  698    29
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.00 0.00  0.00  0.56 0.00  0.44  0.10 0.90  0.00  0.00 0.96  0.04
Final Sat.:     0    0     0   338    0   268    70  615     0     0  764    32
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx xxxx  xxxx  0.23 xxxx  0.23  0.28 0.28  xxxx  xxxx 0.91  0.91
Crit Moves:                                ****  ****                 ****
Delay/Veh:    0.0  0.0   0.0  10.3  0.0  10.3  10.0 10.0   0.0   0.0 35.0  35.0
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0  0.0   0.0  10.3  0.0  10.3  10.0 10.0   0.0   0.0 35.0  35.0
LOS by Move:    *    *     *     B    *     B     B    B     *     *    D     D
ApproachDel:    xxxxxx             10.3             10.0             35.0
Delay Adj:       xxxxx             1.00             1.00             1.00
ApprAdjDel:     xxxxxx             10.3             10.0             35.0
LOS by Appr:         *                B                B                D
AllWayAvgQ:   0.0  0.0   0.0   0.3  0.3   0.3   0.4  0.4   0.4   6.1  6.1   6.1
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

2011 AM Existing + Project Tue Mar 27, 2012 16:08:39 Page 8-1

Garaventa Hills EIR (Project 172670)
Existing (2011) + Project - AM Peak Hour
Kittelson and Associates, Inc.

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #406 Garaventa Ranch Rd/ Altamont Creek Dr

Cycle (sec):	100	Critical Vol./Cap.(X):	0.380
Loss Time (sec):	0	Average Delay (sec/veh):	10.1
Optimal Cycle:	0	Level Of Service:	B

Street Name:	Garaventa Ranch Rd						Altamont Creek Dr					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1	0 1	0	1 0	0 0	0	0 0	0 0	0	0 1!	0 0
Volume Module: >> Count Date: 1 Dec 2011 << 7:45-8:45 AM												
Base Vol:	0	168	28	60	116	0	0	0	0	29	0	73
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	168	28	60	116	0	0	0	0	29	0	73
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
PHF Volume:	0	261	44	93	180	0	0	0	0	45	0	114
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	261	44	93	180	0	0	0	0	45	0	114
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	261	44	93	180	0	0	0	0	45	0	114
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	1.00	0.34	0.66	0.00	0.00	0.00	0.00	0.28	0.00	0.72
Final Sat.:	0	688	794	249	481	0	0	0	0	197	0	496
Capacity Analysis Module:												
Vol/Sat:	xxxx	0.38	0.05	0.37	0.37	xxxx	xxxx	xxxx	xxxx	0.23	xxxx	0.23
Crit Moves:		****			****					****		
Delay/Veh:	0.0	10.8	7.4	10.5	10.5	0.0	0.0	0.0	0.0	9.1	0.0	9.1
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	10.8	7.4	10.5	10.5	0.0	0.0	0.0	0.0	9.1	0.0	9.1
LOS by Move:	*	B	A	B	B	*	*	*	*	A	*	A
ApproachDel:		10.3			10.5			xxxxxx			9.1	
Delay Adj:		1.00			1.00			xxxxx			1.00	
ApprAdjDel:		10.3			10.5			xxxxxx			9.1	
LOS by Appr:		B			B			*			A	
AllWayAvgQ:	0.0	0.6	0.1	0.6	0.6	0.6	0.0	0.0	0.0	0.2	0.2	0.2

Note: Queue reported is the number of cars per lane.

Existing (2011) PM Peak Hour Plus Project

Detailed Intersection Level of Service Calculations from TRAFFIX ©

Garaventa Hills EIR (Project 172670)
Existing (2011) + Project - PM Peak Hour
Kittelson and Associates, Inc.

Scenario Report

Scenario:	2011 PM Existing + Project
Command:	2011 PM Existing + Project
Volume:	2011 PM Peak Existing + Project
Geometry:	Existing
Impact Fee:	None
Trip Generation:	None
Trip Distribution:	None
Paths:	Default Path
Routes:	Default Route
Configuration:	PM Peak

Garaventa Hills EIR (Project 172670)
Existing (2011) + Project - PM Peak Hour
Kittelson and Associates, Inc.

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in	
#401 N. Vasco Rd/ Garaventa Ranch R	A	8.3	0.499	A	8.3	0.499	+ 0.000	D/V
#402 Laughlin Rd/ Bear Creek Dr	A	8.7	0.030	A	8.7	0.030	+ 0.000	D/V
#403 Hawk St/ Garaventa Ranch Rd	B	11.6	0.131	B	11.6	0.131	+ 0.000	D/V
#404 Laughlin Rd/ Altamont Creek Dr	A	9.4	0.046	A	9.4	0.046	+ 0.000	D/V
#405 Laughlin Rd/ Northfront Rd	B	11.2	0.567	B	11.2	0.567	+ 0.000	V/C
#406 Garaventa Ranch Rd/ Altamont C	A	8.4	0.210	A	8.4	0.210	+ 0.000	V/C

2011 PM Existing + Project Tue Mar 27, 2012 16:08:43 Page 3-1

Garaventa Hills EIR (Project 172670)
Existing (2011) + Project - PM Peak Hour
Kittelson and Associates, Inc.

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #401 N. Vasco Rd/ Garaventa Ranch Rd

Cycle (sec):	138	Critical Vol./Cap.(X):	0.499
Loss Time (sec):	12	Average Delay (sec/veh):	8.3
Optimal Cycle:	42	Level Of Service:	A

Street Name:	N Vasco Rd						Garaventa Ranch Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1	1 0	1 0	0	1 0	1 0	0	1 0
Volume Module: >> Count Date: 1 Dec 2011 << 3:30-4:30 PM												
Base Vol:	6	1387	69	17	460	1	4	9	14	50	14	21
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	6	1387	69	17	460	1	4	9	14	50	14	21
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
PHF Volume:	6	1452	72	18	482	1	4	9	15	52	15	22
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	6	1452	72	18	482	1	4	9	15	52	15	22
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	6	1452	72	18	482	1	4	9	15	52	15	22
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.85	0.95	0.95	0.95	0.95	0.91	0.90	0.95	0.91	0.91
Lanes:	1.00	2.00	1.00	1.00	1.99	0.01	1.00	0.39	0.61	1.00	0.40	0.60
Final Sat.:	1805	3610	1615	1805	3602	8	1805	672	1045	1805	691	1037
Capacity Analysis Module:												
Vol/Sat:	0.00	0.40	0.04	0.01	0.13	0.13	0.00	0.01	0.01	0.03	0.02	0.02
Crit Moves:		****		****				****		****		
Green/Cycle:	0.02	0.81	0.81	0.02	0.81	0.81	0.01	0.03	0.03	0.06	0.08	0.08
Volume/Cap:	0.17	0.50	0.06	0.50	0.17	0.17	0.27	0.50	0.50	0.50	0.27	0.27
Delay/Veh:	68.4	4.4	2.7	77.5	3.0	3.0	77.4	74.0	74.0	66.7	61.1	61.1
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	68.4	4.4	2.7	77.5	3.0	3.0	77.4	74.0	74.0	66.7	61.1	61.1
LOS by Move:	E	A	A	E	A	A	E	E	E	E	E	E
HCM2kAvgQ:	0	10	1	1	2	2	0	2	2	3	2	2

Note: Queue reported is the number of cars per lane.

```
2011 PM Existing + Project Tue Mar 27, 2012 16:08:43                    Page 4-1
------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                  Existing (2011) + Project - PM Peak Hour
                       Kittelson and Associates, Inc.
------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #402 Laughlin Rd/ Bear Creek Dr
******************************************************************************
Average Delay (sec/veh):      2.8       Worst Case Level Of Service: A[  8.7]
******************************************************************************
Street Name:            Laughlin Rd                     Bear Creek Dr
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 1 Dec 2011 << 2:45-3:45 PM
Base Vol:      39   59     0     0   36     2     2    0    13     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   39   59     0     0   36     2     2    0    13     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.84 0.84  0.84  0.84 0.84  0.84  0.84 0.84  0.84  0.84 0.84  0.84
PHF Volume:    47   70     0     0   43     2     2    0    16     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   47   70     0     0   43     2     2    0    16     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   45 xxxx xxxxx  xxxx xxxx xxxxx   208  208    44  xxxx xxxx xxxxx
Potent Cap.: 1576 xxxx xxxxx  xxxx xxxx xxxxx   785  693  1032  xxxx xxxx xxxxx
Move Cap.:   1576 xxxx xxxxx  xxxx xxxx xxxxx   767  672  1032  xxxx xxxx xxxxx
Volume/Cap:  0.03 xxxx  xxxx  xxxx xxxx  xxxx  0.00 0.00  0.02  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  986 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.1 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  8.7 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    A     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx              8.7           xxxxxx
ApproachLOS:         *                *               A                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

```
2011 PM Existing + Project Tue Mar 27, 2012 16:08:43                    Page 5-1
------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                  Existing (2011) + Project - PM Peak Hour
                       Kittelson and Associates, Inc.
------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #403 Hawk St/ Garaventa Ranch Rd
******************************************************************************
Average Delay (sec/veh):      3.5       Worst Case Level Of Service: B[ 11.6]
******************************************************************************
Street Name:             Hawk St                     Garaventa Ranch Rd
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 1 Dec 2011 << 2:15-3:15 PM
Base Vol:       0    0     0    18    0    58    47   95     0     0  116    26
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0    18    0    58    47   95     0     0  116    26
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.55 0.55  0.55  0.55 0.55  0.55  0.55 0.55  0.55  0.55 0.55  0.55
PHF Volume:     0    0     0    33    0   106    86  173     0     0  212    47
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0    33    0   106    86  173     0     0  212    47
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   580  580   235   259 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   480  428   809  1317 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   455  399   809  1317 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.07 0.00  0.13  0.07 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.2 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   7.9 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  683 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.8 xxxxx   0.2 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 11.6 xxxxx   7.9 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:    xxxxxx             11.6           xxxxxx           xxxxxx
ApproachLOS:         *                B                *                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

```
2011 PM Existing + Project Tue Mar 27, 2012 16:08:43                    Page 6-1
------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                  Existing (2011) + Project - PM Peak Hour
                       Kittelson and Associates, Inc.
------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #404 Laughlin Rd/ Altamont Creek Dr
******************************************************************************
Average Delay (sec/veh):      3.8       Worst Case Level Of Service: A[  9.4]
******************************************************************************
Street Name:           Laughlin Rd                    Altamont Creek Dr
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 1 Dec 2011 << 4:30 - 5:30 PM
Base Vol:      34   62    0     0   33   20    34    0   24     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00  1.00
Initial Bse:   34   62    0     0   33   20    34    0   24     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00  1.00
PHF Adj:     0.94 0.94  0.94  0.94 0.94 0.94  0.94 0.94 0.94  0.94 0.94  0.94
PHF Volume:    36   66    0     0   35   21    36    0   26     0    0     0
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0     0
FinalVolume:   36   66    0     0   35   21    36    0   26     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   57 xxxx xxxxx  xxxx xxxx xxxxx   184  184    46  xxxx xxxx xxxxx
Potent Cap.: 1561 xxxx xxxxx  xxxx xxxx xxxxx   809  713  1029  xxxx xxxx xxxxx
Move Cap.:   1561 xxxx xxxxx  xxxx xxxx xxxxx   795  697  1029  xxxx xxxx xxxxx
Volume/Cap:  0.02 xxxx  xxxx  xxxx xxxx  xxxx  0.05 0.00  0.02  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  878 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.2 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  9.4 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    A     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx              9.4          xxxxxx
ApproachLOS:         *                *               A               *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

2011 PM Existing + Project Tue Mar 27, 2012 16:08:43 Page 7-1

Garaventa Hills EIR (Project 172670)
Existing (2011) + Project - PM Peak Hour
Kittelson and Associates, Inc.

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #405 Laughlin Rd/ Northfront Rd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.567
Loss Time (sec):	0	Average Delay (sec/veh):	11.2
Optimal Cycle:	0	Level Of Service:	B

Street Name:	Laughlin Rd						Northfront Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0	0 0	0	0	1! 0	0	1	0 0	0	0	0 1 0
Volume Module: >> Count Date: 1 Dec 2011 << 4:45-5:45 PM												
Base Vol:	0	0	0	26	0	31	70	382	0	0	78	50
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	26	0	31	70	382	0	0	78	50
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
PHF Volume:	0	0	0	28	0	33	74	406	0	0	83	53
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	28	0	33	74	406	0	0	83	53
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	28	0	33	74	406	0	0	83	53
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.46	0.00	0.54	0.15	0.85	0.00	0.00	0.61	0.39
Final Sat.:	0	0	0	304	0	362	131	716	0	0	499	320
Capacity Analysis Module:												
Vol/Sat:	xxxx	xxxx	xxxx	0.09	xxxx	0.09	0.57	0.57	xxxx	xxxx	0.17	0.17
Crit Moves:				****				****			****	
Delay/Veh:	0.0	0.0	0.0	8.3	0.0	8.3	12.5	12.5	0.0	0.0	8.1	8.1
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	8.3	0.0	8.3	12.5	12.5	0.0	0.0	8.1	8.1
LOS by Move:	*	*	*	A	*	A	B	B	*	*	A	A
ApproachDel:	xxxxxx			8.3			12.5			8.1		
Delay Adj:	xxxxx			1.00			1.00			1.00		
ApprAdjDel:	xxxxxx			8.3			12.5			8.1		
LOS by Appr:	*			A			B			A		
AllWayAvgQ:	0.0	0.0	0.0	0.1	0.1	0.1	1.2	1.2	1.2	0.2	0.2	0.2

Note: Queue reported is the number of cars per lane.

```
2011 PM Existing + Project Tue Mar 27, 2012 16:08:43                    Page 8-1
-------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                  Existing (2011) + Project - PM Peak Hour
                       Kittelson and Associates, Inc.
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
              2000 HCM 4-Way Stop Method (Base Volume Alternative)
*******************************************************************************
Intersection #406 Garaventa Ranch Rd/ Altamont Creek Dr
*******************************************************************************
Cycle (sec):         100                Critical Vol./Cap.(X):         0.210
Loss Time (sec):       0                Average Delay (sec/veh):         8.4
Optimal Cycle:         0                Level Of Service:                  A
*******************************************************************************
Street Name:        Garaventa Ranch Rd               Altamont Creek Dr
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     0    0     0     0    0     0     0    0     0     0    0     0
Lanes:        0  0  1  0  1    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 1 Dec 2011 << 2:15-3:15 PM
Base Vol:       0  113    36    35   88     0     0    0     0    34    0    42
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  113    36    35   88     0     0    0     0    34    0    42
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.75 0.75  0.75  0.75 0.75  0.75  0.75 0.75  0.75  0.75 0.75  0.75
PHF Volume:     0  151    48    47  118     0     0    0     0    45    0    56
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0  151    48    47  118     0     0    0     0    45    0    56
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    0  151    48    47  118     0     0    0     0    45    0    56
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.00 1.00  1.00  0.28 0.72  0.00  0.00 0.00  0.00  0.45 0.00  0.55
Final Sat.:     0  729   849   223  562     0     0    0     0   342    0   422
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx 0.21  0.06  0.21 0.21  xxxx  xxxx xxxx  xxxx  0.13 xxxx  0.13
Crit Moves:       ****             ****                          ****
Delay/Veh:    0.0  8.8   7.1   8.7  8.7   0.0   0.0  0.0   0.0   8.1  0.0   8.1
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0  8.8   7.1   8.7  8.7   0.0   0.0  0.0   0.0   8.1  0.0   8.1
LOS by Move:    *    A     A     A    A     *     *    *     *     A    *     A
ApproachDel:       8.4              8.7           xxxxxx             8.1
Delay Adj:        1.00              1.00           xxxxx             1.00
ApprAdjDel:        8.4              8.7           xxxxxx             8.1
LOS by Appr:         A                A                *               A
AllWayAvgQ:   0.0  0.2   0.1   0.3  0.3   0.3   0.0  0.0   0.0   0.1  0.1   0.1
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```

Cumulative (2025) AM Peak Hour - No Project

Detailed Intersection Level of Service Calculations from TRAFFIX ©

Garaventa Hills EIR (Project 172670)
Cumulative (2025) - AM Peak Hour
Kittelson and Associates, Inc.

Scenario Report

Scenario:	2025 AM Cumulative
Command:	2025 AM Cumulative
Volume:	2025 AM Cumulative
Geometry:	Cumulative
Impact Fee:	None
Trip Generation:	None
Trip Distribution:	None
Paths:	Default Path
Routes:	Default Route
Configuration:	AM Peak

2025 AM Cumulative Tue Mar 27, 2012 16:09:02 Page 2-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) - AM Peak Hour
Kittelson and Associates, Inc.

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in	
#401 N. Vasco Rd/ Garaventa Ranch R	C	30.2	0.617	C	30.2	0.617	+ 0.000	D/V
#402 Laughlin Rd/ Bear Creek Dr	A	9.2	0.035	A	9.2	0.035	+ 0.000	D/V
#403 Hawk St/ Garaventa Ranch Rd	B	11.1	0.034	B	11.1	0.034	+ 0.000	D/V
#404 Laughlin Rd/ Altamont Creek Dr	B	10.9	0.169	B	10.9	0.169	+ 0.000	D/V
#405 Laughlin Rd/ Northfront Rd	F	339.6	2.148	F	339.6	2.148	+ 0.000	V/C
#406 Garaventa Ranch Rd/ Altamont C	B	11.5	0.550	B	11.5	0.550	+ 0.000	V/C

2025 AM Cumulative Tue Mar 27, 2012 16:09:02 Page 3-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) - AM Peak Hour
Kittelson and Associates, Inc.

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #401 N. Vasco Rd/ Garaventa Ranch Rd

Cycle (sec):	138	Critical Vol./Cap.(X):	0.617
Loss Time (sec):	12	Average Delay (sec/veh):	30.2
Optimal Cycle:	52	Level Of Service:	C

Street Name:	N Vasco Rd						Garaventa Ranch Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1 1	0	1 0	0 1	0	1 0	0 1	0
Volume Module:												
Base Vol:	49	464	75	60	1213	13	0	123	26	142	188	159
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	49	464	75	60	1213	13	0	123	26	142	188	159
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	49	464	75	60	1213	13	0	123	26	142	188	159
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	49	464	75	60	1213	13	0	123	26	142	188	159
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	49	464	75	60	1213	13	0	123	26	142	188	159
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.85	0.95	0.95	0.95	1.00	0.97	0.97	0.95	0.93	0.93
Lanes:	1.00	2.00	1.00	1.00	1.98	0.02	1.00	0.83	0.17	1.00	0.54	0.46
Final Sat.:	1805	3610	1615	1805	3565	38	1900	1528	323	1805	958	811
Capacity Analysis Module:												
Vol/Sat:	0.03	0.13	0.05	0.03	0.34	0.34	0.00	0.08	0.08	0.08	0.20	0.20
Crit Moves:	****				****		****				****	
Green/Cycle:	0.04	0.47	0.47	0.12	0.55	0.55	0.00	0.16	0.16	0.16	0.32	0.32
Volume/Cap:	0.62	0.27	0.10	0.27	0.62	0.62	0.00	0.50	0.50	0.50	0.62	0.62
Delay/Veh:	78.6	22.1	20.2	55.6	21.7	21.7	0.0	54.2	54.2	54.6	42.0	42.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	78.6	22.1	20.2	55.6	21.7	21.7	0.0	54.2	54.2	54.6	42.0	42.0
LOS by Move:	E-	C+	C+	E+	C+	C+	A	D-	D-	D-	D	D
HCM2kAvgQ:	3	6	2	2	18	18	0	6	6	6	13	13

Note: Queue reported is the number of cars per lane.

```
2025 AM Cumulative         Tue Mar 27, 2012 16:09:02                  Page 4-1
------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                      Cumulative (2025) - AM Peak Hour
                       Kittelson and Associates, Inc.
------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #402 Laughlin Rd/ Bear Creek Dr
******************************************************************************
Average Delay (sec/veh):      1.4       Worst Case Level Of Service: A[  9.2]
******************************************************************************
Street Name:           Laughlin Rd                    Bear Creek Dr
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  1  0  0    0  0  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      11   57     0     0  165     0     0    0    31     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   11   57     0     0  165     0     0    0    31     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    11   57     0     0  165     0     0    0    31     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   11   57     0     0  165     0     0    0    31     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  165 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   165  xxxx xxxx xxxxx
Potent Cap.: 1426 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   885  xxxx xxxx xxxxx
Move Cap.:   1426 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   885  xxxx xxxx xxxxx
Volume/Cap:  0.01 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  0.04  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   0.1  xxxx xxxx xxxxx
Control Del:  7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   9.2 xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     A     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx              9.2           xxxxxx
ApproachLOS:         *                *                A                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

```
2025 AM Cumulative         Tue Mar 27, 2012 16:09:02                 Page 5-1
------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                      Cumulative (2025) - AM Peak Hour
                       Kittelson and Associates, Inc.
------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #403 Hawk St/ Garaventa Ranch Rd
******************************************************************************
Average Delay (sec/veh):      1.0       Worst Case Level Of Service: B[ 11.1]
******************************************************************************
Street Name:             Hawk St                    Garaventa Ranch Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0     5    0    23    37  179     0     0  368    11
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0     5    0    23    37  179     0     0  368    11
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0     5    0    23    37  179     0     0  368    11
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0     5    0    23    37  179     0     0  368    11
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   627  627   374   379 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   451  403   677  1191 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   440  390   677  1191 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.01 0.00  0.03  0.03 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.1 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  618 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.1 xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 11.1 xxxxx   8.1 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:    xxxxxx           11.1           xxxxxx           xxxxxx
ApproachLOS:         *             B                *                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

```
2025 AM Cumulative         Tue Mar 27, 2012 16:09:02                  Page 6-1
------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                      Cumulative (2025) - AM Peak Hour
                       Kittelson and Associates, Inc.
------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #404 Laughlin Rd/ Altamont Creek Dr
******************************************************************************
Average Delay (sec/veh):      4.5       Worst Case Level Of Service: B[ 10.9]
******************************************************************************
Street Name:           Laughlin Rd                    Altamont Creek Dr
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     231   51     0     0   59   154    14    0    41     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  231   51     0     0   59   154    14    0    41     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   231   51     0     0   59   154    14    0    41     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:  231   51     0     0   59   154    14    0    41     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  213 xxxx xxxxx  xxxx xxxx xxxxx   649  649   136  xxxx xxxx xxxxx
Potent Cap.: 1369 xxxx xxxxx  xxxx xxxx xxxxx   438  391   918  xxxx xxxx xxxxx
Move Cap.:   1369 xxxx xxxxx  xxxx xxxx xxxxx   372  316   918  xxxx xxxx xxxxx
Volume/Cap:  0.17 xxxx  xxxx  xxxx xxxx  xxxx  0.04 0.00  0.04  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.6 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  8.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  669 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.6 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.3 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  8.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 10.9 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    B     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx             10.9           xxxxxx
ApproachLOS:         *                *                B                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

```
2025 AM Cumulative         Tue Mar 27, 2012 16:09:02                 Page 7-1
-------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                      Cumulative (2025) - AM Peak Hour
                       Kittelson and Associates, Inc.
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
              2000 HCM 4-Way Stop Method (Base Volume Alternative)
*******************************************************************************
Intersection #405 Laughlin Rd/ Northfront Rd
*******************************************************************************
Cycle (sec):         100                Critical Vol./Cap.(X):         2.148
Loss Time (sec):       0                Average Delay (sec/veh):       339.6
Optimal Cycle:         0                Level Of Service:                  F
*******************************************************************************
Street Name:           Laughlin Rd                    Northfront Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     0    0     0     0    0     0     0    0     0     0    0     0
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0   363    0   428   152  301     0     0  738   456
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0   363    0   428   152  301     0     0  738   456
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0   363    0   428   152  301     0     0  738   456
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0    0     0   363    0   428   152  301     0     0  738   456
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    0    0     0   363    0   428   152  301     0     0  738   456
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.00 0.00  0.00  0.46 0.00  0.54  0.34 0.66  0.00  0.00 0.62  0.38
Final Sat.:     0    0     0   259    0   305   175  346     0     0  344   212
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx xxxx  xxxx  1.40 xxxx  1.40  0.87 0.87  xxxx  xxxx 2.15  2.15
Crit Moves:                   ****                   ****               ****
Delay/Veh:    0.0  0.0   0.0 211.2  0.0 211.2  40.4 40.4   0.0   0.0  538 538.1
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0  0.0   0.0 211.2  0.0 211.2  40.4 40.4   0.0   0.0  538 538.1
LOS by Move:    *    *     *     F    *     F     E    E     *     *    F     F
ApproachDel:    xxxxxx           211.2             40.4            538.1
Delay Adj:       xxxxx             1.00             1.00             1.00
ApprAdjDel:     xxxxxx           211.2             40.4            538.1
LOS by Appr:         *               F                E                F
AllWayAvgQ:   0.0  0.0   0.0  31.6 31.6  31.6   4.4  4.4   4.4  81.6 81.6  81.6
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```

```
2025 AM Cumulative         Tue Mar 27, 2012 16:09:02                  Page 8-1
------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                      Cumulative (2025) - AM Peak Hour
                       Kittelson and Associates, Inc.
------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM 4-Way Stop Method (Base Volume Alternative)
******************************************************************************
Intersection #406 Garaventa Ranch Rd/ Altamont Creek Dr
******************************************************************************
Cycle (sec):         100                Critical Vol./Cap.(X):         0.550
Loss Time (sec):       0                Average Delay (sec/veh):        11.5
Optimal Cycle:         0                Level Of Service:                  B
******************************************************************************
Street Name:        Garaventa Ranch Rd               Altamont Creek Dr
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     0    0     0     0    0     0     0    0     0     0    0     0
Lanes:        0  0  1  0  1    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  167    28    60  123     0     0    0     0   170    0   248
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  167    28    60  123     0     0    0     0   170    0   248
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  167    28    60  123     0     0    0     0   170    0   248
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0  167    28    60  123     0     0    0     0   170    0   248
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    0  167    28    60  123     0     0    0     0   170    0   248
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.00 1.00  1.00  0.33 0.67  0.00  0.00 0.00  0.00  0.41 0.00  0.59
Final Sat.:     0  598   676   209  428     0     0    0     0   309    0   451
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx 0.28  0.04  0.29 0.29  xxxx  xxxx xxxx  xxxx  0.55 xxxx  0.55
Crit Moves:       ****        ****                               ****
Delay/Veh:    0.0 10.4   7.9  10.3 10.3   0.0   0.0  0.0   0.0  12.7  0.0  12.7
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0 10.4   7.9  10.3 10.3   0.0   0.0  0.0   0.0  12.7  0.0  12.7
LOS by Move:    *    B     A     B    B     *     *    *     *     B    *     B
ApproachDel:       10.1             10.3           xxxxxx            12.7
Delay Adj:         1.00             1.00            xxxxx            1.00
ApprAdjDel:        10.1             10.3           xxxxxx            12.7
LOS by Appr:          B                B                *                B
AllWayAvgQ:   0.0  0.3   0.0   0.3  0.3   0.3   0.0  0.0   0.0   1.1  1.1   1.1
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

Traffix 8.0.0715 (c) 2008 Dowling Assoc. Licensed to DOWLING ASSOC., OAKLAND

Cumulative (2025) PM Peak Hour - No Project

Detailed Intersection Level of Service Calculations from TRAFFIX ©

Garaventa Hills EIR (Project 172670)
Cumulative (2025) - PM Peak Hour
Kittelson and Associates, Inc.

Scenario Report

Scenario:	2025 PM Cumulative
Command:	2025 PM Cumulative
Volume:	2025 PM Cumulative
Geometry:	Cumulative
Impact Fee:	None
Trip Generation:	None
Trip Distribution:	None
Paths:	Default Path
Routes:	Default Route
Configuration:	PM Peak

2025 PM Cumulative Tue Mar 27, 2012 16:09:05 Page 2-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) - PM Peak Hour
Kittelson and Associates, Inc.

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in	
#401 N. Vasco Rd/ Garaventa Ranch R	C	25.3	0.705	C	25.3	0.705	+ 0.000	D/V
#402 Laughlin Rd/ Bear Creek Dr	A	9.1	0.017	A	9.1	0.017	+ 0.000	D/V
#403 Hawk St/ Garaventa Ranch Rd	B	11.4	0.074	B	11.4	0.074	+ 0.000	D/V
#404 Laughlin Rd/ Altamont Creek Dr	B	11.5	0.187	B	11.5	0.187	+ 0.000	D/V
#405 Laughlin Rd/ Northfront Rd	F	305.5	2.133	F	305.5	2.133	+ 0.000	V/C
#406 Garaventa Ranch Rd/ Altamont C	B	10.6	0.481	B	10.6	0.481	+ 0.000	V/C

2025 PM Cumulative Tue Mar 27, 2012 16:09:05 Page 3-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) - PM Peak Hour
Kittelson and Associates, Inc.

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #401 N. Vasco Rd/ Garaventa Ranch Rd

Cycle (sec):	138	Critical Vol./Cap.(X):	0.705
Loss Time (sec):	12	Average Delay (sec/veh):	25.3
Optimal Cycle:	64	Level Of Service:	C

Street Name:	N Vasco Rd						Garaventa Ranch Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1	1 0	1 0	0	1 0	1 0	0	1 0
Volume Module:												
Base Vol:	6	1526	115	105	526	2	5	29	14	73	20	242
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	6	1526	115	105	526	2	5	29	14	73	20	242
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	6	1526	115	105	526	2	5	29	14	73	20	242
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	6	1526	115	105	526	2	5	29	14	73	20	242
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	6	1526	115	105	526	2	5	29	14	73	20	242
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.85	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.86	0.86
Lanes:	1.00	2.00	1.00	1.00	1.99	0.01	1.00	0.67	0.33	1.00	0.08	0.92
Final Sat.:	1805	3610	1615	1805	3593	14	1805	1219	588	1805	125	1511
Capacity Analysis Module:												
Vol/Sat:	0.00	0.42	0.07	0.06	0.15	0.15	0.00	0.02	0.02	0.04	0.16	0.16
Crit Moves:		****		****			****				****	
Green/Cycle:	0.02	0.60	0.60	0.08	0.67	0.67	0.00	0.09	0.09	0.15	0.23	0.23
Volume/Cap:	0.22	0.71	0.12	0.71	0.22	0.22	0.71	0.28	0.28	0.28	0.71	0.71
Delay/Veh:	71.2	20.3	12.0	76.0	9.0	9.0	222.5	60.1	60.1	53.1	55.1	55.1
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	71.2	20.3	12.0	76.0	9.0	9.0	222.5	60.1	60.1	53.1	55.1	55.1
LOS by Move:	E	C	B	E	A	A	F	E	E	D	E	E
HCM2kAvgQ:	0	24	2	6	4	4	1	2	2	3	11	11

Note: Queue reported is the number of cars per lane.

```
2025 PM Cumulative         Tue Mar 27, 2012 16:09:05                  Page 4-1
------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                      Cumulative (2025) - PM Peak Hour
                       Kittelson and Associates, Inc.
------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #402 Laughlin Rd/ Bear Creek Dr
******************************************************************************
Average Delay (sec/veh):      1.1       Worst Case Level Of Service: A[  9.1]
******************************************************************************
Street Name:           Laughlin Rd                    Bear Creek Dr
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      26  174     0     0   98     3     3    0    13     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   26  174     0     0   98     3     3    0    13     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    26  174     0     0   98     3     3    0    13     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   26  174     0     0   98     3     3    0    13     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  101 xxxx xxxxx  xxxx xxxx xxxxx   326  326   100  xxxx xxxx xxxxx
Potent Cap.: 1504 xxxx xxxxx  xxxx xxxx xxxxx   673  596   962  xxxx xxxx xxxxx
Move Cap.:   1504 xxxx xxxxx  xxxx xxxx xxxxx   664  585   962  xxxx xxxx xxxxx
Volume/Cap:  0.02 xxxx  xxxx  xxxx xxxx  xxxx  0.00 0.00  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  887 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.1 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  9.1 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    A     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx              9.1           xxxxxx
ApproachLOS:         *                *               A                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

```
2025 PM Cumulative         Tue Mar 27, 2012 16:09:05                  Page 5-1
-------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                      Cumulative (2025) - PM Peak Hour
                       Kittelson and Associates, Inc.
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #403 Hawk St/ Garaventa Ranch Rd
*******************************************************************************
Average Delay (sec/veh):      1.2       Worst Case Level Of Service: B[ 11.4]
*******************************************************************************
Street Name:             Hawk St                     Garaventa Ranch Rd
Approach:       North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0     7    0    50    33  264     0     0  368    24
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0     7    0    50    33  264     0     0  368    24
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0     7    0    50    33  264     0     0  368    24
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0     7    0    50    33  264     0     0  368    24
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   710  710   380   392 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   403  361   671  1178 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   394  351   671  1178 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.02 0.00  0.07  0.03 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.1 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  618 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.3 xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 11.4 xxxxx   8.1 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:    xxxxxx           11.4           xxxxxx          xxxxxx
ApproachLOS:         *             B              *               *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```

```
2025 PM Cumulative         Tue Mar 27, 2012 16:09:05                  Page 6-1
------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                      Cumulative (2025) - PM Peak Hour
                       Kittelson and Associates, Inc.
------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #404 Laughlin Rd/ Altamont Creek Dr
******************************************************************************
Average Delay (sec/veh):      7.4       Worst Case Level Of Service: B[ 11.5]
******************************************************************************
Street Name:           Laughlin Rd                    Altamont Creek Dr
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      34   57     0     0   90    23   141    0   161     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   34   57     0     0   90    23   141    0   161     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    34   57     0     0   90    23   141    0   161     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   34   57     0     0   90    23   141    0   161     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  113 xxxx xxxxx  xxxx xxxx xxxxx   227  227   102  xxxx xxxx xxxxx
Potent Cap.: 1489 xxxx xxxxx  xxxx xxxx xxxxx   766  676   959  xxxx xxxx xxxxx
Move Cap.:   1489 xxxx xxxxx  xxxx xxxx xxxxx   753  661   959  xxxx xxxx xxxxx
Volume/Cap:  0.02 xxxx  xxxx  xxxx xxxx  xxxx  0.19 0.00  0.17  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  850 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  1.6 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 11.5 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    B     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx             11.5           xxxxxx
ApproachLOS:         *                *                B              *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

2025 PM Cumulative Tue Mar 27, 2012 16:09:05 Page 7-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) - PM Peak Hour
Kittelson and Associates, Inc.

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #405 Laughlin Rd/ Northfront Rd

Cycle (sec):	100	Critical Vol./Cap.(X):	2.133
Loss Time (sec):	0	Average Delay (sec/veh):	305.5
Optimal Cycle:	0	Level Of Service:	F

Street Name:	Laughlin Rd						Northfront Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0	0 0	0	0	1! 0	0	1	0 0	0	0	0 1 0
Volume Module:												
Base Vol:	0	0	0	217	0	462	380	730	0	0	200	375
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	217	0	462	380	730	0	0	200	375
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	217	0	462	380	730	0	0	200	375
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	217	0	462	380	730	0	0	200	375
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	217	0	462	380	730	0	0	200	375
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.32	0.00	0.68	0.34	0.66	0.00	0.00	0.35	0.65
Final Sat.:	0	0	0	179	0	382	178	342	0	0	194	364
Capacity Analysis Module:												
Vol/Sat:	xxxx	xxxx	xxxx	1.21	xxxx	1.21	2.13	2.13	xxxx	xxxx	1.03	1.03
Crit Moves:				****				****			****	
Delay/Veh:	0.0	0.0	0.0	132.5	0.0	132.5	532.4	532	0.0	0.0	71.7	71.7
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	132.5	0.0	132.5	532.4	532	0.0	0.0	71.7	71.7
LOS by Move:	*	*	*	F	*	F	F	F	*	*	F	F
ApproachDel:	xxxxxx			132.5			532.4			71.7		
Delay Adj:	xxxxx			1.00			1.00			1.00		
ApprAdjDel:	xxxxxx			132.5			532.4			71.7		
LOS by Appr:	*			F			F			F		
AllWayAvgQ:	0.0	0.0	0.0	19.2	19.2	19.2	75.5	75.5	75.5	9.6	9.6	9.6

Note: Queue reported is the number of cars per lane.

2025 PM Cumulative Tue Mar 27, 2012 16:09:05 Page 8-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) - PM Peak Hour
Kittelson and Associates, Inc.

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #406 Garaventa Ranch Rd/ Altamont Creek Dr

Cycle (sec):	100	Critical Vol./Cap.(X):	0.481
Loss Time (sec):	0	Average Delay (sec/veh):	10.6
Optimal Cycle:	0	Level Of Service:	B

Street Name:	Garaventa Ranch Rd						Altamont Creek Dr					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1	0 1	0	1 0	0 0	0	0 0	0 0	0	0 1!	0 0
Volume Module:												
Base Vol:	0	349	110	206	77	0	0	0	0	33	0	42
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	349	110	206	77	0	0	0	0	33	0	42
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	349	110	206	77	0	0	0	0	33	0	42
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	349	110	206	77	0	0	0	0	33	0	42
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	349	110	206	77	0	0	0	0	33	0	42
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	1.00	0.73	0.27	0.00	0.00	0.00	0.00	0.44	0.00	0.56
Final Sat.:	0	726	845	539	201	0	0	0	0	280	0	357
Capacity Analysis Module:												
Vol/Sat:	xxxx	0.48	0.13	0.38	0.38	xxxx	xxxx	xxxx	xxxx	0.12	xxxx	0.12
Crit Moves:		****		****						****		
Delay/Veh:	0.0	12.0	7.5	10.7	10.7	0.0	0.0	0.0	0.0	8.8	0.0	8.8
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	12.0	7.5	10.7	10.7	0.0	0.0	0.0	0.0	8.8	0.0	8.8
LOS by Move:	*	B	A	B	B	*	*	*	*	A	*	A
ApproachDel:		10.9			10.7			xxxxxx			8.8	
Delay Adj:		1.00			1.00			xxxxx			1.00	
ApprAdjDel:		10.9			10.7			xxxxxx			8.8	
LOS by Appr:		B			B			*			A	
AllWayAvgQ:	0.0	0.9	0.1	0.6	0.6	0.6	0.0	0.0	0.0	0.1	0.1	0.1

Note: Queue reported is the number of cars per lane.

Cumulative (2025) AM Peak Hour Plus Project

Detailed Intersection Level of Service Calculations from TRAFFIX ©

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project - AM Peak Hour
Kittelson and Associates, Inc.

Scenario Report

Scenario:	2025 AM Cumulative + Project
Command:	2025 AM Cumulative + Project
Volume:	2025 AM Cumulative + Project
Geometry:	Cumulative
Impact Fee:	None
Trip Generation:	None
Trip Distribution:	None
Paths:	Default Path
Routes:	Default Route
Configuration:	AM Peak

2025 AM Cumulative + ProjecTue Mar 27, 2012 16:08:55 Page 2-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project - AM Peak Hour
Kittelson and Associates, Inc.

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in	
#401 N. Vasco Rd/ Garaventa Ranch R	C	30.5	0.620	C	30.5	0.620	+ 0.000	D/V
#402 Laughlin Rd/ Bear Creek Dr	A	9.3	0.051	A	9.3	0.051	+ 0.000	D/V
#403 Hawk St/ Garaventa Ranch Rd	B	11.8	0.058	B	11.8	0.058	+ 0.000	D/V
#404 Laughlin Rd/ Altamont Creek Dr	B	11.0	0.171	B	11.0	0.171	+ 0.000	D/V
#405 Laughlin Rd/ Northfront Rd	F	342.5	2.150	F	342.5	2.150	+ 0.000	V/C
#406 Garaventa Ranch Rd/ Altamont C	B	11.7	0.559	B	11.7	0.559	+ 0.000	V/C

2025 AM Cumulative + ProjecTue Mar 27, 2012 16:08:55 Page 3-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project - AM Peak Hour
Kittelson and Associates, Inc.

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #401 N. Vasco Rd/ Garaventa Ranch Rd

Cycle (sec):	138	Critical Vol./Cap.(X):	0.620
Loss Time (sec):	12	Average Delay (sec/veh):	30.5
Optimal Cycle:	53	Level Of Service:	C

Street Name:	N Vasco Rd						Garaventa Ranch Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1	0 2	0 1	1	0 1	1 0	1	0 0	1 0	1	0 0	1 0
Volume Module:												
Base Vol:	49	464	77	60	1213	13	0	124	26	152	192	160
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	49	464	77	60	1213	13	0	124	26	152	192	160
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	49	464	77	60	1213	13	0	124	26	152	192	160
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	49	464	77	60	1213	13	0	124	26	152	192	160
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	49	464	77	60	1213	13	0	124	26	152	192	160
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.85	0.95	0.95	0.95	1.00	0.97	0.97	0.95	0.93	0.93
Lanes:	1.00	2.00	1.00	1.00	1.98	0.02	1.00	0.83	0.17	1.00	0.55	0.45
Final Sat.:	1805	3610	1615	1805	3565	38	1900	1530	321	1805	966	805
Capacity Analysis Module:												
Vol/Sat:	0.03	0.13	0.05	0.03	0.34	0.34	0.00	0.08	0.08	0.08	0.20	0.20
Crit Moves:	****				****		****				****	
Green/Cycle:	0.04	0.47	0.47	0.12	0.55	0.55	0.00	0.16	0.16	0.16	0.32	0.32
Volume/Cap:	0.62	0.27	0.10	0.27	0.62	0.62	0.00	0.52	0.52	0.52	0.62	0.62
Delay/Veh:	79.0	22.3	20.4	55.7	21.9	21.9	0.0	54.9	54.9	54.3	41.9	41.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	79.0	22.3	20.4	55.7	21.9	21.9	0.0	54.9	54.9	54.3	41.9	41.9
LOS by Move:	E-	C+	C+	E+	C+	C+	A	D-	D-	D-	D	D
HCM2kAvgQ:	3	6	2	2	19	19	0	6	6	6	13	13

Note: Queue reported is the number of cars per lane.

```
2025 AM Cumulative + ProjecTue Mar 27, 2012 16:08:55                 Page 4-1
-------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                Cumulative (2025) + Project - AM Peak Hour
                      Kittelson and Associates, Inc.
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #402 Laughlin Rd/ Bear Creek Dr
*******************************************************************************
Average Delay (sec/veh):      1.8       Worst Case Level Of Service: A[  9.3]
*******************************************************************************
Street Name:           Laughlin Rd                    Bear Creek Dr
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  1  0  0    0  0  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      12   57     0     0  165     0     0    0    45     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   12   57     0     0  165     0     0    0    45     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    12   57     0     0  165     0     0    0    45     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   12   57     0     0  165     0     0    0    45     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  165 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   165  xxxx xxxx xxxxx
Potent Cap.: 1426 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   885  xxxx xxxx xxxxx
Move Cap.:   1426 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   885  xxxx xxxx xxxxx
Volume/Cap:  0.01 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  0.05  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.0 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx   0.2  xxxx xxxx xxxxx
Control Del:  7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   9.3 xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     A     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    *     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx             9.3           xxxxxx
ApproachLOS:         *                *               A                *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```

```
2025 AM Cumulative + ProjecTue Mar 27, 2012 16:08:55                 Page 5-1
-------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                Cumulative (2025) + Project - AM Peak Hour
                      Kittelson and Associates, Inc.
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #403 Hawk St/ Garaventa Ranch Rd
*******************************************************************************
Average Delay (sec/veh):      1.5       Worst Case Level Of Service: B[ 11.8]
*******************************************************************************
Street Name:             Hawk St                     Garaventa Ranch Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0    16    0    39    40  179     0     0  368    17
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0    16    0    39    40  179     0     0  368    17
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0    16    0    39    40  179     0     0  368    17
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0    16    0    39    40  179     0     0  368    17
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   636  636   377   385 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   446  398   674  1185 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   434  385   674  1185 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.04 0.00  0.06  0.03 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.1 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  581 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.3 xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 11.8 xxxxx   8.1 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:    xxxxxx             11.8           xxxxxx           xxxxxx
ApproachLOS:         *              B                *                *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```

```
2025 AM Cumulative + ProjecTue Mar 27, 2012 16:08:55                 Page 6-1
-------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                Cumulative (2025) + Project - AM Peak Hour
                      Kittelson and Associates, Inc.
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #404 Laughlin Rd/ Altamont Creek Dr
*******************************************************************************
Average Delay (sec/veh):      4.4       Worst Case Level Of Service: B[ 11.0]
*******************************************************************************
Street Name:           Laughlin Rd                    Altamont Creek Dr
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:     231   52     0     0   71   156    14    0    41     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:  231   52     0     0   71   156    14    0    41     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:   231   52     0     0   71   156    14    0    41     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:  231   52     0     0   71   156    14    0    41     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  227 xxxx xxxxx  xxxx xxxx xxxxx   663  663   149  xxxx xxxx xxxxx
Potent Cap.: 1353 xxxx xxxxx  xxxx xxxx xxxxx   429  384   903  xxxx xxxx xxxxx
Move Cap.:   1353 xxxx xxxxx  xxxx xxxx xxxxx   365  309   903  xxxx xxxx xxxxx
Volume/Cap:  0.17 xxxx  xxxx  xxxx xxxx  xxxx  0.04 0.00  0.05  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.6 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  8.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  656 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.6 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.3 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  8.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 11.0 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    B     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx             11.0           xxxxxx
ApproachLOS:         *                *                B                *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```

2025 AM Cumulative + ProjecTue Mar 27, 2012 16:08:55 Page 7-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project - AM Peak Hour
Kittelson and Associates, Inc.

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #405 Laughlin Rd/ Northfront Rd

Cycle (sec):	100	Critical Vol./Cap.(X):	2.150
Loss Time (sec):	0	Average Delay (sec/veh):	342.5
Optimal Cycle:	0	Level Of Service:	F

Street Name:	Laughlin Rd						Northfront Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0	0 0	0	0	1! 0	0	1	0 0	0	0	0 1 0
Volume Module:												
Base Vol:	0	0	0	373	0	430	152	301	0	0	738	457
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	373	0	430	152	301	0	0	738	457
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	373	0	430	152	301	0	0	738	457
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	373	0	430	152	301	0	0	738	457
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	373	0	430	152	301	0	0	738	457
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.46	0.00	0.54	0.34	0.66	0.00	0.00	0.62	0.38
Final Sat.:	0	0	0	262	0	301	175	346	0	0	343	213
Capacity Analysis Module:												
Vol/Sat:	xxxx	xxxx	xxxx	1.43	xxxx	1.43	0.87	0.87	xxxx	xxxx	2.15	2.15
Crit Moves:				****				****			****	
Delay/Veh:	0.0	0.0	0.0	220.7	0.0	220.7	40.4	40.4	0.0	0.0	539	538.8
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	220.7	0.0	220.7	40.4	40.4	0.0	0.0	539	538.8
LOS by Move:	*	*	*	F	*	F	E	E	*	*	F	F
ApproachDel:	xxxxxx			220.7			40.4			538.8		
Delay Adj:	xxxxx			1.00			1.00			1.00		
ApprAdjDel:	xxxxxx			220.7			40.4			538.8		
LOS by Appr:	*			F			E			F		
AllWayAvgQ:	0.0	0.0	0.0	33.0	33.0	33.0	4.4	4.4	4.4	81.7	81.7	81.7

Note: Queue reported is the number of cars per lane.

```
2025 AM Cumulative + ProjecTue Mar 27, 2012 16:08:55                 Page 8-1
-------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                Cumulative (2025) + Project - AM Peak Hour
                      Kittelson and Associates, Inc.
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
            2000 HCM 4-Way Stop Method (Base Volume Alternative)
*******************************************************************************
Intersection #406 Garaventa Ranch Rd/ Altamont Creek Dr
*******************************************************************************
Cycle (sec):         100                Critical Vol./Cap.(X):         0.559
Loss Time (sec):       0                Average Delay (sec/veh):        11.7
Optimal Cycle:         0                Level Of Service:                  B
*******************************************************************************
Street Name:        Garaventa Ranch Rd               Altamont Creek Dr
Approach:      North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Min. Green:     0    0     0     0    0     0     0    0     0     0    0     0
Lanes:        0  0  1  0  1    0  1  0  0  0    0  0  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0  173    28    60  134     0     0    0     0   172    0   248
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0  173    28    60  134     0     0    0     0   172    0   248
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0  173    28    60  134     0     0    0     0   172    0   248
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0  173    28    60  134     0     0    0     0   172    0   248
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    0  173    28    60  134     0     0    0     0   172    0   248
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Adjustment:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Lanes:       0.00 1.00  1.00  0.31 0.69  0.00  0.00 0.00  0.00  0.41 0.00  0.59
Final Sat.:     0  595   672   196  439     0     0    0     0   307    0   443
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     xxxx 0.29  0.04  0.31 0.31  xxxx  xxxx xxxx  xxxx  0.56 xxxx  0.56
Crit Moves:       ****             ****                          ****
Delay/Veh:    0.0 10.6   7.9  10.5 10.5   0.0   0.0  0.0   0.0  12.9  0.0  12.9
Delay Adj:   1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0 10.6   7.9  10.5 10.5   0.0   0.0  0.0   0.0  12.9  0.0  12.9
LOS by Move:    *    B     A     B    B     *     *    *     *     B    *     B
ApproachDel:      10.2             10.5           xxxxxx            12.9
Delay Adj:        1.00             1.00            xxxxx            1.00
ApprAdjDel:       10.2             10.5           xxxxxx            12.9
LOS by Appr:         B                B                *               B
AllWayAvgQ:   0.0  0.4   0.0   0.4  0.4   0.4   0.0  0.0   0.0   1.1  1.1   1.1
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```

Cumulative (2025) PM Peak Hour Plus Project

Detailed Intersection Level of Service Calculations from TRAFFIX ©

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project - PM Peak Hour
Kittelson and Associates, Inc.

Scenario Report

Scenario:	2025 PM Cumulative + Project
Command:	2025 PM Cumulative + Project
Volume:	2025 PM Cumulative + Project
Geometry:	Cumulative
Impact Fee:	None
Trip Generation:	None
Trip Distribution:	None
Paths:	Default Path
Routes:	Default Route
Configuration:	PM Peak

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project - PM Peak Hour
Kittelson and Associates, Inc.

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in	
#401 N. Vasco Rd/ Garaventa Ranch R	C	26.8	0.759	C	26.8	0.759	+ 0.000	D/V
#402 Laughlin Rd/ Bear Creek Dr	A	9.1	0.032	A	9.1	0.032	+ 0.000	D/V
#403 Hawk St/ Garaventa Ranch Rd	B	12.4	0.087	B	12.4	0.087	+ 0.000	D/V
#404 Laughlin Rd/ Altamont Creek Dr	B	11.8	0.202	B	11.8	0.202	+ 0.000	D/V
#405 Laughlin Rd/ Northfront Rd	F	310.7	2.151	F	310.7	2.151	+ 0.000	V/C
#406 Garaventa Ranch Rd/ Altamont C	B	10.8	0.494	B	10.8	0.494	+ 0.000	V/C

2025 PM Cumulative + ProjecTue Mar 27, 2012 16:08:58 Page 3-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project - PM Peak Hour
Kittelson and Associates, Inc.

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #401 N. Vasco Rd/ Garaventa Ranch Rd

Cycle (sec):	138	Critical Vol./Cap.(X):	0.759
Loss Time (sec):	12	Average Delay (sec/veh):	26.8
Optimal Cycle:	74	Level Of Service:	C

Street Name:	N Vasco Rd						Garaventa Ranch Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	1 0	2 0	1	1 0	1 1	0	1 0	0 1	0	1 0	0 1	0
Volume Module: >> Count Date: 21 May 2002 << PM Peak												
Base Vol:	6	1526	121	109	526	2	5	32	14	77	22	243
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	6	1526	121	109	526	2	5	32	14	77	22	243
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.97	0.97	0.97	0.90	0.90	0.90	0.96	0.96	0.96
PHF Volume:	7	1659	132	112	542	2	6	36	16	80	23	253
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	7	1659	132	112	542	2	6	36	16	80	23	253
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	7	1659	132	112	542	2	6	36	16	80	23	253
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.95	0.85	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.86	0.86
Lanes:	1.00	2.00	1.00	1.00	1.99	0.01	1.00	0.70	0.30	1.00	0.08	0.92
Final Sat.:	1805	3610	1615	1805	3593	14	1805	1261	552	1805	136	1502
Capacity Analysis Module:												
Vol/Sat:	0.00	0.46	0.08	0.06	0.15	0.15	0.00	0.03	0.03	0.04	0.17	0.17
Crit Moves:		****		****			****				****	
Green/Cycle:	0.02	0.61	0.61	0.08	0.67	0.67	0.00	0.09	0.09	0.14	0.22	0.22
Volume/Cap:	0.22	0.76	0.13	0.76	0.22	0.22	0.76	0.32	0.32	0.32	0.76	0.76
Delay/Veh:	71.0	21.5	11.8	82.2	8.8	8.8	249.7	60.3	60.3	54.4	59.2	59.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	71.0	21.5	11.8	82.2	8.8	8.8	249.7	60.3	60.3	54.4	59.2	59.2
LOS by Move:	E	C	B	F	A	A	F	E	E	D	E	E
HCM2kAvgQ:	1	27	2	6	5	5	1	2	2	3	12	12

Note: Queue reported is the number of cars per lane.

```
2025 PM Cumulative + ProjecTue Mar 27, 2012 16:08:58                  Page 4-1
------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                Cumulative (2025) + Project - PM Peak Hour
                      Kittelson and Associates, Inc.
------------------------------------------------------------------------------
                      Level Of Service Computation Report
             2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #402 Laughlin Rd/ Bear Creek Dr
******************************************************************************
Average Delay (sec/veh):      1.6       Worst Case Level Of Service: A[  9.1]
******************************************************************************
Street Name:           Laughlin Rd                    Bear Creek Dr
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      48  174     0     0   98     3     3    0    18     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   48  174     0     0   98     3     3    0    18     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    48  174     0     0   98     3     3    0    18     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   48  174     0     0   98     3     3    0    18     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  101 xxxx xxxxx  xxxx xxxx xxxxx   370  370   100  xxxx xxxx xxxxx
Potent Cap.: 1504 xxxx xxxxx  xxxx xxxx xxxxx   635  563   962  xxxx xxxx xxxxx
Move Cap.:   1504 xxxx xxxxx  xxxx xxxx xxxxx   619  545   962  xxxx xxxx xxxxx
Volume/Cap:  0.03 xxxx  xxxx  xxxx xxxx  xxxx  0.00 0.00  0.02  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  891 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.1 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  9.1 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    A     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx              9.1           xxxxxx
ApproachLOS:         *                *               A                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

```
2025 PM Cumulative + ProjecTue Mar 27, 2012 16:08:58                 Page 5-1
-------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                Cumulative (2025) + Project - PM Peak Hour
                      Kittelson and Associates, Inc.
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
*******************************************************************************
Intersection #403 Hawk St/ Garaventa Ranch Rd
*******************************************************************************
Average Delay (sec/veh):      1.7       Worst Case Level Of Service: B[ 12.4]
*******************************************************************************
Street Name:             Hawk St                     Garaventa Ranch Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign       Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0    18    0    58    47  264     0     0  368    33
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0    18    0    58    47  264     0     0  368    33
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0    18    0    58    47  264     0     0  368    33
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:    0    0     0    18    0    58    47  264     0     0  368    33
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   6.4  6.5   6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   3.5  4.0   3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   743  743   385   401 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx   386  346   668  1169 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx   374  332   668  1169 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.05 0.00  0.09  0.04 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx xxxx xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   8.2 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  563 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  0.5 xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 12.4 xxxxx   8.2 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:     *    *     *     *    B     *     A    *     *     *    *     *
ApproachDel:    xxxxxx           12.4           xxxxxx           xxxxxx
ApproachLOS:         *              B                *                *
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```

```
2025 PM Cumulative + ProjecTue Mar 27, 2012 16:08:58                 Page 6-1
------------------------------------------------------------------------------
                    Garaventa Hills EIR (Project 172670)
                Cumulative (2025) + Project - PM Peak Hour
                      Kittelson and Associates, Inc.
------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
******************************************************************************
Intersection #404 Laughlin Rd/ Altamont Creek Dr
******************************************************************************
Average Delay (sec/veh):      7.3       Worst Case Level Of Service: B[ 11.8]
******************************************************************************
Street Name:           Laughlin Rd                    Altamont Creek Dr
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  1  0  0  0    0  0  0  1  0    0  0  1! 0  0    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:      34   72     0     0   93    25   148    0   161     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   34   72     0     0   93    25   148    0   161     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:    34   72     0     0   93    25   148    0   161     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
FinalVolume:   34   72     0     0   93    25   148    0   161     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  118 xxxx xxxxx  xxxx xxxx xxxxx   246  246   106  xxxx xxxx xxxxx
Potent Cap.: 1483 xxxx xxxxx  xxxx xxxx xxxxx   747  660   954  xxxx xxxx xxxxx
Move Cap.:   1483 xxxx xxxxx  xxxx xxxx xxxxx   734  645   954  xxxx xxxx xxxxx
Volume/Cap:  0.02 xxxx  xxxx  xxxx xxxx  xxxx  0.20 0.00  0.17  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:    0.1 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
Control Del:  7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  834 xxxxx  xxxx xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx  1.7 xxxxx xxxxx xxxx xxxxx
Shrd ConDel:  7.5 xxxx xxxxx xxxxx xxxx xxxxx xxxxx 11.8 xxxxx xxxxx xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    B     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx            11.8          xxxxxx
ApproachLOS:         *                *              B               *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

2025 PM Cumulative + ProjecTue Mar 27, 2012 16:08:59 Page 7-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project - PM Peak Hour
Kittelson and Associates, Inc.

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #405 Laughlin Rd/ Northfront Rd

Cycle (sec):	100	Critical Vol./Cap.(X):	2.151
Loss Time (sec):	0	Average Delay (sec/veh):	310.7
Optimal Cycle:	0	Level Of Service:	F

Street Name:	Laughlin Rd						Northfront Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0	0 0	0	0 1!	0 0	0	1 0	0 0	0	0 0	1 0
Volume Module:												
Base Vol:	0	0	0	220	0	462	389	730	0	0	202	381
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	220	0	462	389	730	0	0	202	381
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	220	0	462	389	730	0	0	202	381
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	220	0	462	389	730	0	0	202	381
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	220	0	462	389	730	0	0	202	381
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	0.00	0.00	0.32	0.00	0.68	0.35	0.65	0.00	0.00	0.35	0.65
Final Sat.:	0	0	0	181	0	380	181	339	0	0	193	364
Capacity Analysis Module:												
Vol/Sat:	xxxx	xxxx	xxxx	1.22	xxxx	1.22	2.15	2.15	xxxx	xxxx	1.05	1.05
Crit Moves:				****			****					****
Delay/Veh:	0.0	0.0	0.0	134.8	0.0	134.8	540.3	540	0.0	0.0	75.8	75.8
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	134.8	0.0	134.8	540.3	540	0.0	0.0	75.8	75.8
LOS by Move:	*	*	*	F	*	F	F	F	*	*	F	F
ApproachDel:	xxxxxx			134.8			540.3			75.8		
Delay Adj:	xxxxx			1.00			1.00			1.00		
ApprAdjDel:	xxxxxx			134.8			540.3			75.8		
LOS by Appr:	*			F			F			F		
AllWayAvgQ:	0.0	0.0	0.0	19.5	19.5	19.5	76.7	76.7	76.7	10.3	10.3	10.3

Note: Queue reported is the number of cars per lane.

2025 PM Cumulative + ProjecTue Mar 27, 2012 16:08:59 Page 8-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project - PM Peak Hour
Kittelson and Associates, Inc.

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #406 Garaventa Ranch Rd/ Altamont Creek Dr

Cycle (sec):	100	Critical Vol./Cap.(X):	0.494
Loss Time (sec):	0	Average Delay (sec/veh):	10.8
Optimal Cycle:	0	Level Of Service:	B

Street Name:	Garaventa Ranch Rd						Altamont Creek Dr					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1	0 1	0	1 0	0 0	0	0 0	0 0	0	0 1!	0 0
Volume Module:												
Base Vol:	0	358	117	206	88	0	0	0	0	34	0	42
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	358	117	206	88	0	0	0	0	34	0	42
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	358	117	206	88	0	0	0	0	34	0	42
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	358	117	206	88	0	0	0	0	34	0	42
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	358	117	206	88	0	0	0	0	34	0	42
Saturation Flow Module:												
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	1.00	0.70	0.30	0.00	0.00	0.00	0.00	0.45	0.00	0.55
Final Sat.:	0	724	842	517	221	0	0	0	0	282	0	349
Capacity Analysis Module:												
Vol/Sat:	xxxx	0.49	0.14	0.40	0.40	xxxx	xxxx	xxxx	xxxx	0.12	xxxx	0.12
Crit Moves:		****		****						****		
Delay/Veh:	0.0	12.3	7.6	10.9	10.9	0.0	0.0	0.0	0.0	8.9	0.0	8.9
Delay Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	12.3	7.6	10.9	10.9	0.0	0.0	0.0	0.0	8.9	0.0	8.9
LOS by Move:	*	B	A	B	B	*	*	*	*	A	*	A
ApproachDel:		11.1			10.9			xxxxxx			8.9	
Delay Adj:		1.00			1.00			xxxxx			1.00	
ApprAdjDel:		11.1			10.9			xxxxxx			8.9	
LOS by Appr:		B			B			*			A	
AllWayAvgQ:	0.0	0.9	0.2	0.6	0.6	0.6	0.0	0.0	0.0	0.1	0.1	0.1

Note: Queue reported is the number of cars per lane.

Cumulative (2025) All Scenarios – Mitigation A (Roundabout) at Intersection 5 (Laughlin Road-Northfront Road)

Detailed Intersection Level of Service Calculations from TRAFFIX ©

Garaventa Hills EIR (Project 172670)
Cumulative (2025) with Mitigation A - AM Peak Hour
Kittelson and Associates

Scenario Report

Scenario:	2025 AM MIT1
Command:	2025 AM MIT1
Volume:	2025 AM Cumulative
Geometry:	2025 MIT1
Impact Fee:	None
Trip Generation:	None
Trip Distribution:	None
Paths:	Default Path
Routes:	Default Route
Configuration:	AM Peak

2025 AM MIT1 Tue Mar 27, 2012 16:40:52 Page 2-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) with Mitigation A - AM Peak Hour
Kittelson and Associates

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
#405 Laughlin Rd/ Northfront Rd	E	46.0	1.068	E	46.0	1.068	+ 0.000 V/C

```
2025 AM MIT1              Tue Mar 27, 2012 16:40:52                  Page 3-1
-------------------------------------------------------------------------------
                  Garaventa Hills EIR (Project 172670)
            Cumulative (2025) with Mitigation A - AM Peak Hour
                        Kittelson and Associates
-------------------------------------------------------------------------------
                     Level Of Service Computation Report
              FHWA Roundabout Method (Base Volume Alternative)
*******************************************************************************
Intersection #405 Laughlin Rd/ Northfront Rd
*******************************************************************************
Average Delay (sec/veh):     46.0       Level Of Service: E
*******************************************************************************
Street Name:           Laughlin Rd                    Northfront Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Yield Sign       Yield Sign       Yield Sign       Yield Sign
Lanes:              0                1                1                1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0   363    0   428   152  301     0     0  738   456
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0   363    0   428   152  301     0     0  738   456
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0   363    0   428   152  301     0     0  738   456
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0    0     0   363    0   428   152  301     0     0  738   456
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    0    0     0   363    0   428   152  301     0     0  738   456
------------|---------------||---------------||---------------||---------------|
PCE Module:
AutoPCE:        0    0     0   363    0   428   152  301     0     0  738   456
TruckPCE:       0    0     0     0    0     0     0    0     0     0    0     0
ComboPCE:       0    0     0     0    0     0     0    0     0     0    0     0
BicyclePCE:     0    0     0     0    0     0     0    0     0     0    0     0
AdjVolume:      0    0     0   363    0   428   152  301     0     0  738   456
------------|---------------||---------------||---------------||---------------|
Delay Module: >> Time Period: 0.25 hours <<
CircVolume:        816              738              363              152
MaxVolume:      xxxxxx              801             1004             1118
PedVolume:           0                0                0                0
AdjMaxVol:      xxxxxx              801             1004             1118
ApproachVol:    xxxxxx              791              453             1194
ApproachV/C:      1.00             0.99             0.45             1.07
ApproachDel:    xxxxxx             46.3              6.5             60.7
ApproachLOS:         *                E                A                F
Queue:            xxxx             16.6              2.4             26.4
```

Garaventa Hills EIR (Project 172670)
Cumulative (2025) with Mitigation A - PM Peak Hour
Kittelson and Associates, Inc

Scenario Report

Scenario:	2025 PM MIT1
Command:	2025 PM MIT1
Volume:	2025 PM Cumulative
Geometry:	2025 MIT1
Impact Fee:	None
Trip Generation:	None
Trip Distribution:	None
Paths:	Default Path
Routes:	Default Route
Configuration:	PM Peak

2025 PM MIT1 Tue Mar 27, 2012 16:40:54 Page 2-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) with Mitigation A - PM Peak Hour
Kittelson and Associates, Inc

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
#405 Laughlin Rd/ Northfront Rd	D	27.3	1.025	D	27.3	1.025	+ 0.000 V/C

2025 PM MIT1 Tue Mar 27, 2012 16:40:54 Page 3-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) with Mitigation A - PM Peak Hour
Kittelson and Associates, Inc

Level Of Service Computation Report
FHWA Roundabout Method (Base Volume Alternative)

Intersection #405 Laughlin Rd/ Northfront Rd

Average Delay (sec/veh): 27.3 Level Of Service: D

Street Name:	Laughlin Rd						Northfront Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Yield Sign			Yield Sign			Yield Sign			Yield Sign		
Lanes:	0			1			1			1		
Volume Module:												
Base Vol:	0	0	0	217	0	462	380	730	0	0	200	375
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	217	0	462	380	730	0	0	200	375
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	217	0	462	380	730	0	0	200	375
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	217	0	462	380	730	0	0	200	375
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	217	0	462	380	730	0	0	200	375
PCE Module:												
AutoPCE:	0	0	0	217	0	462	380	730	0	0	200	375
TruckPCE:	0	0	0	0	0	0	0	0	0	0	0	0
ComboPCE:	0	0	0	0	0	0	0	0	0	0	0	0
BicyclePCE:	0	0	0	0	0	0	0	0	0	0	0	0
AdjVolume:	0	0	0	217	0	462	380	730	0	0	200	375

Delay Module: >> Time Period: 0.25 hours <<				
CircVolume:	1327	200	217	380
MaxVolume:	xxxxxx	1092	1083	995
PedVolume:	0	0	0	0
AdjMaxVol:	xxxxxx	1092	1083	995
ApproachVol:	xxxxxx	679	1110	575
ApproachV/C:	1.00	0.62	1.03	0.58
ApproachDel:	xxxxxx	8.6	48.5	8.5
ApproachLOS:	*	A	E	A
Queue:	xxxx	4.5	22.2	3.8

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project with Mitigation A - AM Peak Hour
Kittelson and Associates, Inc

Scenario Report

Scenario:	2025 AM + Proj MIT1
Command:	2025 AM + Project MIT1
Volume:	2025 AM Cumulative + Project
Geometry:	2025 MIT1
Impact Fee:	None
Trip Generation:	None
Trip Distribution:	None
Paths:	Default Path
Routes:	Default Route
Configuration:	AM Peak

2025 AM + Proj MIT1 Tue Mar 27, 2012 16:40:59 Page 2-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project with Mitigation A - AM Peak Hour
Kittelson and Associates, Inc

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
#405 Laughlin Rd/ Northfront Rd	E	47.3	1.069	E	47.3	1.069	+ 0.000 V/C

2025 AM + Proj MIT1 Tue Mar 27, 2012 16:40:59 Page 3-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project with Mitigation A - AM Peak Hour
Kittelson and Associates, Inc

Level Of Service Computation Report
FHWA Roundabout Method (Base Volume Alternative)

Intersection #405 Laughlin Rd/ Northfront Rd

Average Delay (sec/veh): 47.3 Level Of Service: E

Street Name:	Laughlin Rd						Northfront Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Yield Sign			Yield Sign			Yield Sign			Yield Sign		
Lanes:	0			1			1			1		
Volume Module:												
Base Vol:	0	0	0	373	0	430	152	301	0	0	738	457
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	373	0	430	152	301	0	0	738	457
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	373	0	430	152	301	0	0	738	457
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	373	0	430	152	301	0	0	738	457
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	373	0	430	152	301	0	0	738	457
PCE Module:												
AutoPCE:	0	0	0	373	0	430	152	301	0	0	738	457
TruckPCE:	0	0	0	0	0	0	0	0	0	0	0	0
ComboPCE:	0	0	0	0	0	0	0	0	0	0	0	0
BicyclePCE:	0	0	0	0	0	0	0	0	0	0	0	0
AdjVolume:	0	0	0	373	0	430	152	301	0	0	738	457

Delay Module: >> Time Period: 0.25 hours <<				
CircVolume:	826	738	373	152
MaxVolume:	xxxxxx	801	999	1118
PedVolume:	0	0	0	0
AdjMaxVol:	xxxxxx	801	999	1118
ApproachVol:	xxxxxx	803	453	1195
ApproachV/C:	1.00	1.00	0.45	1.07
ApproachDel:	xxxxxx	49.9	6.6	61.0
ApproachLOS:	*	E	A	F
Queue:	xxxx	17.4	2.4	26.5

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project with Mitigation A - PM Peak Hour
Kittelson and Associates, Inc

Scenario Report

Scenario:	2025 PM + Proj MIT1
Command:	2025 PM + Project MIT1
Volume:	2025 PM Cumulative + Project
Geometry:	2025 MIT1
Impact Fee:	None
Trip Generation:	None
Trip Distribution:	None
Paths:	Default Path
Routes:	Default Route
Configuration:	PM Peak

2025 PM + Proj MIT1 Tue Mar 27, 2012 16:41:01 Page 2-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project with Mitigation A - PM Peak Hour
Kittelson and Associates, Inc

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
#405 Laughlin Rd/ Northfront Rd	D	28.7	1.035	D	28.7	1.035	+ 0.000 V/C

2025 PM + Proj MIT1 Tue Mar 27, 2012 16:41:01 Page 3-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project with Mitigation A - PM Peak Hour
Kittelson and Associates, Inc

Level Of Service Computation Report
FHWA Roundabout Method (Base Volume Alternative)

Intersection #405 Laughlin Rd/ Northfront Rd

Average Delay (sec/veh): 28.7 Level Of Service: D

Street Name:	Laughlin Rd						Northfront Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Yield Sign			Yield Sign			Yield Sign			Yield Sign		
Lanes:	0			1			1			1		
Volume Module:												
Base Vol:	0	0	0	220	0	462	389	730	0	0	202	381
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	220	0	462	389	730	0	0	202	381
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	220	0	462	389	730	0	0	202	381
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	220	0	462	389	730	0	0	202	381
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	220	0	462	389	730	0	0	202	381
PCE Module:												
AutoPCE:	0	0	0	220	0	462	389	730	0	0	202	381
TruckPCE:	0	0	0	0	0	0	0	0	0	0	0	0
ComboPCE:	0	0	0	0	0	0	0	0	0	0	0	0
BicyclePCE:	0	0	0	0	0	0	0	0	0	0	0	0
AdjVolume:	0	0	0	220	0	462	389	730	0	0	202	381

Delay Module: >> Time Period: 0.25 hours <<				
CircVolume:	1339	202	220	389
MaxVolume:	xxxxxx	1091	1081	990
PedVolume:	0	0	0	0
AdjMaxVol:	xxxxxx	1091	1081	990
ApproachVol:	xxxxxx	682	1119	583
ApproachV/C:	1.00	0.63	1.03	0.59
ApproachDel:	xxxxxx	8.6	51.4	8.7
ApproachLOS:	*	A	F	A
Queue:	xxxx	4.6	23.0	4.0

Cumulative (2025) All Scenarios – Mitigation B (Traffic Signal) at Intersection 5 (Laughlin Road-Northfront Road)

Detailed Intersection Level of Service Calculations from TRAFFIX ©

Garaventa Hills EIR (Project 172670)
Cumulative (2025) with Mitigation B - AM Peak Hour
Kittelson and Associates, Inc

Scenario Report

Scenario:	2025 AM MIT2
Command:	2025 AM MIT2
Volume:	2025 AM Cumulative
Geometry:	2025 MIT2
Impact Fee:	None
Trip Generation:	None
Trip Distribution:	None
Paths:	Default Path
Routes:	Default Route
Configuration:	PM Peak

2025 AM MIT2 Tue Mar 27, 2012 16:54:48 Page 2-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) with Mitigation B - AM Peak Hour
Kittelson and Associates, Inc

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in D/V
#405 Laughlin Rd/ Northfront Rd	E	58.9	1.024	E	58.9	1.024	+ 0.000

2025 AM MIT2 Tue Mar 27, 2012 16:54:49 Page 3-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) with Mitigation B - AM Peak Hour
Kittelson and Associates, Inc

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #405 Laughlin Rd/ Northfront Rd

Cycle (sec):	100	Critical Vol./Cap.(X):	1.024
Loss Time (sec):	9	Average Delay (sec/veh):	58.9
Optimal Cycle:	180	Level Of Service:	E

Street Name:	Laughlin Rd						Northfront Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0	0	0	0	0	1! 0	0	1	0	1	0	0	0	1	0	1
Volume Module:												
Base Vol:	0	0	0	363	0	428	152	301	0	0	738	456
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	363	0	428	152	301	0	0	738	456
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	363	0	428	152	301	0	0	738	456
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	363	0	428	152	301	0	0	738	456
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	363	0	428	152	301	0	0	738	456
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	0.91	1.00	0.91	0.95	1.00	1.00	1.00	1.00	0.85
Lanes:	0.00	0.00	0.00	0.46	0.00	0.54	1.00	1.00	0.00	0.00	1.00	1.00
Final Sat.:	0	0	0	791	0	932	1805	1900	0	0	1900	1615
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.46	0.00	0.46	0.08	0.16	0.00	0.00	0.39	0.28
Crit Moves:				****			****				****	
Green/Cycle:	0.00	0.00	0.00	0.45	0.00	0.45	0.08	0.46	0.00	0.00	0.38	0.38
Volume/Cap:	0.00	0.00	0.00	1.02	0.00	1.02	1.02	0.34	0.00	0.00	1.02	0.74
Delay/Veh:	0.0	0.0	0.0	66.2	0.0	66.2	126.2	17.5	0.0	0.0	70.8	31.8
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	66.2	0.0	66.2	126.2	17.5	0.0	0.0	70.8	31.8
LOS by Move:	A	A	A	E	A	E	F	B	A	A	E	C
HCM2kAvgQ:	0	0	0	33	0	33	9	6	0	0	31	14

Note: Queue reported is the number of cars per lane.

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project with Mitigation B - PM Peak Hour
Kittelson and Associates, Inc

Scenario Report

Scenario:	2025 PM + Proj MIT2
Command:	2025 PM MIT2
Volume:	2025 PM Cumulative + Project
Geometry:	2025 MIT2
Impact Fee:	None
Trip Generation:	None
Trip Distribution:	None
Paths:	Default Path
Routes:	Default Route
Configuration:	PM Peak

2025 PM + Proj MIT2 Tue Mar 27, 2012 16:53:09 Page 2-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project with Mitigation B - PM Peak Hour
Kittelson and Associates, Inc

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
#405 Laughlin Rd/ Northfront Rd	D	45.7	0.937	D	45.7	0.937	+ 0.000 D/V

```
2025 PM + Proj MIT2        Tue Mar 27, 2012 16:53:09                  Page 3-1
------------------------------------------------------------------------------
                  Garaventa Hills EIR (Project 172670)
       Cumulative (2025) + Project with Mitigation B - PM Peak Hour
                      Kittelson and Associates, Inc
------------------------------------------------------------------------------
                    Level Of Service Computation Report
           2000 HCM Operations Method (Base Volume Alternative)
******************************************************************************
Intersection #405 Laughlin Rd/ Northfront Rd
******************************************************************************
Cycle (sec):         100              Critical Vol./Cap.(X):         0.937
Loss Time (sec):       9              Average Delay (sec/veh):        45.7
Optimal Cycle:       126              Level Of Service:                  D
******************************************************************************
Street Name:           Laughlin Rd                    Northfront Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     0    0     0     0    0     0     0    0     0     0    0     0
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
Lanes:        0  0  0  0  0    0  0  1! 0  0    1  0  1  0  0    0  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0   220    0   462   389  730     0     0  202   381
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0   220    0   462   389  730     0     0  202   381
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0   220    0   462   389  730     0     0  202   381
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0    0     0   220    0   462   389  730     0     0  202   381
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    0    0     0   220    0   462   389  730     0     0  202   381
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  1.00 1.00  1.00  0.89 1.00  0.89  0.95 1.00  1.00  1.00 1.00  0.85
Lanes:       0.00 0.00  0.00  0.32 0.00  0.68  1.00 1.00  0.00  0.00 1.00  1.00
Final Sat.:     0    0     0   548    0  1151  1805 1900     0     0 1900  1615
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.00  0.00  0.40 0.00  0.40  0.22 0.38  0.00  0.00 0.11  0.24
Crit Moves:                   ****             ****                     ****
Green/Cycle: 0.00 0.00  0.00  0.43 0.00  0.43  0.23 0.48  0.00  0.00 0.25  0.25
Volume/Cap:  0.00 0.00  0.00  0.94 0.00  0.94  0.94 0.80  0.00  0.00 0.42  0.94
Delay/Veh:    0.0  0.0   0.0  46.9  0.0  46.9  66.6 26.8   0.0   0.0 31.9  65.8
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0  0.0   0.0  46.9  0.0  46.9  66.6 26.8   0.0   0.0 31.9  65.8
LOS by Move:    A    A     A     D    A     D     E    C     A     A    C     E
HCM2kAvgQ:      0    0     0    25    0    25    16   20     0     0    5    16
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************
```

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project with Mitigation B - AM Peak Hour
Kittelson and Associates, Inc

Scenario Report

Scenario:	2025 AM + Proj MIT2
Command:	2025 AM + Project MIT2
Volume:	2025 AM Cumulative + Project
Geometry:	2025 MIT2
Impact Fee:	None
Trip Generation:	None
Trip Distribution:	None
Paths:	Default Path
Routes:	Default Route
Configuration:	AM Peak

2025 AM + Proj MIT2 Tue Mar 27, 2012 16:55:09 Page 2-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project with Mitigation B - AM Peak Hour
Kittelson and Associates, Inc

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
#405 Laughlin Rd/ Northfront Rd	E	60.5	1.032	E	60.5	1.032	+ 0.000 D/V

```
2025 AM + Proj MIT2        Tue Mar 27, 2012 16:55:09                 Page 3-1
-------------------------------------------------------------------------------
                  Garaventa Hills EIR (Project 172670)
        Cumulative (2025) + Project with Mitigation B - AM Peak Hour
                      Kittelson and Associates, Inc
-------------------------------------------------------------------------------
                    Level Of Service Computation Report
           2000 HCM Operations Method (Base Volume Alternative)
*******************************************************************************
Intersection #405 Laughlin Rd/ Northfront Rd
*******************************************************************************
Cycle (sec):         100                Critical Vol./Cap.(X):         1.032
Loss Time (sec):       9                Average Delay (sec/veh):        60.5
Optimal Cycle:       180                Level Of Service:                  E
*******************************************************************************
Street Name:           Laughlin Rd                    Northfront Rd
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Protected        Protected        Protected        Protected
Rights:           Include          Include          Include          Include
Min. Green:     0    0     0     0    0     0     0    0     0     0    0     0
Y+R:          4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0   4.0  4.0   4.0
Lanes:        0  0  0  0  0    0  0  1! 0  0    1  0  1  0  0    0  0  1  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0    0     0   373    0   430   152  301     0     0  738   457
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0    0     0   373    0   430   152  301     0     0  738   457
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Volume:     0    0     0   373    0   430   152  301     0     0  738   457
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Reduced Vol:    0    0     0   373    0   430   152  301     0     0  738   457
PCE Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
MLF Adj:     1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
FinalVolume:    0    0     0   373    0   430   152  301     0     0  738   457
------------|---------------||---------------||---------------||---------------|
Saturation Flow Module:
Sat/Lane:    1900 1900  1900  1900 1900  1900  1900 1900  1900  1900 1900  1900
Adjustment:  1.00 1.00  1.00  0.91 1.00  0.91  0.95 1.00  1.00  1.00 1.00  0.85
Lanes:       0.00 0.00  0.00  0.46 0.00  0.54  1.00 1.00  0.00  0.00 1.00  1.00
Final Sat.:     0    0     0   800    0   922  1805 1900     0     0 1900  1615
------------|---------------||---------------||---------------||---------------|
Capacity Analysis Module:
Vol/Sat:     0.00 0.00  0.00  0.47 0.00  0.47  0.08 0.16  0.00  0.00 0.39  0.28
Crit Moves:                   ****             ****                   ****
Green/Cycle: 0.00 0.00  0.00  0.45 0.00  0.45  0.08 0.46  0.00  0.00 0.38  0.38
Volume/Cap:  0.00 0.00  0.00  1.03 0.00  1.03  1.03 0.35  0.00  0.00 1.03  0.75
Delay/Veh:    0.0  0.0   0.0  68.1  0.0  68.1 128.7 17.7   0.0   0.0 73.2  32.3
User DelAdj: 1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
AdjDel/Veh:   0.0  0.0   0.0  68.1  0.0  68.1 128.7 17.7   0.0   0.0 73.2  32.3
LOS by Move:    A    A     A     E    A     E     F    B     A     A    E    C-
HCM2kAvgQ:      0    0     0    34    0    34     9    6     0     0   32    14
*******************************************************************************
Note: Queue reported is the number of cars per lane.
*******************************************************************************
```

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project with Mitigation B - PM Peak Hour
Kittelson and Associates, Inc

Scenario Report

Scenario:	2025 PM + Proj MIT2
Command:	2025 PM MIT2
Volume:	2025 PM Cumulative + Project
Geometry:	2025 MIT2
Impact Fee:	None
Trip Generation:	None
Trip Distribution:	None
Paths:	Default Path
Routes:	Default Route
Configuration:	PM Peak

2025 PM + Proj MIT2 Tue Mar 27, 2012 16:55:32 Page 2-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project with Mitigation B - PM Peak Hour
Kittelson and Associates, Inc

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
#405 Laughlin Rd/ Northfront Rd	D	45.7	0.937	D	45.7	0.937	+ 0.000 D/V

2025 PM + Proj MIT2 Tue Mar 27, 2012 16:55:32 Page 3-1

Garaventa Hills EIR (Project 172670)
Cumulative (2025) + Project with Mitigation B - PM Peak Hour
Kittelson and Associates, Inc

Level Of Service Computation Report
2000 HCM Operations Method (Base Volume Alternative)

Intersection #405 Laughlin Rd/ Northfront Rd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.937
Loss Time (sec):	9	Average Delay (sec/veh):	45.7
Optimal Cycle:	126	Level Of Service:	D

Street Name:	Laughlin Rd						Northfront Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Y+R:	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lanes:	0	0	0	0	0	0	1! 0	0	1	0	1	0	0	1	0	1
Volume Module:												
Base Vol:	0	0	0	220	0	462	389	730	0	0	202	381
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	220	0	462	389	730	0	0	202	381
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	220	0	462	389	730	0	0	202	381
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	220	0	462	389	730	0	0	202	381
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	0	0	220	0	462	389	730	0	0	202	381
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	0.89	1.00	0.89	0.95	1.00	1.00	1.00	1.00	0.85
Lanes:	0.00	0.00	0.00	0.32	0.00	0.68	1.00	1.00	0.00	0.00	1.00	1.00
Final Sat.:	0	0	0	548	0	1151	1805	1900	0	0	1900	1615
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.40	0.00	0.40	0.22	0.38	0.00	0.00	0.11	0.24
Crit Moves:				****			****					****
Green/Cycle:	0.00	0.00	0.00	0.43	0.00	0.43	0.23	0.48	0.00	0.00	0.25	0.25
Volume/Cap:	0.00	0.00	0.00	0.94	0.00	0.94	0.94	0.80	0.00	0.00	0.42	0.94
Delay/Veh:	0.0	0.0	0.0	46.9	0.0	46.9	66.6	26.8	0.0	0.0	31.9	65.8
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	46.9	0.0	46.9	66.6	26.8	0.0	0.0	31.9	65.8
LOS by Move:	A	A	A	D	A	D	E	C	A	A	C	E
HCM2kAvgQ:	0	0	0	25	0	25	16	20	0	0	5	16

Note: Queue reported is the number of cars per lane.

Intersection Turning Movement Counts for Vehicles

Conducted by Metro Traffic Data

Turning Movement Report

Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Prepared For: Kamala Parks

Dowling Associates Inc.
180 Grand Avenue, Suite 250
Oakland, CA 94612

510-839-1742

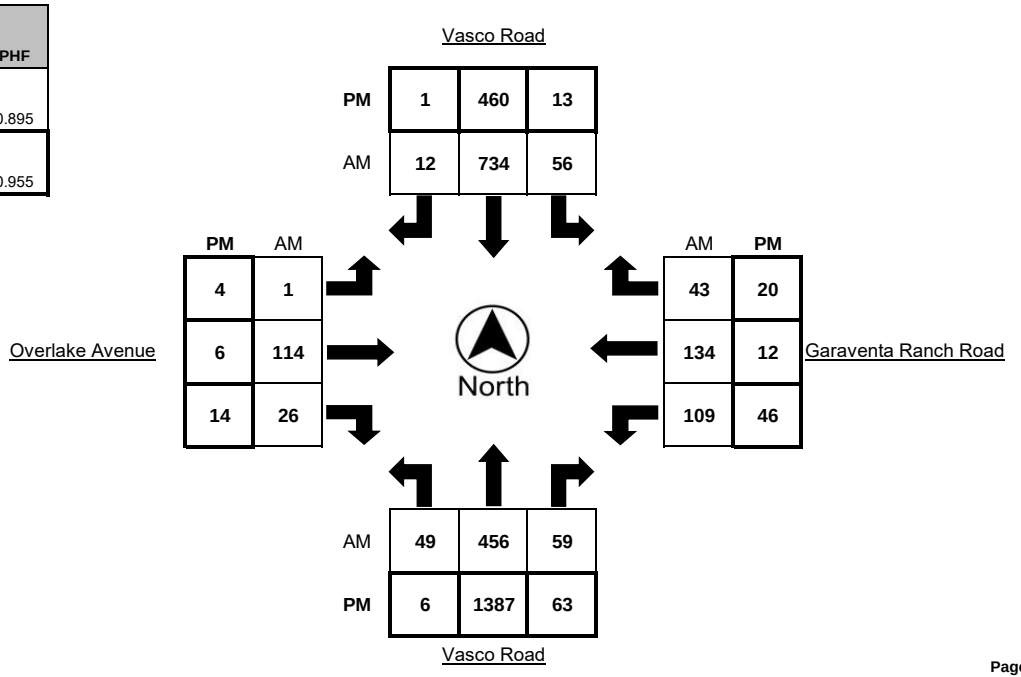
LOCATION Garaventa Ranch Road @ Vasco Road
LATITUDE 37.722355°
COUNTY Alameda
LONGITUDE -121.724076°
COLLECTION DATE 12/1/2011
WEATHER Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	1	137	8	x	2	204	0	x	0	2	3	x	13	11	10	x
7:15 AM - 7:30 AM	1	130	6	x	2	214	0	x	0	13	4	x	16	28	10	x
7:30 AM - 7:45 AM	5	101	9	x	5	208	1	x	0	3	10	x	10	12	20	x
7:45 AM - 8:00 AM	13	121	14	x	9	187	4	x	0	6	6	x	9	17	8	x
8:00 AM - 8:15 AM	26	129	19	x	15	159	6	x	1	46	12	x	14	63	11	x
8:15 AM - 8:30 AM	6	103	19	x	29	193	1	x	0	57	4	x	43	31	14	x
8:30 AM - 8:45 AM	4	103	7	x	3	195	1	x	0	5	4	x	43	23	10	x
8:45 AM - 9:00 AM	1	87	7	x	3	167	1	x	0	0	5	x	16	2	5	x
TOTAL	**57**	**911**	**89**	**x**	**68**	**1527**	**14**	**x**	**1**	**132**	**48**	**x**	**164**	**187**	**88**	**x**

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
2:00 PM - 2:15 PM	8	204	15	x	4	86	1	x	0	4	2	x	6	17	5	x
2:15 PM - 2:30 PM	5	211	21	x	35	130	0	x	0	46	14	x	19	13	6	x
2:30 PM - 2:45 PM	1	220	25	x	6	105	1	x	0	14	6	x	61	34	7	x
2:45 PM - 3:00 PM	5	275	19	x	6	113	0	x	0	6	5	x	19	4	4	x
3:00 PM - 3:15 PM	2	283	21	x	1	86	0	x	0	3	6	x	16	6	3	x
3:15 PM - 3:30 PM	0	317	20	x	4	92	0	x	0	2	6	x	20	2	7	x
3:30 PM - 3:45 PM	2	347	17	x	4	126	0	x	0	2	2	x	13	4	4	x
3:45 PM - 4:00 PM	2	350	9	x	4	99	0	x	0	2	4	x	8	0	5	x
4:00 PM - 4:15 PM	0	335	15	x	0	117	1	x	4	2	0	x	11	5	6	x
4:15 PM - 4:30 PM	2	355	22	x	5	118	0	x	0	0	8	x	14	3	5	x
4:30 PM - 4:45 PM	3	303	19	x	4	102	1	x	0	1	0	x	12	3	8	x
4:45 PM - 5:00 PM	3	268	14	x	6	106	3	x	2	2	1	x	26	1	9	x
5:00 PM - 5:15 PM	3	272	28	x	5	143	0	x	2	1	4	x	16	2	4	x
5:15 PM - 5:30 PM	6	261	24	x	8	134	1	x	1	2	2	x	13	4	2	x
5:30 PM - 5:45 PM	4	257	23	x	7	108	1	x	0	2	2	x	18	4	1	x
5:45 PM - 6:00 PM	3	234	18	x	7	121	0	x	0	1	3	x	15	1	1	x
TOTAL	**49**	**4492**	**310**	**x**	**106**	**1786**	**9**	**x**	**9**	**90**	**65**	**x**	**287**	**103**	**77**	**x**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:45 AM - 8:45 AM	49	456	59	x	56	734	12	x	1	114	26	x	109	134	43	x
3:30 PM - 4:30 PM	6	1387	63	x	13	460	1	x	4	6	14	x	46	12	20	x

	PHF
AM	0.895
PM	0.955



Turning Movement Report

Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Prepared For: Kamala Parks

Dowling Associates Inc.
180 Grand Avenue, Suite 250
Oakland, CA 94612

510-839-1742

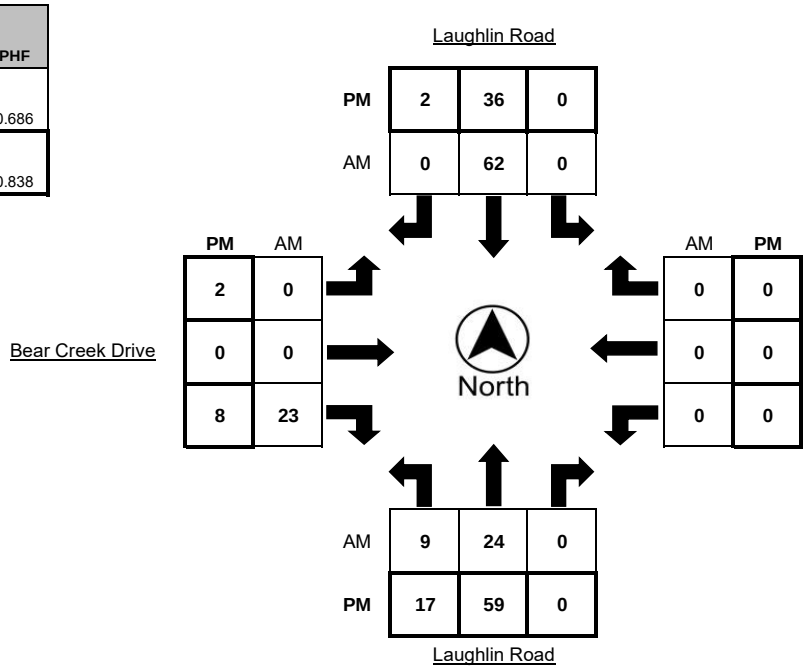
LOCATION Laughlin Road @ Bear Creek Drive
LATITUDE 37.723254°
COUNTY Alameda
LONGITUDE -121.710711°
COLLECTION DATE 12/1/2011
WEATHER Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	1	5	0	x	0	7	0	x	1	0	6	x	0	0	0	x
7:15 AM - 7:30 AM	2	5	0	x	0	18	0	x	0	0	10	x	0	0	0	x
7:30 AM - 7:45 AM	3	5	0	x	0	17	0	x	0	0	6	x	0	0	0	x
7:45 AM - 8:00 AM	2	1	0	x	0	9	0	x	0	0	3	x	0	0	0	x
8:00 AM - 8:15 AM	4	6	0	x	0	13	0	x	0	0	6	x	0	0	0	x
8:15 AM - 8:30 AM	0	12	0	x	0	23	0	x	0	0	8	x	0	0	0	x
8:30 AM - 8:45 AM	4	7	0	x	0	9	1	x	0	0	4	x	0	0	0	x
8:45 AM - 9:00 AM	2	5	0	x	0	12	0	x	0	0	1	x	0	0	0	x
TOTAL	**18**	**46**	**0**	**x**	**0**	**108**	**1**	**x**	**1**	**0**	**44**	**x**	**0**	**0**	**0**	**x**

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
2:00 PM - 2:15 PM	3	8	0	x	0	3	0	x	0	0	2	x	0	0	0	x
2:15 PM - 2:30 PM	0	7	0	x	0	16	0	x	0	0	6	x	0	0	0	x
2:30 PM - 2:45 PM	2	4	0	x	0	9	0	x	0	0	7	x	0	0	0	x
2:45 PM - 3:00 PM	2	21	0	x	0	10	1	x	1	0	2	x	0	0	0	x
3:00 PM - 3:15 PM	4	17	0	x	0	6	0	x	0	0	1	x	0	0	0	x
3:15 PM - 3:30 PM	7	7	0	x	0	5	0	x	0	0	1	x	0	0	0	x
3:30 PM - 3:45 PM	4	14	0	x	0	15	1	x	1	0	4	x	0	0	0	x
3:45 PM - 4:00 PM	3	8	0	x	0	4	0	x	0	0	3	x	0	0	0	x
4:00 PM - 4:15 PM	3	8	0	x	0	6	0	x	0	0	2	x	0	0	0	x
4:15 PM - 4:30 PM	3	5	0	x	0	3	0	x	0	0	4	x	0	0	0	x
4:30 PM - 4:45 PM	6	12	0	x	0	7	0	x	0	0	3	x	0	0	0	x
4:45 PM - 5:00 PM	5	14	0	x	0	10	0	x	0	0	1	x	0	0	0	x
5:00 PM - 5:15 PM	6	8	0	x	0	6	0	x	0	0	2	x	0	0	0	x
5:15 PM - 5:30 PM	4	14	0	x	0	12	0	x	0	0	3	x	0	0	0	x
5:30 PM - 5:45 PM	6	7	0	x	0	6	0	x	0	0	1	x	0	0	0	x
5:45 PM - 6:00 PM	7	11	0	x	0	7	1	x	1	0	2	x	0	0	0	x
TOTAL	**65**	**165**	**0**	**x**	**0**	**125**	**3**	**x**	**3**	**0**	**44**	**x**	**0**	**0**	**0**	**x**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:30 AM - 8:30 AM	9	24	0	x	0	62	0	x	0	0	23	x	0	0	0	x
2:45 PM - 3:45 PM	17	59	0	x	0	36	2	x	2	0	8	x	0	0	0	x

	PHF
AM	0.686
PM	0.838



Turning Movement Report

Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Prepared For: Kamala Parks

Dowling Associates Inc.
180 Grand Avenue, Suite 250
Oakland, CA 94612

510-839-1742

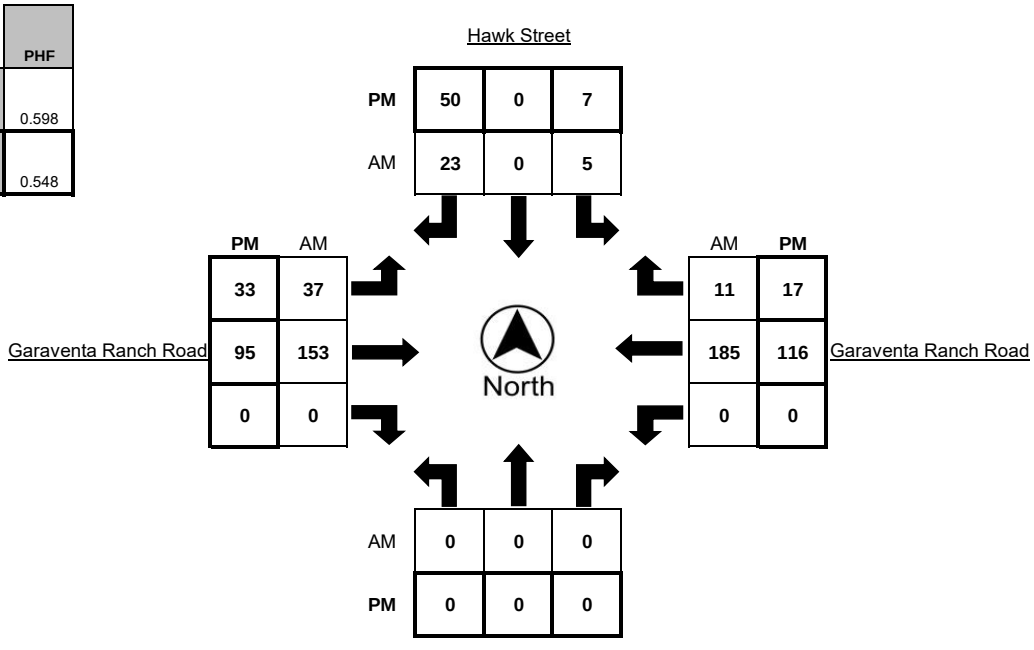
LOCATION Garaventa Ranch Road @ Hawk Street
LATITUDE 37.722662°
COUNTY Alameda
LONGITUDE -121.719350°
COLLECTION DATE 12/1/2011
WEATHER Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	0	0	0	x	2	0	1	x	2	17	0	x	0	18	1	x
7:15 AM - 7:30 AM	0	0	0	x	2	0	4	x	3	17	0	x	0	23	1	x
7:30 AM - 7:45 AM	0	0	0	x	1	0	0	x	5	16	0	x	0	17	4	x
7:45 AM - 8:00 AM	0	0	0	x	1	0	1	x	4	22	0	x	0	28	2	x
8:00 AM - 8:15 AM	0	0	0	x	0	0	5	x	12	60	0	x	0	62	1	x
8:15 AM - 8:30 AM	0	0	0	x	3	0	17	x	16	55	0	x	0	78	4	x
8:30 AM - 8:45 AM	0	0	0	x	1	0	8	x	3	12	0	x	0	17	0	x
8:45 AM - 9:00 AM	0	0	0	x	1	0	3	x	1	5	0	x	0	6	1	x
TOTAL	**0**	**0**	**0**	**x**	**11**	**0**	**39**	**x**	**46**	**204**	**0**	**x**	**0**	**249**	**14**	**x**

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
2:00 PM - 2:15 PM	0	0	0	x	0	0	1	x	2	6	0	x	0	8	2	x
2:15 PM - 2:30 PM	0	0	0	x	0	0	1	x	5	6	0	x	0	13	4	x
2:30 PM - 2:45 PM	0	0	0	x	1	0	6	x	6	42	0	x	0	26	4	x
2:45 PM - 3:00 PM	0	0	0	x	5	0	28	x	18	35	0	x	0	50	9	x
3:00 PM - 3:15 PM	0	0	0	x	1	0	15	x	4	12	0	x	0	27	0	x
3:15 PM - 3:30 PM	0	0	0	x	3	0	4	x	2	6	0	x	0	11	0	x
3:30 PM - 3:45 PM	0	0	0	x	1	0	3	x	1	8	0	x	0	14	0	x
3:45 PM - 4:00 PM	0	0	0	x	0	0	1	x	2	7	0	x	0	16	1	x
4:00 PM - 4:15 PM	0	0	0	x	1	0	0	x	0	4	0	x	0	6	1	x
4:15 PM - 4:30 PM	0	0	0	x	1	0	4	x	0	3	0	x	0	9	0	x
4:30 PM - 4:45 PM	0	0	0	x	2	0	1	x	1	8	0	x	0	14	3	x
4:45 PM - 5:00 PM	0	0	0	x	0	0	1	x	2	10	0	x	0	16	0	x
5:00 PM - 5:15 PM	0	0	0	x	0	0	5	x	1	13	0	x	0	12	1	x
5:15 PM - 5:30 PM	0	0	0	x	0	0	1	x	2	18	0	x	0	14	2	x
5:30 PM - 5:45 PM	0	0	0	x	0	0	1	x	1	15	0	x	0	15	3	x
5:45 PM - 6:00 PM	0	0	0	x	1	0	2	x	3	14	0	x	0	9	1	x
TOTAL	**0**	**0**	**0**	**x**	**16**	**0**	**74**	**x**	**50**	**207**	**0**	**x**	**0**	**260**	**31**	**x**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:30 AM - 8:30 AM	0	0	0	x	5	0	23	x	37	153	0	x	0	185	11	x
2:15 PM - 3:15 PM	0	0	0	x	7	0	50	x	33	95	0	x	0	116	17	x

	PHF
AM	0.598
PM	0.548



Turning Movement Report

Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Prepared For: Kamala Parks

Dowling Associates Inc.
180 Grand Avenue, Suite 250
Oakland, CA 94612

510-839-1742

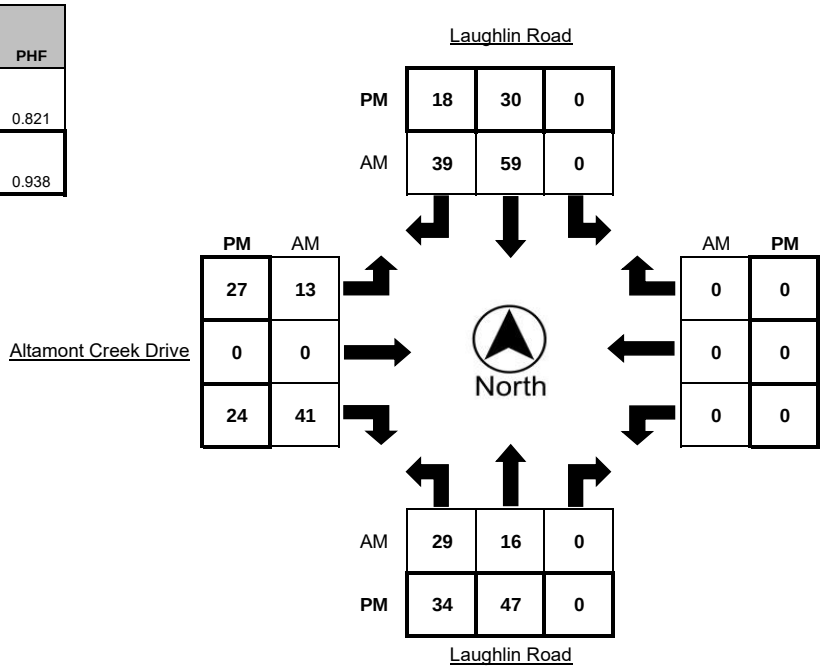
LOCATION Altamont Creek Drive @ Lauglin Road
LATITUDE 37.721670°
COUNTY Alameda
LONGITUDE -121.710703°
COLLECTION DATE 12/1/2011
WEATHER Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	1	4	0	x	0	10	4	x	2	0	3	x	0	0	0	x
7:15 AM - 7:30 AM	8	3	0	x	0	27	9	x	5	0	8	x	0	0	0	x
7:30 AM - 7:45 AM	13	3	0	x	0	15	1	x	3	0	9	x	0	0	0	x
7:45 AM - 8:00 AM	5	4	0	x	0	9	8	x	2	0	7	x	0	0	0	x
8:00 AM - 8:15 AM	3	6	0	x	0	8	21	x	3	0	17	x	0	0	0	x
8:15 AM - 8:30 AM	4	4	0	x	0	13	11	x	15	0	6	x	0	0	0	x
8:30 AM - 8:45 AM	4	3	0	x	0	13	3	x	7	0	10	x	0	0	0	x
8:45 AM - 9:00 AM	1	4	0	x	0	7	1	x	2	0	1	x	0	0	0	x
TOTAL	**39**	**31**	**0**	**x**	**0**	**102**	**58**	**x**	**39**	**0**	**61**	**x**	**0**	**0**	**0**	**x**

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
2:00 PM - 2:15 PM	2	8	0	x	0	5	7	x	0	0	0	x	0	0	0	x
2:15 PM - 2:30 PM	7	2	0	x	0	7	14	x	2	0	1	x	0	0	0	x
2:30 PM - 2:45 PM	5	9	0	x	0	9	8	x	15	0	3	x	0	0	0	x
2:45 PM - 3:00 PM	4	6	0	x	0	6	5	x	16	0	3	x	0	0	0	x
3:00 PM - 3:15 PM	5	12	0	x	0	5	1	x	8	0	0	x	0	0	0	x
3:15 PM - 3:30 PM	3	22	0	x	0	10	4	x	4	0	1	x	0	0	0	x
3:30 PM - 3:45 PM	8	8	0	x	0	8	5	x	5	0	2	x	0	0	0	x
3:45 PM - 4:00 PM	5	8	0	x	0	8	3	x	4	0	3	x	0	0	0	x
4:00 PM - 4:15 PM	3	6	0	x	0	3	1	x	1	0	1	x	0	0	0	x
4:15 PM - 4:30 PM	4	12	0	x	0	6	2	x	4	0	0	x	0	0	0	x
4:30 PM - 4:45 PM	10	11	0	x	0	6	2	x	4	0	10	x	0	0	0	x
4:45 PM - 5:00 PM	3	17	0	x	0	8	4	x	8	0	2	x	0	0	0	x
5:00 PM - 5:15 PM	8	6	0	x	0	5	9	x	10	0	10	x	0	0	0	x
5:15 PM - 5:30 PM	13	13	0	x	0	11	3	x	5	0	2	x	0	0	0	x
5:30 PM - 5:45 PM	6	15	0	x	0	9	2	x	3	0	2	x	0	0	0	x
5:45 PM - 6:00 PM	9	16	0	x	0	5	5	x	4	0	2	x	0	0	0	x
TOTAL	**95**	**171**	**0**	**x**	**0**	**111**	**75**	**x**	**93**	**0**	**42**	**x**	**0**	**0**	**0**	**x**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:15 AM - 8:15 AM	29	16	0	x	0	59	39	x	13	0	41	x	0	0	0	x
4:30 PM - 5:30 PM	34	47	0	x	0	30	18	x	27	0	24	x	0	0	0	x

	PHF
AM	0.821
PM	0.938



Turning Movement Report

Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Prepared For: Kamala Parks

Dowling Associates Inc.
180 Grand Avenue, Suite 250
Oakland, CA 94612

510-839-1742

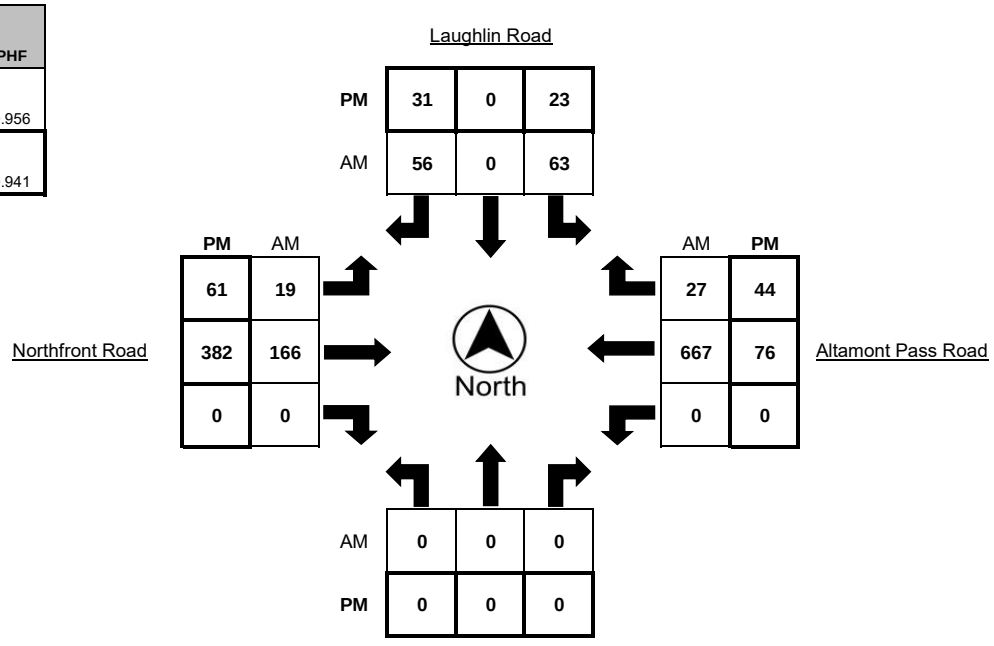
LOCATION Laughlin Road @ Altamont Pass Road
LATITUDE 37.715166°
COUNTY Alameda
LONGITUDE -121.710545°
COLLECTION DATE 12/1/2011
WEATHER Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	0	0	0	x	8	0	7	x	0	12	0	x	0	169	4	x
7:15 AM - 7:30 AM	0	0	0	x	14	0	22	x	3	19	0	x	0	182	7	x
7:30 AM - 7:45 AM	0	0	0	x	18	0	25	x	5	37	0	x	0	162	14	x
7:45 AM - 8:00 AM	0	0	0	x	16	0	12	x	2	45	0	x	0	168	4	x
8:00 AM - 8:15 AM	0	0	0	x	11	0	9	x	10	45	0	x	0	161	6	x
8:15 AM - 8:30 AM	0	0	0	x	18	0	10	x	2	39	0	x	0	176	3	x
8:30 AM - 8:45 AM	0	0	0	x	12	0	11	x	4	36	0	x	0	164	5	x
8:45 AM - 9:00 AM	0	0	0	x	7	0	11	x	4	24	0	x	0	140	1	x
TOTAL	**0**	**0**	**0**	**x**	**104**	**0**	**107**	**x**	**30**	**257**	**0**	**x**	**0**	**1322**	**44**	**x**

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
2:00 PM - 2:15 PM	0	0	0	x	4	0	2	x	11	5	0	x	0	7	0	x
2:15 PM - 2:30 PM	0	0	0	x	4	0	7	x	11	17	0	x	0	15	2	x
2:30 PM - 2:45 PM	0	0	0	x	4	0	7	x	2	12	0	x	0	17	4	x
2:45 PM - 3:00 PM	0	0	0	x	5	0	9	x	10	16	0	x	0	9	6	x
3:00 PM - 3:15 PM	0	0	0	x	3	0	4	x	11	19	0	x	0	21	5	x
3:15 PM - 3:30 PM	0	0	0	x	1	0	8	x	19	23	0	x	0	18	4	x
3:30 PM - 3:45 PM	0	0	0	x	5	0	10	x	21	16	0	x	0	21	4	x
3:45 PM - 4:00 PM	0	0	0	x	2	0	8	x	5	30	0	x	0	20	14	x
4:00 PM - 4:15 PM	0	0	0	x	5	0	7	x	12	42	0	x	0	15	2	x
4:15 PM - 4:30 PM	0	0	0	x	3	0	6	x	14	51	0	x	0	17	6	x
4:30 PM - 4:45 PM	0	0	0	x	3	0	6	x	15	68	0	x	0	29	9	x
4:45 PM - 5:00 PM	0	0	0	x	7	0	7	x	15	82	0	x	0	21	15	x
5:00 PM - 5:15 PM	0	0	0	x	3	0	10	x	13	101	0	x	0	20	7	x
5:15 PM - 5:30 PM	0	0	0	x	8	0	7	x	14	94	0	x	0	18	11	x
5:30 PM - 5:45 PM	0	0	0	x	5	0	7	x	19	105	0	x	0	17	11	x
5:45 PM - 6:00 PM	0	0	0	x	6	0	9	x	23	70	0	x	0	22	5	x
TOTAL	**0**	**0**	**0**	**x**	**68**	**0**	**114**	**x**	**215**	**751**	**0**	**x**	**0**	**287**	**105**	**x**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:30 AM - 8:30 AM	0	0	0	x	63	0	56	x	19	166	0	x	0	667	27	x
4:45 PM - 5:45 PM	0	0	0	x	23	0	31	x	61	382	0	x	0	76	44	x

	PHF
AM	0.956
PM	0.941



Turning Movement Report

Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Prepared For: Kamala Parks

Dowling Associates Inc.
180 Grand Avenue, Suite 250
Oakland, CA 94612

510-839-1742

LOCATION Garaventa Ranch Road @ Altamont Creek Drive
LATITUDE 37.721128°

COUNTY Alameda
LONGITUDE -121.717499°

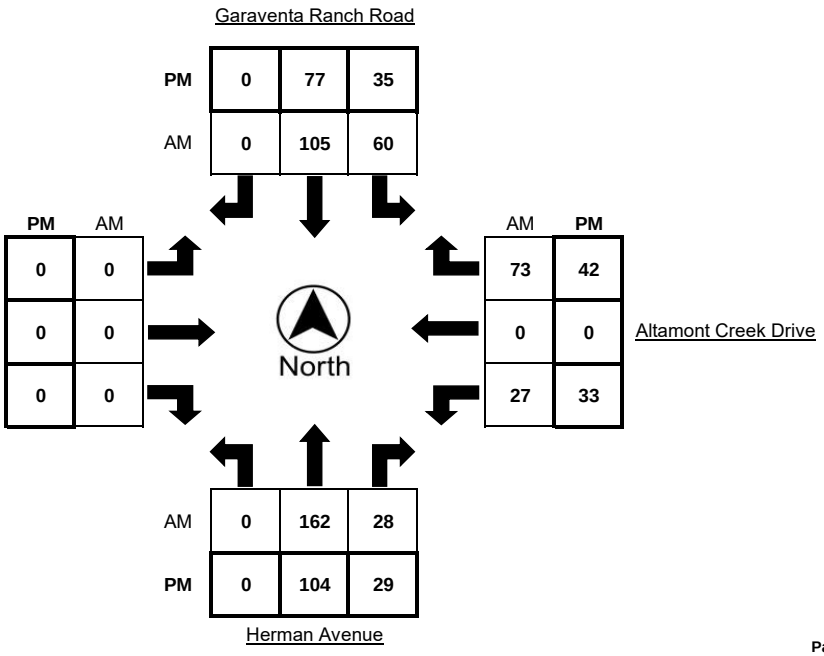
COLLECTION DATE 12/1/2011
WEATHER Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	0	12	2	x	8	8	0	x	0	0	0	x	2	0	7	x
7:15 AM - 7:30 AM	0	16	5	x	6	15	0	x	0	0	0	x	16	0	9	x
7:30 AM - 7:45 AM	0	11	2	x	8	10	0	x	0	0	0	x	5	0	15	x
7:45 AM - 8:00 AM	0	14	6	x	6	10	0	x	0	0	0	x	8	0	15	x
8:00 AM - 8:15 AM	0	57	7	x	14	16	0	x	0	0	0	x	11	0	27	x
8:15 AM - 8:30 AM	0	82	9	x	23	36	0	x	0	0	0	x	1	0	26	x
8:30 AM - 8:45 AM	0	9	6	x	17	43	0	x	0	0	0	x	7	0	5	x
8:45 AM - 9:00 AM	0	3	1	x	4	9	0	x	0	0	0	x	8	0	5	x
TOTAL	**0**	**204**	**38**	**x**	**86**	**147**	**0**	**x**	**0**	**0**	**0**	**x**	**58**	**0**	**109**	**x**

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
2:00 PM - 2:15 PM	0	22	8	x	2	2	0	x	0	0	0	x	3	0	6	x
2:15 PM - 2:30 PM	0	27	6	x	1	3	0	x	0	0	0	x	6	0	15	x
2:30 PM - 2:45 PM	0	45	7	x	11	16	0	x	0	0	0	x	4	0	12	x
2:45 PM - 3:00 PM	0	25	9	x	15	32	0	x	0	0	0	x	16	0	10	x
3:00 PM - 3:15 PM	0	7	7	x	8	26	0	x	0	0	0	x	7	0	5	x
3:15 PM - 3:30 PM	0	8	6	x	4	8	0	x	0	0	0	x	7	0	4	x
3:30 PM - 3:45 PM	0	6	11	x	3	7	0	x	0	0	0	x	6	0	8	x
3:45 PM - 4:00 PM	0	6	8	x	6	5	0	x	0	0	0	x	4	0	8	x
4:00 PM - 4:15 PM	0	5	4	x	1	6	0	x	0	0	0	x	2	0	1	x
4:15 PM - 4:30 PM	0	10	8	x	4	5	0	x	0	0	0	x	3	0	3	x
4:30 PM - 4:45 PM	0	11	7	x	7	8	0	x	0	0	0	x	2	0	6	x
4:45 PM - 5:00 PM	0	8	9	x	5	6	0	x	0	0	0	x	7	0	11	x
5:00 PM - 5:15 PM	0	13	6	x	7	12	0	x	0	0	0	x	10	0	8	x
5:15 PM - 5:30 PM	0	12	7	x	12	9	0	x	0	0	0	x	10	0	7	x
5:30 PM - 5:45 PM	0	12	5	x	4	13	0	x	0	0	0	x	3	0	9	x
5:45 PM - 6:00 PM	0	6	9	x	7	11	0	x	0	0	0	x	6	0	2	x
TOTAL	**0**	**223**	**117**	**x**	**97**	**169**	**0**	**x**	**0**	**0**	**0**	**x**	**96**	**0**	**115**	**x**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:45 AM - 8:45 AM	0	162	28	x	60	105	0	x	0	0	0	x	27	0	73	x
2:15 PM - 3:15 PM	0	104	29	x	35	77	0	x	0	0	0	x	33	0	42	x

	PHF
AM	0.643
PM	0.748



Intersection Turning Movement Counts for Bicyclists and Intersection Crossing Counts for Pedestrians

Conducted by Metro Traffic Data

Turning Movement Report

Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Prepared For: Kamala Parks

Dowling Associates Inc.
180 Grand Avenue, Suite 250
Oakland, CA 94612

510-839-1742

LOCATION Garaventa Ranch Road @ Vasco Road

LATITUDE 37.722355°

COUNTY Alameda

LONGITUDE -121.724076°

COLLECTION DATE 12/1/2011

WEATHER Clear

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:00 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM - 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM - 8:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	0
8:00 AM - 8:15 AM	0	0	0	0	0	0	1	3	0	0	0	0	0	8	0	0
8:15 AM - 8:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0
8:30 AM - 8:45 AM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
8:45 AM - 9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**6**	**0**	**1**	**0**	**0**	**0**	**11**	**0**	**0**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
2:00 PM - 2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM - 2:30 PM	0	0	0	3	0	0	0	7	0	7	0	0	0	1	0	1
2:30 PM - 2:45 PM	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	1
2:45 PM - 3:00 PM	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0
3:00 PM - 3:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
3:15 PM - 3:30 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
3:30 PM - 3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM - 4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	1
4:15 PM - 4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM - 4:45 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
4:45 PM - 5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM - 5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM - 5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM - 5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**13**	**0**	**13**	**0**	**1**	**0**	**2**	**0**	**3**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
PEAK HOUR	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:45 AM - 8:45 AM	0	0	0	0	0	0	1	6	0	1	0	0	0	11	0	0
3:30 PM - 4:30 PM	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	1

Turning Movement Report

Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Prepared For: Kamala Parks

Dowling Associates Inc.
180 Grand Avenue, Suite 250
Oakland, CA 94612

510-839-1742

LOCATION Laughlin Road @ Bear Creek Drive
LATITUDE 37.723254°
COUNTY Alameda
LONGITUDE -121.710711°
COLLECTION DATE 12/1/2011
WEATHER Clear

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:00 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM - 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM - 8:00 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1
8:00 AM - 8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM - 8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM - 8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM - 9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
2:00 PM - 2:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM - 2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM - 2:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
2:45 PM - 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM - 3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM - 3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM - 3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:45 PM - 4:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
4:00 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:15 PM - 4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:30 PM - 4:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:45 PM - 5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:00 PM - 5:15 PM	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
5:15 PM - 5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM - 5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**2**	**2**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**9**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
PEAK HOUR	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:30 AM - 8:30 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1
2:45 PM - 3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Turning Movement Report

Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Prepared For: Kamala Parks

Dowling Associates Inc.
180 Grand Avenue, Suite 250
Oakland, CA 94612

510-839-1742

LOCATION Garaventa Ranch Road @ Hawk Street
LATITUDE 37.722662°
COUNTY Alameda
LONGITUDE -121.719350°
COLLECTION DATE 12/1/2011
WEATHER Clear

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:00 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
7:15 AM - 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM - 8:00 AM	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM - 8:15 AM	0	0	0	0	0	0	0	0	0	0	0	18	0	0	0	0
8:15 AM - 8:30 AM	0	0	0	28	0	0	0	0	0	0	0	70	0	0	0	0
8:30 AM - 8:45 AM	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8:45 AM - 9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**0**	**0**	**31**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**92**	**0**	**1**	**0**	**0**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
2:00 PM - 2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM - 2:30 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
2:30 PM - 2:45 PM	0	0	0	4	0	0	0	0	0	1	0	18	0	1	0	0
2:45 PM - 3:00 PM	0	0	0	10	0	0	0	0	0	2	0	54	0	0	0	0
3:00 PM - 3:15 PM	0	0	0	1	0	0	0	0	0	0	0	20	0	2	0	0
3:15 PM - 3:30 PM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
3:30 PM - 3:45 PM	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0
3:45 PM - 4:00 PM	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0
4:00 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM - 4:30 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM - 4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM - 5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM - 5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM - 5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM - 5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**0**	**0**	**18**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**98**	**0**	**4**	**0**	**0**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
PEAK HOUR	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:30 AM - 8:30 AM	0	0	0	31	0	0	0	0	0	0	0	88	0	0	0	0
2:15 PM - 3:15 PM	0	0	0	15	0	0	0	0	0	3	0	94	0	3	0	0

Turning Movement Report

Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Prepared For: Kamala Parks

Dowling Associates Inc.
180 Grand Avenue, Suite 250
Oakland, CA 94612

510-839-1742

LOCATION Altamont Creek Drive @ Lauglin Road
LATITUDE 37.721670°

COUNTY Alameda
LONGITUDE -121.710703°

COLLECTION DATE 12/1/2011
WEATHER Clear

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:00 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM - 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
7:30 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:45 AM - 8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM - 8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM - 8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM - 8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:45 AM - 9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
2:00 PM - 2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM - 2:30 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2:30 PM - 2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM - 3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:00 PM - 3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM - 3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM - 3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
3:45 PM - 4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
4:15 PM - 4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
4:30 PM - 4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
4:45 PM - 5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
5:00 PM - 5:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 PM - 5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM - 5:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**4**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**16**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
PEAK HOUR	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:15 AM - 8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
4:30 PM - 5:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	8

Turning Movement Report

Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Prepared For: Kamala Parks

Dowling Associates Inc.
180 Grand Avenue, Suite 250
Oakland, CA 94612

510-839-1742

LOCATION Laughlin Road @ Altamont Pass Road
LATITUDE 37.715166°

COUNTY Alameda
LONGITUDE -121.710545°

COLLECTION DATE 12/1/2011
WEATHER Clear

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:00 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM - 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM - 8:00 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM - 8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM - 8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM - 8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM - 9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
2:00 PM - 2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM - 2:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
2:30 PM - 2:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM - 3:00 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
3:00 PM - 3:15 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
3:15 PM - 3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM - 3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM - 4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM - 4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM - 4:45 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM - 5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
5:00 PM - 5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM - 5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM - 5:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**1**	**3**	**0**	**0**	**0**	**3**	**0**	**0**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
PEAK HOUR	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:30 AM - 8:30 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM - 5:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0

Turning Movement Report

Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Prepared For: Kamala Parks

Dowling Associates Inc.
180 Grand Avenue, Suite 250
Oakland, CA 94612

510-839-1742

LOCATION Garaventa Ranch Road @ Altamont Creek Drive
LATITUDE 37.721128°

COUNTY Alameda
LONGITUDE -121.717499°

COLLECTION DATE 12/1/2011
WEATHER Clear

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:00 AM - 7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM - 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM - 8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM - 8:15 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
8:15 AM - 8:30 AM	0	2	0	4	0	0	0	0	0	0	0	19	0	0	0	0
8:30 AM - 8:45 AM	0	1	0	3	0	0	0	1	0	0	0	17	0	0	1	0
8:45 AM - 9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**3**	**0**	**7**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**36**	**0**	**0**	**2**	**0**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
2:00 PM - 2:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:15 PM - 2:30 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
2:30 PM - 2:45 PM	0	1	0	3	0	0	0	0	0	0	0	5	0	0	0	0
2:45 PM - 3:00 PM	0	0	0	6	0	1	0	0	0	0	0	11	0	0	0	0
3:00 PM - 3:15 PM	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0
3:15 PM - 3:30 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
3:30 PM - 3:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
3:45 PM - 4:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
4:00 PM - 4:15 PM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM - 4:30 PM	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
4:30 PM - 4:45 PM	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM - 5:00 PM	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0
5:00 PM - 5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM - 5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM - 5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**2**	**0**	**16**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**27**	**0**	**0**	**0**	**0**

	Northbound Bikes			N.Leg	Southbound Bikes			S.Leg	Eastbound Bikes			E.Leg	Westbound Bikes			W.Leg
PEAK HOUR	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
7:45 AM - 8:45 AM	0	3	0	7	0	0	0	2	0	0	0	36	0	0	2	0
2:15 PM - 3:15 PM	0	2	0	9	0	2	0	0	0	0	0	18	0	0	0	0

24-hour Vehicle Volume and Speed Data

Conducted by Metro Traffic Data

Special Speed Study Report: 02 LIV

Station ID : 02 LIV

Info Line 1 : Altamont Creek Drive
Info Line 2 : w/o Fox Creek Ct
GPS Lat/Lon :
DB File : 02 LIV.DB

Last Connected Device Type : Apollo
Version Number : 1.51
Serial Number : 10432

Number of Lanes : 2
Posted Speed Limit : 25.0 mph

Lane #1 Configuration

#	Dir.	Information	Vehicle Sensors	Sensor Spacing	Loop Length	Comment
1.	E		Ax-Ax	4.0 ft	6.0 ft	

Lane #1 Special Speed Study Data From: 00:00 - 12/01/2011 To: 23:59 - 12/01/2011

Date	Time	#1 0 - 19.9	#2 20 - 24.9	#3 25 - 29.9	#4 30 - 34.9	#5 35 - 39.9	#6 40 - 44.9	#7 45 - 49.9	#8 50 - 54.9	#9 55 - 59.9	#10 60 - 64.9	#11 65 - 69.9	#12 70 - 74.9	#13 75 - 79.9	#14 80 - 84.9	#15 85 - 89.9	#16 Other	Total
12/01/11	00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thu	00:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	00:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	00:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	04:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	04:30	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	04:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	05:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	05:30	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	05:45	0	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	4
	06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	06:15	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
	06:30	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	06:45	1	0	1	3	1	0	0	0	0	0	0	0	0	0	0	0	6
	07:00	3	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	6
	07:15	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	6
	07:30	1	2	2	6	1	0	0	0	0	0	0	0	0	0	0	0	12
	07:45	1	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	8
	08:00	1	2	5	6	0	0	0	0	0	0	0	0	0	0	0	0	14
	08:15	0	2	17	4	2	0	0	0	0	0	0	0	0	0	0	0	25
	08:30	0	3	12	6	3	0	0	0	0	0	0	0	0	0	0	0	24
	08:45	0	0	3	3	1	1	0	0	0	0	0	0	0	0	0	0	8
	09:00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	09:15	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	09:30	1	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	5
	09:45	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	5
	10:00	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	4
	10:15	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1

Date	Time	#1 0 - 19.9	#2 20 - 24.9	#3 25 - 29.9	#4 30 - 34.9	#5 35 - 39.9	#6 40 - 44.9	#7 45 - 49.9	#8 50 - 54.9	#9 55 - 59.9	#10 60 - 64.9	#11 65 - 69.9	#12 70 - 74.9	#13 75 - 79.9	#14 80 - 84.9	#15 85 - 89.9	#16 Other	Total
12/01/11	10:30	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Thu	10:45	0	2	0	4	0	0	0	0	0	0	0	0	0	0	0	0	6
	11:00	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	3
	11:15	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	11:30	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	4
	11:45	1	2	2	1	1	0	0	0	0	0	0	0	0	0	0	0	7
	12:00	0	1	4	1	1	0	0	0	0	0	0	0	0	0	0	0	7
	12:15	1	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	7
	12:30	0	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	7
	12:45	1	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	7
	13:00	0	3	1	2	0	0	0	0	0	0	0	0	0	0	0	0	6
	13:15	1	2	3	1	0	0	0	0	0	0	0	0	0	0	0	0	7
	13:30	0	2	4	1	0	0	0	0	0	0	0	0	0	0	0	0	7
	13:45	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	14:00	0	5	2	3	1	0	0	0	0	0	0	0	0	0	0	0	11
	14:15	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	3
	14:30	0	3	2	7	0	0	0	0	0	0	0	0	0	0	0	0	12
	14:45	2	8	6	2	0	0	0	0	0	0	0	0	0	0	0	0	18
	15:00	0	5	14	2	1	0	0	0	0	0	0	0	0	0	0	0	22
	15:15	0	3	5	3	0	0	0	0	0	0	0	0	0	0	0	0	11
	15:30	0	1	6	1	1	0	0	0	0	0	0	0	0	0	0	0	9
	15:45	0	4	4	1	0	0	0	0	0	0	0	0	0	0	0	0	9
	16:00	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	5
	16:15	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	4
	16:30	1	2	3	4	0	0	0	0	0	0	0	0	0	0	0	0	10
	16:45	1	2	5	1	0	0	0	0	0	0	0	0	0	0	0	0	9
	17:00	0	2	6	3	0	0	0	0	0	0	0	0	0	0	0	0	11
	17:15	0	4	5	7	1	0	0	0	0	0	0	0	0	0	0	0	17
	17:30	2	2	4	0	1	0	0	0	0	0	0	0	0	0	0	0	9
	17:45	2	3	4	3	0	0	0	0	0	0	0	0	0	0	0	0	12
	18:00	1	3	4	2	0	0	0	0	0	0	0	0	0	0	0	0	10
	18:15	0	2	2	2	0	0	0	0	0	0	0	0	0	0	0	0	6
	18:30	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	6
	18:45	0	1	4	2	0	0	0	0	0	0	0	0	0	0	0	0	7
	19:00	0	0	7	1	0	0	0	0	0	0	0	0	0	0	0	0	8
	19:15	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	4
	19:30	0	2	3	3	0	0	0	0	0	0	0	0	0	0	0	0	8
	19:45	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	5
	20:00	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	20:15	1	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	5
	20:30	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	5
	20:45	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	21:00	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	3
	21:15	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	21:30	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	21:45	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	22:00	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	3
	22:15	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	22:45	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	23:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daily Total :		33	99	201	120	16	1	0	0	0	0	0	0	0	0	0	0	470
Percent :		7%	21%	43%	26%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Cum. Percent :		7%	28%	71%	96%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Average :		0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	4

Average Speed : 26.8 mph 50% Speed : 27.6 mph 67% Speed : 29.4 mph 85% Speed : 32.7 mph
10mph Pace: 25.0 - 34.9 (68.3%)

Lane #3 Configuration

#	Dir.	Information	Vehicle Sensors	Sensor Spacing	Loop Length	Comment
3.	W		Ax-Ax	4.0 ft	6.0 ft	

Lane #3 Special Speed Study Data From: 00:00 - 12/01/2011 To: 23:59 - 12/01/2011

Date	Time	#1 0 - 19.9	#2 20 - 24.9	#3 25 - 29.9	#4 30 - 34.9	#5 35 - 39.9	#6 40 - 44.9	#7 45 - 49.9	#8 50 - 54.9	#9 55 - 59.9	#10 60 - 64.9	#11 65 - 69.9	#12 70 - 74.9	#13 75 - 79.9	#14 80 - 84.9	#15 85 - 89.9	#16 Other	Total
12/01/11	00:00	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Thu	00:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	00:30	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	00:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:15	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
	02:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	04:15	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	04:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	04:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	05:00	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	3
	05:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	05:30	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3
	05:45	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	06:00	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	4
	06:15	0	1	4	2	2	0	0	0	0	0	0	0	0	0	0	0	9
	06:30	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	06:45	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	3
	07:00	0	2	0	0	3	0	0	0	0	0	0	0	0	0	0	0	5
	07:15	2	2	2	6	3	3	0	0	0	0	0	0	0	0	0	0	18
	07:30	0	2	2	9	7	5	0	0	0	0	0	0	0	0	0	0	25
	07:45	0	0	1	6	4	1	0	0	0	0	0	0	0	0	0	0	12
	08:00	0	3	10	7	7	2	0	0	0	0	0	0	0	0	0	0	29
	08:15	0	1	5	11	16	2	0	0	0	0	0	0	0	0	0	0	35
	08:30	1	1	1	2	4	1	0	0	0	0	0	0	0	0	0	0	10
	08:45	0	0	3	2	2	1	0	0	0	0	0	0	0	0	0	0	8
	09:00	0	1	1	3	0	0	0	0	0	0	0	0	0	0	0	0	5
	09:15	0	2	1	3	2	0	0	0	0	0	0	0	0	0	0	0	8
	09:30	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	3
	09:45	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	3
	10:00	0	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	4
	10:15	0	0	2	3	1	0	0	0	0	0	0	0	0	0	0	0	6
	10:30	0	0	1	3	0	1	0	0	0	0	0	0	0	0	0	0	5
	10:45	0	1	2	0	0	1	0	0	0	0	0	0	0	0	0	0	4
	11:00	0	1	4	2	1	0	0	0	0	0	0	0	0	0	0	0	8
	11:15	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
	11:30	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2
	11:45	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	3
	12:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
	12:15	0	0	3	2	1	0	0	0	0	0	0	0	0	0	0	0	6
	12:30	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	12:45	1	1	2	3	1	0	0	0	0	0	0	0	0	0	0	0	8
	13:00	0	1	2	1	2	0	0	0	0	0	0	0	0	0	0	0	6

Date	Time	#1 0 - 19.9	#2 20 - 24.9	#3 25 - 29.9	#4 30 - 34.9	#5 35 - 39.9	#6 40 - 44.9	#7 45 - 49.9	#8 50 - 54.9	#9 55 - 59.9	#10 60 - 64.9	#11 65 - 69.9	#12 70 - 74.9	#13 75 - 79.9	#14 80 - 84.9	#15 85 - 89.9	#16 Other	Total
12/01/11	13:15	2	2	6	4	2	0	0	0	0	0	0	0	0	0	0	0	16
Thu	13:30	0	2	1	3	1	0	0	0	0	0	0	0	0	0	0	0	7
	13:45	0	2	0	3	0	0	0	0	0	0	0	0	0	0	0	0	5
	14:00	0	1	3	4	3	0	0	0	0	0	0	0	0	0	0	0	11
	14:15	1	1	1	9	3	2	0	0	0	0	0	0	0	0	0	0	17
	14:30	0	3	4	10	3	1	0	0	0	0	0	0	0	0	0	0	21
	14:45	0	0	6	3	2	0	0	0	0	0	0	0	0	0	0	0	11
	15:00	0	2	1	5	0	0	0	0	0	0	0	0	0	0	0	0	8
	15:15	1	0	3	0	1	1	0	0	0	0	0	0	0	0	0	0	6
	15:30	0	0	2	2	5	1	0	0	0	0	0	0	0	0	0	0	10
	15:45	0	0	1	3	6	1	0	0	0	0	0	0	0	0	0	0	11
	16:00	0	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	6
	16:15	0	1	0	3	2	0	0	0	0	0	0	0	0	0	0	0	6
	16:30	0	2	3	2	2	0	0	0	0	0	0	0	0	0	0	0	9
	16:45	3	2	3	3	4	0	1	0	0	0	0	0	0	0	0	0	16
	17:00	0	0	4	6	1	0	0	0	0	0	0	0	0	0	0	0	11
	17:15	0	2	4	6	2	0	0	0	0	0	0	0	0	0	0	0	14
	17:30	1	3	0	3	3	0	0	0	0	0	0	0	0	0	0	0	10
	17:45	0	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	6
	18:00	0	1	5	4	1	0	0	0	0	0	0	0	0	0	0	0	11
	18:15	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	2
	18:30	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	18:45	1	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	5
	19:00	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	4
	19:15	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	5
	19:30	0	1	0	5	0	0	0	0	0	0	0	0	0	0	0	0	6
	19:45	1	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	4
	20:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
	20:15	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	20:30	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
	20:45	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	4
	21:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	21:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	21:30	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	21:45	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
	22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	22:15	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	22:45	0	0	4	5	0	0	0	0	0	0	0	0	0	0	0	0	9
	23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	23:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daily Total :		17	57	118	170	116	27	1	0	0	0	0	0	0	0	0	0	506
Percent :		3%	11%	23%	34%	23%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Cum. Percent :		3%	15%	38%	72%	94%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Average :		0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	5

Average Speed : 31.1 mph 50% Speed : 31.9 mph 67% Speed : 34.3 mph 85% Speed : 37.8 mph
10mph Pace: 26.3 - 36.2 (56.9%)

Date	Time	#1 0 - 19.9	#2 20 - 24.9	#3 25 - 29.9	#4 30 - 34.9	#5 35 - 39.9	#6 40 - 44.9	#7 45 - 49.9	#8 50 - 54.9	#9 55 - 59.9	#10 60 - 64.9	#11 65 - 69.9	#12 70 - 74.9	#13 75 - 79.9	#14 80 - 84.9	#15 85 - 89.9	#16 Other	Total

Special Speed Study Summary: 02 LIV

Description	#1 0 - 19.9	#2 20 - 24.9	#3 25 - 29.9	#4 30 - 34.9	#5 35 - 39.9	#6 40 - 44.9	#7 45 - 49.9	#8 50 - 54.9	#9 55 - 59.9	#10 60 - 64.9	#11 65 - 69.9	#12 70 - 74.9	#13 75 - 79.9	#14 80 - 84.9	#15 85 - 89.9	#16 Other	Total
Grand Total #1:	33	99	201	120	16	1	0	0	0	0	0	0	0	0	0	0	470
Percent :	7%	21%	43%	26%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Cum. Percent :	7%	28%	71%	96%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Average :	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	4

ADT = 470

Average Speed : 26.8 mph 50% Speed : 27.6 mph 67% Speed : 29.4 mph 85% Speed : 32.7 mph
10mph Pace: 25.0 - 34.9 (68.3%)

Grand Total #3:	17	57	118	170	116	27	1	0	0	0	0	0	0	0	0	0	506
Percent :	3%	11%	23%	34%	23%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Cum. Percent :	3%	15%	38%	72%	94%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Average :	0	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	5

ADT = 506

Average Speed : 31.1 mph 50% Speed : 31.9 mph 67% Speed : 34.3 mph 85% Speed : 37.8 mph
10mph Pace: 26.2 - 36.2 (56.9%)

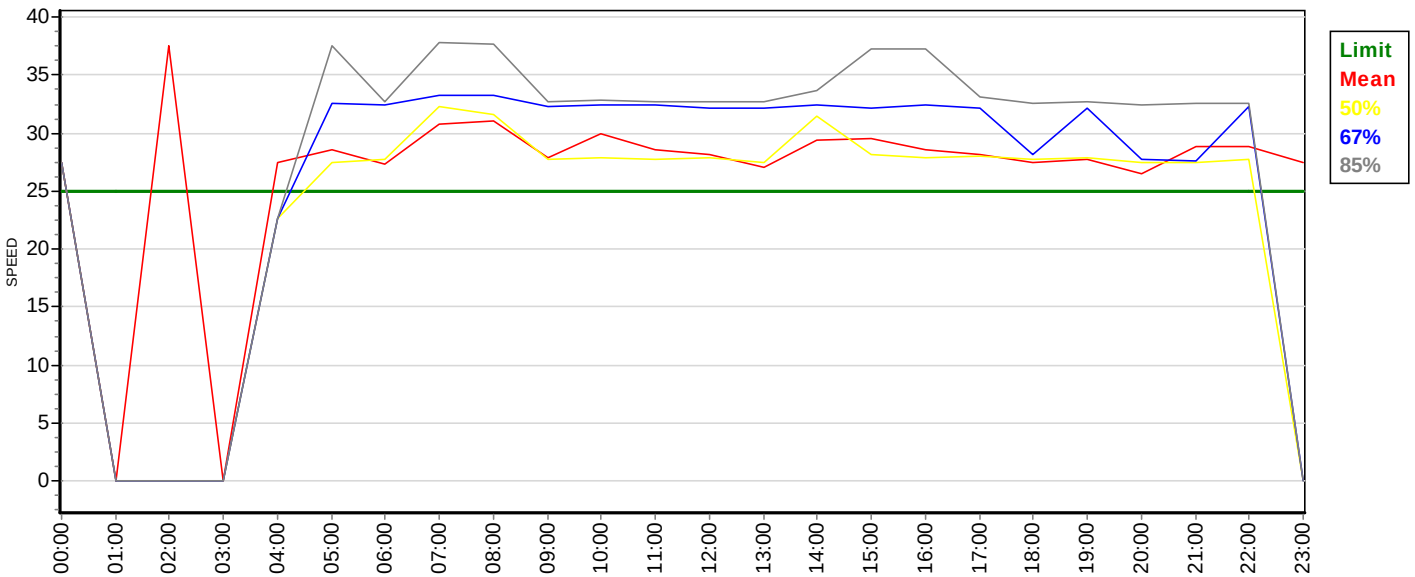
Comb. Total :	50	156	319	290	132	28	1	0	0	0	0	0	0	0	0	0	976
Percent :	5%	16%	33%	30%	14%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Cum. Percent :	5%	21%	54%	84%	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Average :	1	2	3	3	1	0	0	0	0	0	0	0	0	0	0	0	10

ADT = 976

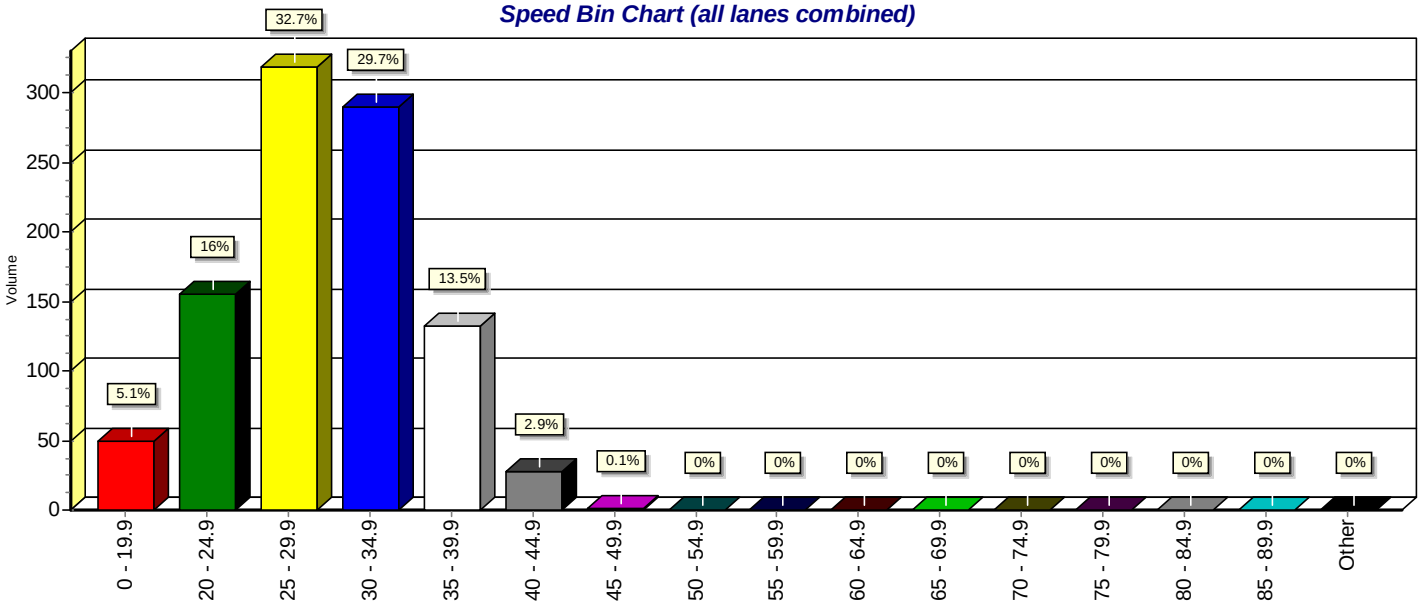
Average Speed : 29.0 mph 50% Speed : 29.4 mph 67% Speed : 32.2 mph 85% Speed : 35.9 mph
10mph Pace: 25.0 - 34.9 (62.4%)

02 LIV Charts For Data From: 00:00 - 12/01/2011 To: 23:59 - 12/01/2011

Speed Percent vs. Time (all lanes)



Speed Bin Chart (all lanes combined)



Special Speed Study Report: 01 LIV

Station ID : 01 LIV

Info Line 1 : Garaventa Ranch Road
Info Line 2 : w/o Maralisa Lane
GPS Lat/Lon : 37.722721 / -121.720585
DB File : 01 LIV.DB

Last Connected Device Type : Unic-L
Version Number : 1.41
Serial Number : 676

Number of Lanes : 2
Posted Speed Limit : 25.0 mph

Lane #1 Configuration

#	Dir.	Information	Vehicle Sensors	Sensor Spacing	Loop Length	Comment
1.	E		Ax-Ax	4.0 ft	6.0 ft	

Lane #1 Special Speed Study Data From: 00:00 - 12/06/2011 To: 23:59 - 12/06/2011

Date	Time	#1 0 - 19.9	#2 20 - 24.9	#3 25 - 29.9	#4 30 - 34.9	#5 35 - 39.9	#6 40 - 44.9	#7 45 - 49.9	#8 50 - 54.9	#9 55 - 59.9	#10 60 - 64.9	#11 65 - 69.9	#12 70 - 74.9	#13 75 - 79.9	#14 80 - 84.9	#15 85 - 89.9	#16 Other	Total
12/06/11	00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tue	00:15	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	00:30	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	00:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:45	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	04:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	04:30	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	04:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	05:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	05:15	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	05:30	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	05:45	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
	06:00	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	3
	06:15	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3
	06:30	0	1	1	2	1	1	0	0	0	0	0	0	0	0	0	0	6
	06:45	0	1	1	1	3	0	0	0	0	0	0	0	0	0	0	0	6
	07:00	0	1	4	3	7	1	0	0	0	0	0	0	0	0	0	0	16
	07:15	0	2	5	9	5	2	0	0	0	0	0	0	0	0	0	0	23
	07:30	0	2	6	7	2	1	0	0	0	0	0	0	0	0	0	0	18
	07:45	0	0	4	8	2	0	0	0	0	0	0	0	0	0	0	0	14
	08:00	1	6	12	14	7	0	0	0	0	0	0	0	0	0	0	0	40
	08:15	4	22	44	26	3	0	0	0	0	0	0	0	0	0	0	1	100
	08:30	0	4	3	10	4	3	0	0	0	0	0	0	0	0	0	0	24
	08:45	0	1	1	5	3	0	0	0	0	0	0	0	0	0	0	0	10
	09:00	0	2	0	4	1	0	0	1	0	0	0	0	0	0	0	0	8
	09:15	0	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	6
	09:30	0	0	1	3	2	0	0	0	0	0	0	0	0	0	0	0	6
	09:45	0	0	3	1	2	0	0	0	0	0	0	0	0	0	0	0	6
	10:00	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	3
	10:15	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	4

Date	Time	#1 0 - 19.9	#2 20 - 24.9	#3 25 - 29.9	#4 30 - 34.9	#5 35 - 39.9	#6 40 - 44.9	#7 45 - 49.9	#8 50 - 54.9	#9 55 - 59.9	#10 60 - 64.9	#11 65 - 69.9	#12 70 - 74.9	#13 75 - 79.9	#14 80 - 84.9	#15 85 - 89.9	#16 Other	Total
12/06/11	10:30	0	1	0	5	1	0	0	0	0	0	0	0	0	0	0	0	7
Tue	10:45	0	1	2	2	2	0	0	0	0	0	0	0	0	0	0	0	7
	11:00	0	0	1	4	3	0	0	0	0	0	0	0	0	0	0	0	8
	11:15	0	0	2	2	4	0	0	0	0	0	0	0	0	0	0	0	8
	11:30	0	1	3	3	2	0	0	0	0	0	0	0	0	0	0	0	9
	11:45	0	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	3
	12:00	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	3
	12:15	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	4
	12:30	0	1	0	8	3	0	0	0	0	0	0	0	0	0	0	0	12
	12:45	0	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0	5
	13:00	0	0	3	7	0	0	0	0	0	0	0	0	0	0	0	0	10
	13:15	0	0	3	5	4	1	0	0	0	0	0	0	0	0	0	0	13
	13:30	1	1	2	5	3	0	0	0	0	0	0	0	0	0	0	0	12
	13:45	0	0	4	6	3	0	0	0	0	0	0	0	0	0	0	0	13
	14:00	0	1	4	8	5	0	0	0	0	0	0	0	0	0	0	0	18
	14:15	0	0	4	6	2	0	0	0	0	0	0	0	0	0	0	0	12
	14:30	4	10	41	16	0	1	0	0	0	0	0	1	0	0	0	0	73
	14:45	1	6	24	8	5	0	0	0	0	0	0	0	0	0	0	0	44
	15:00	1	2	3	12	2	0	0	0	0	0	0	0	0	0	0	0	20
	15:15	0	0	5	14	3	1	0	0	0	0	0	0	0	0	0	0	23
	15:30	0	1	2	5	6	1	0	0	0	0	0	0	0	0	0	0	15
	15:45	0	1	2	4	1	0	0	0	0	0	0	0	0	0	0	0	8
	16:00	1	0	6	6	5	0	0	0	0	0	0	0	0	0	0	0	18
	16:15	0	0	1	5	4	2	0	0	0	0	0	0	0	0	0	0	12
	16:30	0	0	2	8	8	2	0	0	0	0	0	0	0	0	0	0	20
	16:45	0	1	0	8	3	0	0	0	0	0	0	0	0	0	0	0	12
	17:00	0	0	0	10	9	0	0	0	0	0	0	0	0	0	0	0	19
	17:15	0	1	6	8	3	1	0	0	0	0	0	0	0	0	0	0	19
	17:30	0	0	7	7	5	1	0	0	0	0	0	0	0	0	0	0	20
	17:45	0	0	5	2	6	4	0	0	0	0	0	0	0	0	0	0	17
	18:00	0	1	1	5	3	0	1	0	0	0	0	0	0	0	0	0	11
	18:15	0	1	0	8	2	2	0	0	0	0	0	0	0	0	0	0	13
	18:30	0	1	1	6	1	0	0	0	0	0	0	0	0	0	0	0	9
	18:45	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	5
	19:00	0	0	0	6	3	0	0	0	0	0	0	0	0	0	0	0	9
	19:15	0	0	1	4	0	1	0	0	0	0	0	0	0	0	0	0	6
	19:30	0	0	3	6	6	1	0	0	0	0	0	0	0	0	0	0	16
	19:45	0	1	2	4	0	1	0	0	0	0	0	0	0	0	0	0	8
	20:00	0	0	2	3	1	0	0	0	0	0	0	0	0	0	0	0	6
	20:15	0	0	2	5	2	0	0	0	0	0	0	0	0	0	0	0	9
	20:30	0	0	2	3	1	0	0	0	0	0	0	0	0	0	0	0	6
	20:45	0	0	1	4	1	0	0	0	0	0	0	0	0	0	0	0	6
	21:00	0	0	0	4	3	0	0	0	0	0	0	0	0	0	0	0	7
	21:15	0	0	2	1	2	0	0	0	0	0	0	0	0	0	0	0	5
	21:30	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	21:45	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	3
	22:00	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	3
	22:15	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	3
	22:30	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
	22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	23:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
	23:15	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	23:30	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	4
	23:45	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	3
Daily Total :		14	86	251	348	172	31	2	2	0	0	0	1	0	0	0	1	908
Percent :		2%	9%	28%	38%	19%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Cum. Percent :		2%	11%	39%	77%	96%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Average :		0	1	3	4	2	0	0	0	0	0	0	0	0	0	0	0	10

Average Speed : 31.1 mph 50% Speed : 31.6 mph 67% Speed : 33.6 mph 85% Speed : 37.2 mph
10mph Pace: 25.0 - 34.9 (66.0%)

Lane #3 Configuration

#	Dir.	Information	Vehicle Sensors	Sensor Spacing	Loop Length	Comment
3.	W		Ax-Ax	4.0 ft	6.0 ft	

Lane #3 Special Speed Study Data From: 00:00 - 12/06/2011 To: 23:59 - 12/06/2011

Date	Time	#1 0 - 19.9	#2 20 - 24.9	#3 25 - 29.9	#4 30 - 34.9	#5 35 - 39.9	#6 40 - 44.9	#7 45 - 49.9	#8 50 - 54.9	#9 55 - 59.9	#10 60 - 64.9	#11 65 - 69.9	#12 70 - 74.9	#13 75 - 79.9	#14 80 - 84.9	#15 85 - 89.9	#16 Other	Total
12/06/11	00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tue	00:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	00:30	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	00:45	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	02:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	04:00	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	04:15	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	04:30	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	04:45	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
	05:00	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	05:15	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	05:30	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2
	05:45	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	4
	06:00	0	0	1	2	0	1	0	0	0	0	0	0	0	0	0	0	4
	06:15	0	0	2	1	1	1	0	0	0	0	0	0	0	0	0	0	5
	06:30	0	0	2	1	3	2	0	0	0	0	0	0	0	0	0	0	8
	06:45	0	0	1	1	2	2	0	0	0	0	0	0	0	0	0	0	6
	07:00	0	0	2	3	6	4	0	0	0	0	0	0	0	0	0	0	15
	07:15	0	0	3	6	10	2	3	0	0	0	0	0	0	0	0	0	24
	07:30	1	1	3	8	9	1	1	0	0	0	0	0	0	0	0	0	24
	07:45	0	0	2	10	6	0	0	0	0	0	0	0	0	0	0	0	18
	08:00	0	0	18	24	8	0	0	0	0	0	0	0	0	0	0	0	50
	08:15	0	1	19	24	7	0	0	0	0	0	0	0	0	0	0	0	51
	08:30	1	3	39	20	8	0	0	0	0	0	0	0	0	0	0	0	71
	08:45	0	1	4	8	4	1	0	0	0	0	0	0	0	0	0	0	18
	09:00	0	0	1	9	0	0	0	0	0	0	0	0	0	0	0	0	10
	09:15	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	09:30	2	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	5
	09:45	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	5
	10:00	0	0	1	6	2	0	0	0	0	0	0	0	0	0	0	0	9
	10:15	0	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	3
	10:30	0	0	1	2	0	2	0	0	0	0	0	0	0	0	0	0	5
	10:45	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	3
	11:00	0	0	2	4	2	1	0	0	0	0	0	0	0	0	0	0	9
	11:15	0	0	2	1	2	0	0	0	0	0	0	0	0	0	0	0	5
	11:30	1	1	3	7	1	0	0	0	0	0	0	0	0	0	0	0	13
	11:45	0	5	4	2	3	0	0	0	0	0	0	0	0	0	0	0	14
	12:00	1	1	0	5	1	0	0	0	0	0	0	0	0	0	0	0	8
	12:15	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	4
	12:30	0	0	1	3	2	0	0	0	0	0	0	0	0	0	0	0	6
	12:45	0	1	0	2	1	0	0	0	0	0	0	0	0	0	0	0	4
	13:00	0	0	1	5	2	0	0	0	0	0	0	0	0	0	0	0	8

Date	Time	#1 0 - 19.9	#2 20 - 24.9	#3 25 - 29.9	#4 30 - 34.9	#5 35 - 39.9	#6 40 - 44.9	#7 45 - 49.9	#8 50 - 54.9	#9 55 - 59.9	#10 60 - 64.9	#11 65 - 69.9	#12 70 - 74.9	#13 75 - 79.9	#14 80 - 84.9	#15 85 - 89.9	#16 Other	Total
12/06/11	13:15	0	0	0	8	1	2	0	0	0	0	0	0	0	0	0	0	11
Tue	13:30	1	1	9	9	2	0	0	0	0	0	0	0	0	0	0	0	22
	13:45	0	0	4	4	1	1	0	0	0	0	0	0	0	0	0	0	10
	14:00	0	0	5	6	5	0	0	0	0	0	0	0	0	0	0	0	16
	14:15	0	2	5	8	9	1	0	0	0	0	0	0	0	0	0	0	25
	14:30	0	1	7	7	5	0	0	0	0	0	0	0	0	0	0	0	20
	14:45	1	4	34	41	7	0	0	0	0	0	0	0	0	0	0	0	87
	15:00	1	0	16	14	2	0	0	0	0	0	0	0	0	0	0	0	33
	15:15	0	2	3	10	2	0	0	0	0	0	0	0	0	0	0	0	17
	15:30	0	1	6	12	5	0	0	0	0	0	0	0	0	0	0	0	24
	15:45	1	0	3	6	4	2	1	0	0	0	0	0	0	0	0	0	17
	16:00	0	0	4	5	5	2	0	0	0	0	0	0	0	0	0	0	16
	16:15	1	1	2	4	4	0	1	0	0	0	0	0	0	0	0	0	13
	16:30	0	0	2	5	9	1	0	0	0	0	0	0	0	0	0	0	17
	16:45	0	0	6	9	5	3	1	0	0	0	0	0	0	0	0	0	24
	17:00	0	1	3	9	4	1	0	0	0	0	0	0	0	0	0	0	18
	17:15	1	1	1	4	6	2	0	0	0	0	0	0	0	0	0	0	15
	17:30	0	0	2	3	3	0	1	0	0	0	0	0	0	0	0	0	9
	17:45	0	1	4	3	6	0	1	0	0	0	0	0	0	0	0	0	15
	18:00	0	0	1	4	3	0	0	0	0	0	0	0	0	0	0	0	8
	18:15	0	0	3	3	1	0	0	0	0	0	0	0	0	0	0	0	7
	18:30	0	0	4	3	2	0	0	0	0	0	0	0	0	0	0	0	9
	18:45	0	1	3	3	3	0	0	0	0	0	0	0	0	0	0	0	10
	19:00	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	3
	19:15	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	4
	19:30	0	0	1	2	5	1	0	0	0	0	0	0	0	0	0	0	9
	19:45	0	0	4	1	2	0	0	0	0	0	0	0	0	0	0	0	7
	20:00	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	5
	20:15	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	3
	20:30	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	6
	20:45	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	4
	21:00	0	0	2	2	1	0	0	0	0	0	0	0	0	0	0	0	5
	21:15	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2
	21:30	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
	21:45	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	4
	22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	22:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	22:30	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	22:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	23:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
	23:15	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	23:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daily Total :		13	34	269	370	193	34	9	0	0	0	0	0	0	0	0	0	922
Percent :		1%	4%	29%	40%	21%	4%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Cum. Percent :		1%	5%	34%	74%	95%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Average :		0	0	3	4	2	0	0	0	0	0	0	0	0	0	0	0	9

Average Speed : 31.9 mph 50% Speed : 32.0 mph 67% Speed : 33.9 mph 85% Speed : 37.5 mph
10mph Pace: 25.0 - 34.9 (69.3%)

		#1 0 - 19.9	#2 20 - 24.9	#3 25 - 29.9	#4 30 - 34.9	#5 35 - 39.9	#6 40 - 44.9	#7 45 - 49.9	#8 50 - 54.9	#9 55 - 59.9	#10 60 - 64.9	#11 65 - 69.9	#12 70 - 74.9	#13 75 - 79.9	#14 80 - 84.9	#15 85 - 89.9	#16 Other	Total
Date	Time																	

Special Speed Study Summary: 01 LIV

Description	#1 0 - 19.9	#2 20 - 24.9	#3 25 - 29.9	#4 30 - 34.9	#5 35 - 39.9	#6 40 - 44.9	#7 45 - 49.9	#8 50 - 54.9	#9 55 - 59.9	#10 60 - 64.9	#11 65 - 69.9	#12 70 - 74.9	#13 75 - 79.9	#14 80 - 84.9	#15 85 - 89.9	#16 Other	Total
Grand Total #1:	14	86	251	348	172	31	2	2	0	0	0	1	0	0	0	1	908
Percent :	2%	9%	28%	38%	19%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Cum. Percent :	2%	11%	39%	77%	96%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Average :	0	1	3	4	2	0	0	0	0	0	0	0	0	0	0	0	10

ADT = 908 Average Speed : 31.1 mph 50% Speed : 31.6 mph 67% Speed : 33.6 mph 85% Speed : 37.2 mph
10mph Pace: 25.0 - 34.9 (66.0%)

Grand Total #3:	13	34	269	370	193	34	9	0	0	0	0	0	0	0	0	0	922
Percent :	1%	4%	29%	40%	21%	4%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Cum. Percent :	1%	5%	34%	74%	95%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Average :	0	0	3	4	2	0	0	0	0	0	0	0	0	0	0	0	9

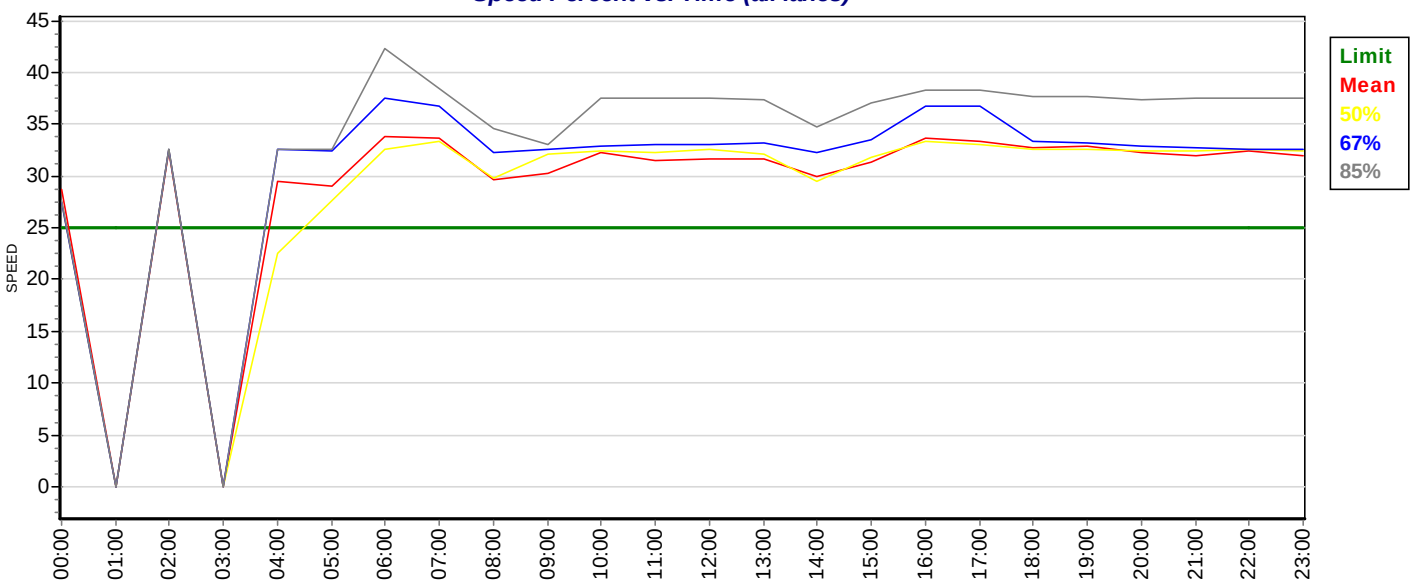
ADT = 922 Average Speed : 31.9 mph 50% Speed : 32.0 mph 67% Speed : 33.9 mph 85% Speed : 37.5 mph
10mph Pace: 25.0 - 34.9 (69.3%)

Comb. Total :	27	120	520	718	365	65	11	2	0	0	0	1	0	0	0	1	1830
Percent :	1%	7%	28%	39%	20%	4%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Cum. Percent :	1%	8%	36%	76%	96%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
Average :	0	1	5	7	4	1	0	0	0	0	0	0	0	0	0	0	18

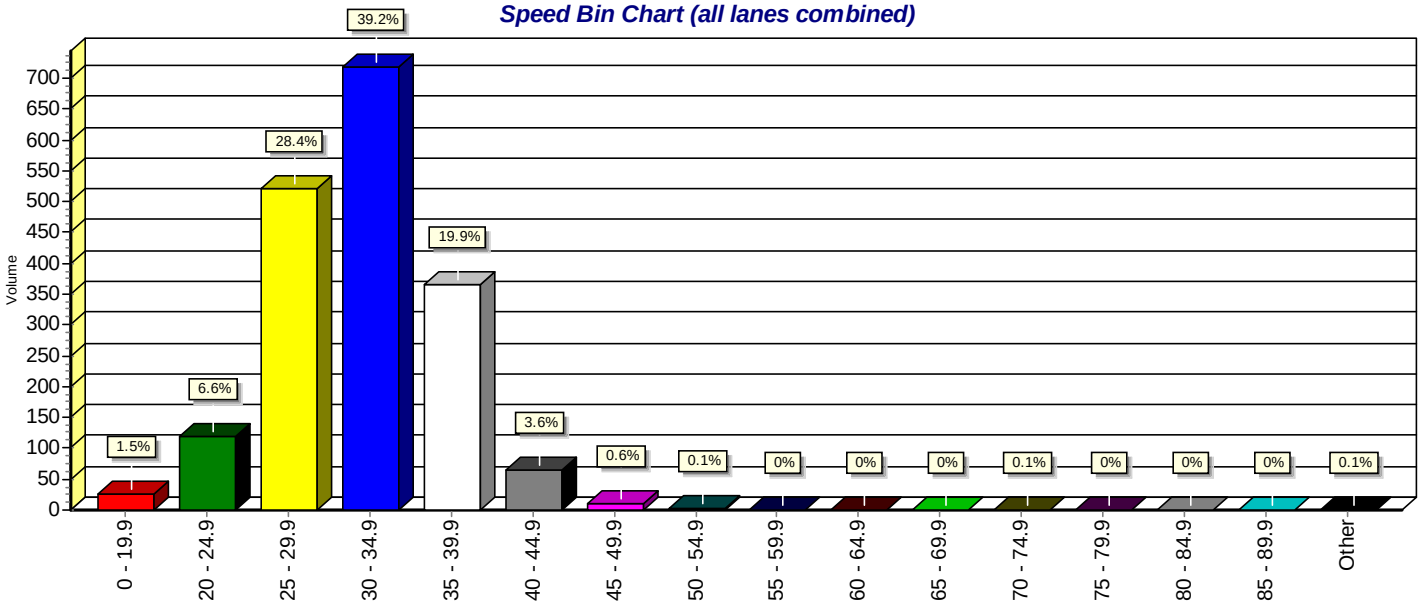
ADT = 1830 Average Speed : 31.5 mph 50% Speed : 31.8 mph 67% Speed : 33.9 mph 85% Speed : 37.3 mph
10mph Pace: 25.0 - 34.9 (67.7%)

01 LIV Charts For Data From: 00:00 - 12/06/2011 To: 23:59 - 12/06/2011

Speed Percent vs. Time (all lanes)



Speed Bin Chart (all lanes combined)



Special Speed Study Report: 03 LIV

Station ID : 03 LIV

Info Line 1 : Laughlin Road
Info Line 2 : s/o Foxtail Drive
GPS Lat/Lon :
DB File : 03 LIV.DB

Last Connected Device Type : Apollo
Version Number : 1.51
Serial Number : 10434

Number of Lanes : 2
Posted Speed Limit : 40.0 mph

Lane #1 Configuration

#	Dir.	Information	Vehicle Sensors	Sensor Spacing	Loop Length	Comment
1.	N		Ax-Ax	4.0 ft	6.0 ft	

Lane #1 Special Speed Study Data From: 00:00 - 12/01/2011 To: 23:59 - 12/01/2011

Date	Time	#1 0 - 19.9	#2 20 - 24.9	#3 25 - 29.9	#4 30 - 34.9	#5 35 - 39.9	#6 40 - 44.9	#7 45 - 49.9	#8 50 - 54.9	#9 55 - 59.9	#10 60 - 64.9	#11 65 - 69.9	#12 70 - 74.9	#13 75 - 79.9	#14 80 - 84.9	#15 85 - 89.9	#16 Other	Total
12/01/11	00:00	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Thu	00:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	00:30	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
	00:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	04:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
	04:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	04:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	04:45	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	05:15	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	05:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	05:45	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	06:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	06:15	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
	06:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	06:45	0	1	0	1	2	0	0	2	0	0	0	0	0	0	0	0	6
	07:00	0	0	0	2	3	0	0	0	1	0	0	0	0	0	0	0	6
	07:15	0	0	0	1	2	4	1	0	0	0	0	0	0	0	0	0	8
	07:30	0	0	0	0	5	4	4	1	0	0	0	0	0	0	0	0	14
	07:45	0	0	0	0	2	1	2	0	0	0	0	0	0	0	0	0	5
	08:00	0	0	0	1	3	7	3	0	0	0	0	0	0	0	0	0	14
	08:15	0	0	0	0	0	4	2	0	0	0	0	0	0	0	0	0	6
	08:30	0	0	0	0	0	1	4	2	0	0	0	0	0	0	0	0	7
	08:45	0	0	0	1	0	2	2	0	0	0	0	0	0	0	0	0	5
	09:00	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	3
	09:15	0	0	0	0	2	3	2	1	0	0	0	0	0	0	0	0	8
	09:30	0	0	0	0	1	1	3	0	0	0	0	0	0	0	0	0	5
	09:45	0	1	1	0	1	2	0	1	0	0	0	0	0	0	0	0	6
	10:00	0	0	0	0	2	1	2	0	0	0	0	0	0	0	0	0	5
	10:15	0	0	1	0	1	4	0	0	0	0	0	0	0	0	0	0	6

Date	Time	#1 0 - 19.9	#2 20 - 24.9	#3 25 - 29.9	#4 30 - 34.9	#5 35 - 39.9	#6 40 - 44.9	#7 45 - 49.9	#8 50 - 54.9	#9 55 - 59.9	#10 60 - 64.9	#11 65 - 69.9	#12 70 - 74.9	#13 75 - 79.9	#14 80 - 84.9	#15 85 - 89.9	#16 Other	Total
12/01/11	10:30	0	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	5
Thu	10:45	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	4
	11:00	0	0	0	1	1	4	1	0	0	0	0	0	0	0	0	0	7
	11:15	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	4
	11:30	0	0	0	0	0	2	2	1	0	0	0	0	0	0	0	0	5
	11:45	0	0	0	0	3	4	0	0	0	0	0	0	0	0	0	0	7
	12:00	0	0	1	2	5	6	3	1	0	0	0	0	0	0	0	0	18
	12:15	0	0	0	0	6	3	6	0	0	0	0	0	0	0	0	0	15
	12:30	0	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	5
	12:45	0	0	0	2	4	7	1	1	0	0	0	0	0	0	0	0	15
	13:00	0	0	0	0	0	4	3	1	0	0	0	0	0	0	0	0	8
	13:15	0	0	0	1	2	5	2	0	0	0	0	0	0	0	0	0	10
	13:30	0	0	0	0	0	3	5	1	0	0	0	0	0	0	0	0	9
	13:45	0	0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	5
	14:00	1	0	0	0	5	3	4	1	0	0	0	0	0	0	0	0	14
	14:15	0	0	1	0	4	2	2	0	0	0	0	0	0	0	0	0	9
	14:30	0	0	0	2	2	3	0	0	0	0	0	0	0	0	0	0	7
	14:45	0	0	1	0	2	12	3	0	0	0	0	0	0	0	0	0	18
	15:00	0	0	0	1	3	6	1	0	1	0	0	0	0	0	0	0	12
	15:15	0	0	1	1	5	8	4	0	0	0	0	0	0	0	0	0	19
	15:30	0	0	0	1	4	9	6	2	0	0	0	0	0	0	0	0	22
	15:45	0	0	0	0	3	6	2	3	0	0	0	0	0	0	0	0	14
	16:00	0	0	0	1	3	5	2	2	0	0	0	0	0	0	0	0	13
	16:15	0	0	0	2	5	6	2	0	0	0	0	0	0	0	0	0	15
	16:30	1	0	0	0	6	11	2	0	1	0	0	0	0	0	0	0	21
	16:45	0	0	0	2	10	7	5	0	0	0	0	0	0	0	0	0	24
	17:00	0	0	0	1	7	8	0	0	0	0	0	0	0	0	0	0	16
	17:15	0	0	0	5	5	7	2	1	0	0	0	0	0	0	0	0	20
	17:30	0	0	0	3	10	7	1	1	0	0	0	0	0	0	0	0	22
	17:45	0	0	0	0	6	18	1	1	0	0	0	0	0	0	0	0	26
	18:00	0	0	0	1	6	7	2	0	0	0	0	0	0	0	0	0	16
	18:15	0	0	0	0	5	4	4	1	0	0	0	0	0	0	0	0	14
	18:30	0	0	0	2	4	6	2	2	0	0	0	0	0	0	0	0	16
	18:45	0	0	0	5	6	9	4	0	0	0	0	0	0	0	0	0	24
	19:00	0	0	0	0	2	4	0	0	0	0	0	0	0	0	0	0	6
	19:15	0	0	0	1	4	5	2	0	0	0	0	0	0	0	0	0	12
	19:30	0	0	0	2	3	2	2	0	0	0	0	0	0	0	0	0	9
	19:45	0	0	0	0	2	6	1	0	0	0	0	0	0	0	0	0	9
	20:00	0	0	0	0	4	9	0	0	0	1	0	0	0	0	0	0	14
	20:15	0	0	0	1	4	3	2	0	0	0	0	0	0	0	0	0	10
	20:30	0	0	0	0	6	2	3	0	0	0	0	0	0	0	0	0	11
	20:45	0	0	0	0	4	7	1	0	0	0	0	0	0	0	0	0	12
	21:00	0	0	0	0	2	5	0	1	0	0	0	0	0	0	0	0	8
	21:15	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	4
	21:30	0	0	0	0	2	2	1	0	0	0	0	0	0	0	0	0	5
	21:45	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	5
	22:00	0	0	0	0	1	4	1	1	0	0	0	0	0	0	0	0	7
	22:15	0	0	0	0	1	0	2	1	0	0	0	0	0	0	0	0	4
	22:30	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
	22:45	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
	23:00	0	0	0	1	0	3	1	0	0	0	0	0	0	0	0	0	5
	23:15	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
	23:30	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	23:45	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	2
Daily Total :		2	2	7	49	194	287	123	32	3	1	0	0	0	0	0	0	700
Percent :		0%	0%	1%	7%	28%	41%	18%	5%	0%	0%	0%	0%	0%	0%	0%	0%	
Cum. Percent :		0%	1%	2%	9%	36%	77%	95%	99%	100%	100%	100%	100%	100%	100%	100%	100%	
Average :		0	0	0	1	2	3	1	0	0	0	0	0	0	0	0	0	7

Average Speed : 41.4 mph 50% Speed : 41.8 mph 67% Speed : 43.6 mph 85% Speed : 47.3 mph
10mph Pace: 35.0 - 44.9 (68.7%)

Lane #3 Configuration

#	Dir.	Information	Vehicle Sensors	Sensor Spacing	Loop Length	Comment
3.	S		Ax-Ax	4.0 ft	6.0 ft	

Lane #3 Special Speed Study Data From: 00:00 - 12/01/2011 To: 23:59 - 12/01/2011

Date	Time	#1 0 - 19.9	#2 20 - 24.9	#3 25 - 29.9	#4 30 - 34.9	#5 35 - 39.9	#6 40 - 44.9	#7 45 - 49.9	#8 50 - 54.9	#9 55 - 59.9	#10 60 - 64.9	#11 65 - 69.9	#12 70 - 74.9	#13 75 - 79.9	#14 80 - 84.9	#15 85 - 89.9	#16 Other	Total
12/01/11	00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thu	00:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	00:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	00:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:00	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	2
	01:15	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
	01:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	01:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	02:45	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
	03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	03:15	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
	03:30	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	03:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	04:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	04:15	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
	04:30	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	4
	04:45	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2
	05:00	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	3
	05:15	0	0	0	0	0	2	3	2	2	0	0	0	0	0	0	0	9
	05:30	0	0	0	1	1	1	2	0	1	0	0	0	0	0	0	0	6
	05:45	0	0	0	0	1	3	4	1	0	0	0	0	0	0	0	0	9
	06:00	0	0	0	0	1	2	3	1	1	0	0	0	0	0	0	0	8
	06:15	0	0	0	1	2	5	4	1	1	0	0	0	0	0	0	0	14
	06:30	0	1	0	1	3	4	4	0	0	0	0	0	0	0	0	0	13
	06:45	0	0	0	2	3	7	4	1	0	0	0	0	0	0	0	0	17
	07:00	0	0	0	1	3	8	4	0	0	0	0	0	0	0	0	0	16
	07:15	0	0	0	0	4	13	5	1	0	0	0	0	0	0	0	0	23
	07:30	0	0	0	2	3	7	10	9	1	1	0	0	0	0	0	0	33
	07:45	0	0	0	1	0	7	8	5	1	0	0	0	0	0	0	0	22
	08:00	0	0	0	0	4	6	5	1	0	0	0	0	0	0	0	0	16
	08:15	0	0	0	0	2	7	10	2	1	0	0	0	0	0	0	0	22
	08:30	0	0	0	0	6	9	4	3	0	0	0	0	0	0	0	0	22
	08:45	0	0	0	0	1	0	8	5	2	0	0	0	0	0	0	0	16
	09:00	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	3
	09:15	0	0	0	0	0	2	6	1	1	0	0	0	0	0	0	0	10
	09:30	0	0	0	1	2	2	1	1	0	0	0	0	0	0	0	0	7
	09:45	0	0	0	1	1	3	1	1	0	0	0	0	0	0	0	0	7
	10:00	0	1	0	0	0	2	2	2	0	0	0	0	0	0	0	0	7
	10:15	0	0	0	1	0	5	3	0	1	0	0	0	0	0	0	0	10
	10:30	0	1	0	1	0	4	4	2	1	0	0	0	0	0	0	0	13
	10:45	0	0	0	1	1	2	2	2	0	0	0	0	0	0	0	0	8
	11:00	0	0	0	0	2	4	3	2	0	0	0	0	0	0	0	0	11
	11:15	0	0	0	0	1	1	3	0	0	0	0	0	0	0	0	0	5
	11:30	0	0	0	1	2	1	2	1	1	0	0	0	0	0	0	0	8
	11:45	0	0	0	1	0	1	3	1	0	0	0	0	0	0	0	0	6
	12:00	1	0	0	0	3	4	4	0	1	0	0	0	0	0	0	0	13
	12:15	0	0	1	0	0	5	2	2	1	0	0	0	0	0	0	0	11
	12:30	0	0	1	0	0	3	2	2	1	0	0	0	0	0	0	0	9
	12:45	0	0	0	1	2	4	3	1	0	0	0	0	0	0	0	0	11
	13:00	1	0	1	1	2	5	2	4	0	0	0	0	0	0	0	0	16

Date	Time	#1 0 - 19.9	#2 20 - 24.9	#3 25 - 29.9	#4 30 - 34.9	#5 35 - 39.9	#6 40 - 44.9	#7 45 - 49.9	#8 50 - 54.9	#9 55 - 59.9	#10 60 - 64.9	#11 65 - 69.9	#12 70 - 74.9	#13 75 - 79.9	#14 80 - 84.9	#15 85 - 89.9	#16 Other	Total
12/01/11	13:15	0	0	0	0	2	4	0	1	0	0	0	0	0	0	0	0	7
Thu	13:30	0	0	0	0	0	4	1	2	0	0	0	0	0	0	0	0	7
	13:45	0	0	0	0	3	1	2	1	1	0	0	0	0	0	0	0	8
	14:00	0	0	0	1	2	2	1	0	1	0	0	0	0	0	0	0	7
	14:15	0	0	0	0	3	1	2	1	0	2	0	0	0	0	0	0	9
	14:30	0	1	0	0	3	5	1	1	1	0	0	0	0	0	0	0	12
	14:45	0	0	0	0	0	3	4	1	0	0	0	0	0	0	0	0	8
	15:00	0	0	0	0	1	2	3	1	0	0	0	0	0	0	0	0	7
	15:15	0	0	0	0	2	1	2	1	0	0	0	0	0	0	0	0	6
	15:30	0	0	0	0	0	0	6	3	2	0	0	0	0	0	0	0	11
	15:45	0	0	0	0	2	3	4	0	0	0	0	0	0	0	0	0	9
	16:00	0	0	0	0	3	2	6	0	0	0	0	0	0	0	0	0	11
	16:15	2	0	0	1	2	1	2	2	0	0	0	0	0	0	0	0	10
	16:30	0	0	0	0	2	1	3	1	2	0	0	0	0	0	0	0	9
	16:45	0	0	0	0	0	8	5	0	0	0	0	0	0	0	0	0	13
	17:00	0	0	0	1	3	5	1	1	0	0	0	0	0	0	0	0	11
	17:15	0	0	0	1	1	5	4	0	0	0	0	0	0	0	0	0	11
	17:30	0	0	1	0	1	1	9	0	0	0	0	0	0	0	0	0	12
	17:45	0	0	0	0	2	5	3	0	0	0	0	0	0	0	0	0	10
	18:00	0	0	0	0	3	6	2	0	0	0	0	0	0	0	0	0	11
	18:15	0	0	0	0	1	6	2	0	0	0	0	0	0	0	0	0	9
	18:30	0	0	0	0	3	2	1	1	0	0	0	0	0	0	0	0	7
	18:45	0	0	0	0	2	5	9	0	0	0	0	0	0	0	0	0	16
	19:00	0	0	0	1	0	5	1	1	1	0	0	0	0	0	0	0	9
	19:15	0	0	0	1	1	3	3	1	0	0	0	0	0	0	0	0	9
	19:30	0	0	0	0	2	2	3	0	0	0	0	0	0	0	0	0	7
	19:45	0	0	0	0	2	2	1	1	0	0	0	0	0	0	0	0	6
	20:00	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	2
	20:15	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	1	4
	20:30	0	0	0	0	2	1	0	0	1	0	0	0	0	0	0	0	4
	20:45	0	0	0	0	0	3	0	0	1	0	0	0	0	0	0	0	4
	21:00	0	0	0	0	2	0	1	0	1	0	0	0	0	0	0	0	4
	21:15	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
	21:30	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
	21:45	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	3
	22:00	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	22:15	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
	22:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	22:45	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
	23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	23:15	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
	23:30	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
	23:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Daily Total :		4	5	4	26	105	229	214	78	29	3	0	0	0	0	0	1	698
Percent :		1%	1%	1%	4%	15%	33%	31%	11%	4%	0%	0%	0%	0%	0%	0%	0%	
Cum. Percent :		1%	1%	2%	6%	21%	53%	84%	95%	99%	100%	100%	100%	100%	100%	100%	100%	
Average :		0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	6

Average Speed : 44.2 mph 50% Speed : 44.4 mph 67% Speed : 47.3 mph 85% Speed : 50.5 mph
10mph Pace: 40.0 - 49.9 (63.5%)

Date	Time	#1 0 - 19.9	#2 20 - 24.9	#3 25 - 29.9	#4 30 - 34.9	#5 35 - 39.9	#6 40 - 44.9	#7 45 - 49.9	#8 50 - 54.9	#9 55 - 59.9	#10 60 - 64.9	#11 65 - 69.9	#12 70 - 74.9	#13 75 - 79.9	#14 80 - 84.9	#15 85 - 89.9	#16 Other	Total

Special Speed Study Summary: 03 LIV

Description	#1 0 - 19.9	#2 20 - 24.9	#3 25 - 29.9	#4 30 - 34.9	#5 35 - 39.9	#6 40 - 44.9	#7 45 - 49.9	#8 50 - 54.9	#9 55 - 59.9	#10 60 - 64.9	#11 65 - 69.9	#12 70 - 74.9	#13 75 - 79.9	#14 80 - 84.9	#15 85 - 89.9	#16 Other	Total
Grand Total #1:	2	2	7	49	194	287	123	32	3	1	0	0	0	0	0	0	700
Percent :	0%	0%	1%	7%	28%	41%	18%	5%	0%	0%	0%	0%	0%	0%	0%	0%	
Cum. Percent :	0%	1%	2%	9%	36%	77%	95%	99%	100%	100%	100%	100%	100%	100%	100%	100%	
Average :	0	0	0	1	2	3	1	0	0	0	0	0	0	0	0	0	7

ADT = 700

Average Speed : 41.4 mph 50% Speed : 41.8 mph 67% Speed : 43.6 mph 85% Speed : 47.3 mph
10mph Pace: 35.0 - 44.9 (68.7%)

Grand Total #3:	4	5	4	26	105	229	214	78	29	3	0	0	0	0	0	1	698
Percent :	1%	1%	1%	4%	15%	33%	31%	11%	4%	0%	0%	0%	0%	0%	0%	0%	
Cum. Percent :	1%	1%	2%	6%	21%	53%	84%	95%	99%	100%	100%	100%	100%	100%	100%	100%	
Average :	0	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	6

ADT = 698

Average Speed : 44.2 mph 50% Speed : 44.4 mph 67% Speed : 47.3 mph 85% Speed : 50.5 mph
10mph Pace: 40.0 - 49.9 (63.5%)

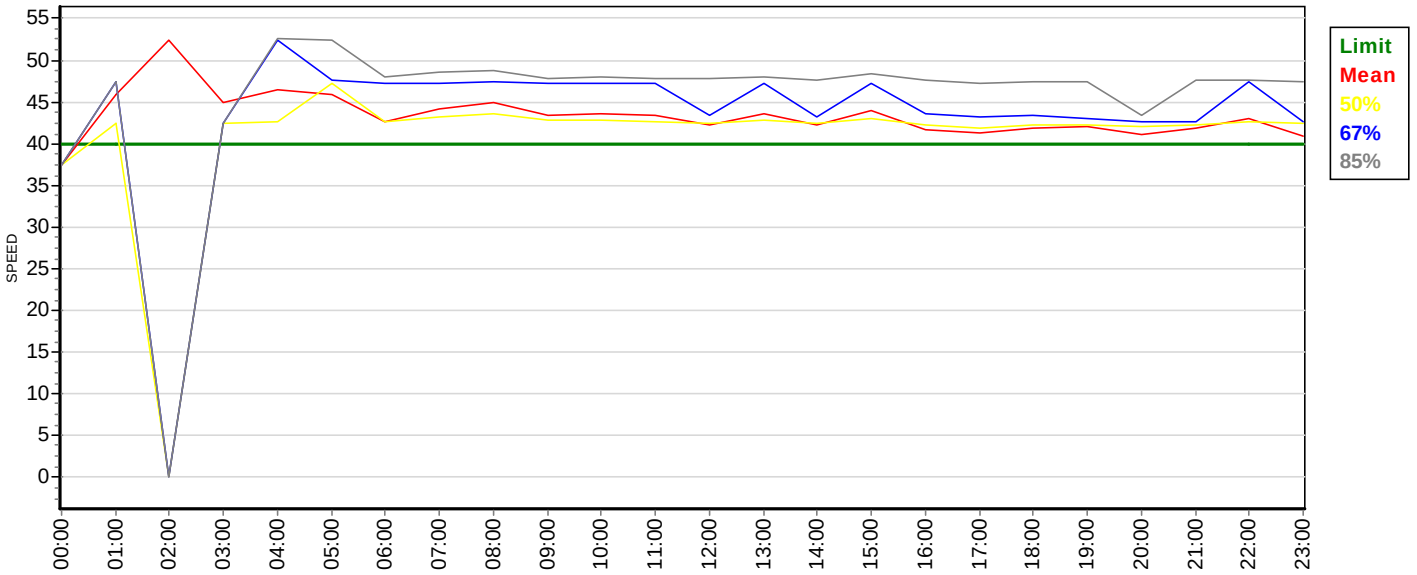
Comb. Total :	6	7	11	75	299	516	337	110	32	4	0	0	0	0	0	1	1398
Percent :	0%	1%	1%	5%	21%	37%	24%	8%	2%	0%	0%	0%	0%	0%	0%	0%	
Cum. Percent :	0%	1%	2%	7%	28%	65%	89%	97%	100%	100%	100%	100%	100%	100%	100%	100%	
Average :	0	0	0	1	3	5	4	1	0	0	0	0	0	0	0	0	14

ADT = 1398

Average Speed : 42.8 mph 50% Speed : 42.9 mph 67% Speed : 45.4 mph 85% Speed : 49.0 mph
10mph Pace: 40.0 - 49.9 (61.0%)

03 LIV Charts For Data From: 00:00 - 12/01/2011 To: 23:59 - 12/01/2011

Speed Percent vs. Time (all lanes)



Speed Bin Chart (all lanes combined)