PUBLIC REVIEW DRAFT

CITY OF LARKSPUR
SMART STATION AREA PLAN
ENVIRONMENTAL IMPACT REPORT

SCH NO. 2013012020

LSA

February 2014

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I. INTRODUCTION

A. PURPOSE OF THIS DRAFT EIR

In compliance with the California Environmental Quality Act (CEQA)[1] and the State *CEQA Guidelines*,[2] this Draft Environmental Impact Report (EIR) describes the environmental consequences of the City of Larkspur SMART Station Area Plan (Station Area Plan or Plan). The Draft EIR is designed to fully inform decision-makers in the City of Larkspur, responsible agencies, and the general public of the potential environmental consequences of approval and implementation of the Station Area Plan. In many instances, the Draft EIR recommends mitigation measures in the form of General Plan amendments, Zoning Ordinance amendments, or conditions of approval for projects implemented as part of the Station Area Plan, which would reduce or avoid potentially significant impacts. This Draft EIR also examines alternatives to the Station Area Plan.

The City of Larkspur (City) is the lead agency for environmental review of the project. This Draft EIR will be used by City staff and the public in their review of the Station Area Plan.

This document is a Program EIR for the Station Area Plan, and may function as a project-level EIR for later specific projects based on the outcome of subsequent project and/or site review and analysis by City staff.[3] The effects of the Station Area Plan land uses and implementation actions are analyzed in this document as specifically and comprehensively as possible, consistent with State law, for further CEQA compliance.

There are several advantages to a Program EIR. It provides a more thorough consideration of regional influences, secondary effects, cumulative impacts, land use and policy alternatives, global climate change, and other factors that apply to the program as a whole. Program EIRs avoid duplicative reconsideration of basic policy considerations. They allow the lead agency to consider broad policy alternatives and program-wide mitigation measures at a time when the agency has greater flexibility to deal with fundamental issues and/or cumulative effects.

Subsequent projects approved or undertaken pursuant to a Program EIR may still require additional environmental review. This will be determined by the City on a project-by-project basis based on the details and specifics of the project and/or site, and appropriate subsequent analysis. However, Program EIRs allow subsequent environmental review to focus on issues unique to the site or individual projects that were not specifically addressed in the Program EIR. Program EIRs allow decision-makers and interested parties to focus the subsequent CEQA analysis of follow on projects on new effects (if any) not considered before.

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[1] Public Resources Code Section 21000 et. seq.

[2] California Code of Regulations, Title 14, Section 15000.

[3] *CEQA Guidelines* Section 15168.

The City will consider future discretionary projects and make determinations as to their consistency with the Station Area Plan and other regulations and whether they may properly rely on this EIR, and/or whether any subsequent site-level technical studies and resource inventories should be required. The City and other agencies will use information presented in this Program EIR to evaluate future land use and/or development proposals and to focus subsequent CEQA review on project-related impacts (if any) that were not specifically addressed in this EIR.

B. PROPOSED PROJECT

The City of Larkspur is preparing the Larkspur SMART Station Area Plan. The SMART (Sonoma-Marin Area Rail Transit) is a passenger train and multi-use pathway project planned to extend 70 miles from Cloverdale in Sonoma County to Larkspur in Marin County. SMART will use an existing but dormant rail corridor formerly used by the Northwestern Pacific Railroad. The SMART corridor generally parallels U.S. 101 through Sonoma and Marin counties, and will serve 14 stations when completed. The Station Area Plan will identify potential land use and regulatory changes for the area surrounding the planned SMART Station that are intended to support long term SMART ridership. The Station Area Plan does not include planning for the Larkspur SMART Station or the infrastructure associated with the SMART Station; these improvements would fall under the purview of SMART.

The Station Area Plan includes many components, and it identifies the anticipated type, intensity and distribution of land uses within the Plan area as established in the preferred land use scenario. It also identifies pedestrian, transit, vehicular, and bicycle access to the station and general circulation throughout the Plan area. The Station Area Plan includes design policies and standards that encourage pedestrian-friendly design to promote walkability and livability of the Plan area and infrastructure improvements that will be needed to support implementation of the Station Area Plan. Finally, the Station Area Plan identifies regulatory and policy changes to the General Plan, Zoning Ordinance, and Design Guidelines needed to implement the Plan.

C. DRAFT EIR SCOPE

The City of Larkspur circulated a Notice of Preparation (NOP) that included a list of potential environmental effects associated with the Station Area Plan. The NOP was published on January 8, 2013, and was distributed to local, regional, and State agencies and posted on the City's website, www.cityoflarkspur.org. Comments received by the City were taken into account during the preparation of the Draft EIR. The NOP and written comments received on the NOP are included in Appendix A.

The Draft EIR focuses on areas of concern identified in the NOP and comments received on the NOP. The following environmental topics are addressed in this Draft EIR:

A. Land Use and Planning Policy

B. Transportation and Circulation

C. Air Quality

D. Global Climate Change

E. Noise

F. Biological Resources

G. Geology, Soils and Seismicity

H. Hydrology and Water Quality

I. Hazards and Hazardous Materials

J. Cultural Resources

K. Public Services

L. Utilities and Infrastructure

The following topics were not included as separate topics within the Draft EIR: agriculture and forestry resources; mineral resources; population and housing; and visual resources. These topics are discussed in the Effects Found Not to be Significant section of Chapter VI.

D. REPORT ORGANIZATION

This Draft EIR is organized into the following chapters:

- *Chapter I – Introduction:* Discusses the overall Draft EIR purpose, provides a summary of the proposed project, describes the Draft EIR scope, and summarizes the organization of the Draft EIR.
- *Chapter II – Summary:* Provides a summary of the impacts that would result from implementation of the project, describes mitigation measures recommended to reduce or avoid significant impacts, and describes the alternatives to the project
- *Chapter III –Project Description:* Provides a description of the regional location and general setting of the City of Larkspur and the Plan area, intended uses of the Draft EIR, the objectives of the Station Area Plan, the components of the Station Area Plan, and adoption and implementation of the Station Area Plan.
- *Chapter IV – Setting, Impacts and Mitigation Measures:* Describes the following for each environmental technical topic: existing conditions (setting), potential environmental impacts (project level and cumulative) and their level of significance, and mitigation measures recommended to mitigate identified impacts. Potential adverse impacts are identified by levels of significance, as follows: less-than-significant impact (LTS), significant impact (S), and significant and unavoidable impact (SU). The significance of each impact is categorized before and after implementation of any recommended mitigation measure(s).
- *Chapter V – Alternatives:* Provides an evaluation of three alternatives to the Station Area Plan.
- *Chapter VI –Other CEQA Considerations:* Provides an analysis of effects found not to be significant, growth-inducing impacts, unavoidable significant environmental impacts and significant irreversible changes.
- *Chapter VII – Report Preparation:* Identifies preparers of the Draft EIR, references used, and the persons and organizations contacted.

- *Appendices:* The appendices contain the NOP and comments on the NOP, technical calculations, and other documentation prepared in conjunction with this Draft EIR. The appendices are provided on a CD inside the back cover of hard copies of the Draft EIR, but hard copies are available for review at the Planning Department.

II. SUMMARY

A. PROJECT UNDER REVIEW

This EIR has been prepared to evaluate the environmental consequences of approval and implementation of the SMART (Sonoma-Marin Area Rail Transit) Station Area Plan (Station Area Plan or Plan) being prepared by the City of Larkspur. SMART is a passenger train and multi-use pathway project planned to extend 70 miles from Cloverdale in Sonoma County to Larkspur in Marin County. SMART will use an existing but dormant rail corridor formerly used by Northwestern Pacific Railroad. The SMART corridor generally parallels U.S. 101 through Sonoma and Marin Counties, and will serve 14 stations when completed. The Larkspur SMART Station Area Plan will identify potential land use and regulatory changes for the area surrounding the planned SMART station that are intended to support long term SMART ridership. The Station Area Plan does not include planning for the specific SMART station or the infrastructure associated with the station; those improvements would be under the purview of SMART.

The Station Area Plan includes many components, and it identifies the anticipated type, intensity and distribution of land uses within the Plan area as established in the preferred land use scenario. It also identifies pedestrian, transit, vehicular, and bicycle access to the station and general circulation throughout the Plan area. The Station Area Plan includes design policies and standards that encourage pedestrian-friendly design to promote walkability and livability of the Plan area and infrastructure improvements that will be needed to support implementation of the Station Area Plan. Finally, the Station Area Plan identifies regulatory and policy changes to the General Plan, Zoning Ordinance, and Design Guidelines needed to implement the Plan.

B. SUMMARY OF IMPACTS AND MITIGATION MEASURES

This summary provides an overview of the analysis contained in Chapter IV, Setting, Impacts and Mitigation Measures. CEQA requires a summary to include discussion of: 1) potential areas of controversy; 2) significant impacts; 3) recommended mitigation measures; 4) alternatives to the project; and 5) cumulative impacts.

1. Potential Areas of Controversy

Comments on the Notice of Preparation (NOP), and comments raised during the scoping period, included the following issue areas: transportation; traffic and congestion; bicycle and pedestrian mobility; geological hazards; public services; biological resources; sea level rise; hydrology; land use. The NOP, comments received in response to the NOP, and a summary of the comments received at the scoping session are included in Appendix A of this EIR.

2. Significant Impacts

Under CEQA, a significant impact on the environment is defined as "…a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project,

including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance." Implementation of the Station Area Plan has the potential to result in adverse environmental impacts in several environmental areas. Impacts in the following areas 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 report are implemented:

- Noise
- Biological Resources
- Geology, Soils and Seismicity
- Hydrology and Water Quality
- Hazards and Hazardous Materials
- Cultural Resources
- Public Services
- Utilities

3. Significant Unavoidable Impacts

Implementation of the Station Area Plan would result in following significant and unavoidable impacts:

- Implementation of the Station Area Plan would result in the addition of project traffic that would increase the average delay during the AM and PM peak hours by more than 5 seconds at Intersection #8 Sir Francis Drake Boulevard/Andersen Drive, which would operate at unacceptable LOS under Existing Plus Project Conditions and Cumulative Plus Project Conditions.
- Implementation of the Station Area Plan would add traffic greater than 1 percent of the freeway segment capacity on the two segments of northbound U.S. 101 between Tamalpais Drive and Industrial Way, resulting in a significant project contribution under Cumulative Conditions.
- Implementation of the Station Area Plan could generate air pollutant emissions that would exceed the BAAQMD criteria and could substantially contribute to a violation of air quality standards.
- Implementation of the Station Area Plan could result in a significant cumulative net increase in criteria pollutant emissions.
- Implementation of the Station Area Plan could result in GHG emissions that would have a significant impact and cumulatively contribute to global climate change.

4. Alternatives to the Project

The following alternatives were evaluated within the EIR:

- The CEQA-required **No Project alternative** assumes that the Station Area Plan would not be adopted and implemented. While the Station Area Plan would not be implemented, this alternative does evaluate the development approved by the Larkspur City Council in 2006-2007 on the Sanitary District Site (Opportunity Site 5). Development associated with the No Project

alternative would include a 64,000-square-foot hotel, 126 residential units, and 11,000 square feet of office/retail.

- The **No Larkspur Ferry Terminal Development alternative** assumes that there would be no development on the Larkspur Ferry Terminal site, but that the development identified on the other opportunity sites within the Plan area would occur. This alternative would include the following: 39,500 square feet of office space; 75,000 square feet of retail space; 620 residential dwelling units; and a 60,000-square-foot hotel.
- The **Reduced Residential Development alternative** assumes that the Station Area Plan is adopted, but that the residential uses proposed within the Plan area would be developed at the minimum density identified in the Station Area Plan of 20 dwelling units per acre. The hotel, office and retail use square footage identified in the Station Area Plan would be developed as proposed under this alternative. This alternative would include the following: 39,500 square feet of office space; 75,000 square feet of retail space; 560 residential dwelling units; and a 60,000-square-foot hotel.

5. Cumulative Impacts

Implementation of the Station Area Plan would result in the following cumulative impacts:

- Implementation of the Station Area Plan would result in the addition of project traffic that would increase the average delay during the AM and PM peak hours by more than 5 seconds at Intersection #8 Sir Francis Drake Boulevard/Andersen Drive, which would operate at unacceptable LOS under Existing Plus Project Conditions and Cumulative Plus Project Conditions.
- Implementation of the Station Area Plan would add traffic greater than 1 percent of the freeway segment capacity on the two segments of northbound U.S. 101 between Tamalpais Drive and Industrial Way, resulting in a significant project contribution under Cumulative Conditions.
- Implementation of the Station Area Plan could result in a significant cumulative net increase in criteria pollutant emissions.
- Implementation of the Station Area Plan could result in GHG emissions that would have a significant impact and cumulatively contribute to global climate change.

C. SUMMARY TABLE

Information in Table II-1, Summary of Impacts and Mitigation Measures, has been organized to correspond with environmental issues discussed in Chapter IV. The table is arranged in four columns: (1) impacts; (2) level of significance prior to mitigation; (3) mitigation measures; and (4) level of significance after mitigation. Levels of significance are categorized as follows:

SU = Significant and Unavoidable
S = Significant
LTS = Less Than Significant

For a complete description of potential impacts and recommended mitigation measures, please refer to the specific topical discussions in Chapter IV.

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Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
A. LAND USE AND PLANNING POLICY			
There are no significant impacts to land use and planning policy.			
B. TRANSPORTATION AND CIRCULATION			
TRANS-1: The addition of PM peak hour trips to Sir Francis Drake Boulevard would conflict with Circulation Element Policy C in the City of Larkspur General Plan.	S	TRANS-1: The Draft Station Area Plan Implementation Chapter recommends a policy to amend the Larkspur General Plan to eliminate Circulation Element Policy C. Implementation of this policy would reduce this impact to less-than-significant levels. The City will be required to take this action prior to approval of individual projects within the Plan area.	LTS
TRANS-2: The addition of traffic associated with implementation of the Station Area Plan could increase the average delay during the AM and PM peak hours by more than 5 seconds at Intersection #3 Sir Francis Drake Boulevard/Eliseo Drive, which would operate at unacceptable LOS under Existing Plus Project Conditions.	S	TRANS-2: Add a short auxiliary lane to serve as a third eastbound through lane on Sir Francis Drake Boulevard approaching Eliseo Drive through to the U.S. 101 southbound on-ramp. This improvement would be consistent with recommendations in the County of Marin General Plan and TAM Resolution 10 from the September 26, 2013 Transportation Authority of Marin Board Meeting. However, Circulation Element Policy M of the Larkspur General Plan states that Intersection #3 currently operates at LOS E or F and that the City may have to accept this LOS as roadway expansion would be unacceptable to the community. This mitigation measure therefore conflicts with Larkspur General Plan Policy M. The Draft Station Area Plan Implementation Chapter recommends a policy to amend the Larkspur General Plan to eliminate Circulation Element Policy M. Implementing the short auxiliary lane on Sir Francis Drake Boulevard and amending the General Plan would reduce this impact to less-than-significant levels. The City will be required to take these actions prior to approval of individual projects within the Plan area.	LTS

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
TRANS-3: Implementation of the Station Area Plan would result in the addition of project traffic to westbound Sir Francis Drake Boulevard and would cause Intersection #6 Sir Francis Drake Boulevard/ Larkspur Landing Circle (West) to degrade from acceptable LOS D to unacceptable LOS E in the AM peak hour under Existing Plus Project Conditions. New project trips would worsen congestion on the westbound through movement at the U.S. 101 Northbound Ramps during the AM peak hour, which operates at LOS E under existing conditions, causing queues to back up to Larkspur Landing Circle (West) and increasing congestion at this intersection.	S	TRANS-3: Based on a determination of costs by the City, applicants for individual projects shall pay their fair share towards the addition of a third westbound through lane on Sir Francis Drake Boulevard at Larkspur Landing Circle West and to retime and optimize the traffic signals on Sir Francis Drake Boulevard at the U.S. 101 interchange to provide additional green time to the westbound approach at the U.S. 101 Northbound Ramps during the AM peak period. The funding for these improvements shall be balanced with regional transportation funding as appropriate. The additional westbound through lane could be constructed by repurposing the parking lane or removing portions of the median to create room for a third lane that extends back approximately 350 feet to the GGBHTD bus stop and pedestrian bridge. This additional lane would provide vehicle storage capacity to the westbound approach at Larkspur Landing Circle (West) and allow vehicles to position themselves to turn right into Larkspur Landing or onto the U.S. 101 northbound on-ramp. Adding the additional green time and capacity to westbound Sir Francis Drake Boulevard would reduce queues at the U.S. 101 Northbound Ramps such that they no longer inhibit operations at Intersection #6 Sir Francis Drake Boulevard/Larkspur Landing Circle (West). These mitigation measures were recommended previously in the traffic study and Mitigated Negative Declaration for the 2000 Larkspur Landing Circle mixed-use project and approved by the Larkspur City Council in 2005.[1]These measures would improve intersection operations to an acceptable LOS D in the AM peak hour. The City will be required to take these actions prior to approval of individual projects within the Plan area.	LTS

[1] *2000 Larkspur Landing Circle Traffic Impact Assessment and Parking Report* (Dowling Associates, 2003); City of Larkspur Ordinance Number 948, adopted by the Larkspur City Council on September 21, 2005.

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
TRANS-4: Implementation of the Station Area Plan would result in the addition of project traffic that would increase the average delay during the AM and PM peak hours by more than 5 seconds at Intersection #8 Sir Francis Drake Boulevard/Andersen Drive, which would operate at unacceptable LOS under Existing Plus Project Conditions.	S	TRANS-4: Applicants for individual projects shall pay their fair share in coordination with other stakeholders including the City of San Rafael, County of Marin, and Caltrans towards a traffic signal or other means of improving the LOS at Intersection #8 Sir Francis Drake Boulevard/Andersen Drive. The San Rafael General Plan recommends a traffic signal at this location. Internal and External Circulation Linkages Program 13 (CL[13]), of the 1990 Larkspur General Plan notes that the City should encourage and cooperate with the appropriate jurisdictions to signalize this intersection. The project sponsor shall contribute a pro rata share to the improvement described in this measure or other improvements after consultation and a record of agreement or other legal instrument with other jurisdictions. As the feasibility of this improvement will require further study and coordination with other agencies for approval and is not under the sole jurisdiction of the City of Larkspur, this impact is considered significant and unavoidable.	SU
TRANS-5: The addition of Station Area Plan traffic would increase the average delay during the AM and PM peak hours by more than 5 seconds at Intersection #8 Sir Francis Drake Boulevard/Andersen Drive, which contributes to unacceptable intersection operations under Cumulative Plus Project Conditions.	S	TRANS-5: Implementation of Mitigation Measure TRANS-4 would reduce vehicle delay at this intersection to less than without the project. As the feasibility of this improvement will require further study and coordination with other agencies for approval, this impact is considered significant and unavoidable.	SU
TRANS-6: Implementation of the Station Area Plan would add traffic greater than 1 percent of the freeway segment capacity on the two segments of northbound U.S. 101 between Tamalpais Drive and Industrial Way, resulting in a significant project contribution under Cumulative Conditions.	S	TRANS-6: Widening of northbound U.S. 101 to from three to four mixed-flow lanes (in addition to one HOV lane) from the Tamalpais Drive to Sir Francis Drake Boulevard interchanges would expand roadway capacity from 7,700 to 9,900 vehicles per hour between Tamalpais Drive and Industrial Way and from 8,800 to 11,000 vehicles per hour north of Industrial Way, thus providing acceptable operations. However, this roadway improvement is neither planned nor funded and is under the jurisdiction of Caltrans. Therefore, this impact is considered significant and unavoidable.	SU

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
TRANS-7: Project construction activities could interfere with circulation patterns.	S	TRANS-7: The City will require as a Condition of Approval that project applicants develop and submit construction management plans for City approval that specify measures that would reduce impacts to motor vehicle, bicycle, pedestrian, and transit circulation. Construction management plans shall include the following: • Location of construction staging areas for materials, equipment, and vehicles; • Notification procedures for adjacent property owners and public safety personnel regarding when major deliveries, detours, and lane closures will occur; • Identification of haul routes for movement of construction vehicles that would minimize impacts on vehicular and pedestrian traffic, circulation, and safety; and provision for monitoring surface streets used for haul routes so that any damage and debris attributable to the haul trucks can be identified and corrected by the project sponsors; • Provisions for removal of trash generated by project construction activity; • A process for responding to, and tracking, complaints pertaining to construction activity, including identification of an on-site complaint manager; and • Provisions for pedestrian and bicycle circulation through the congestion zone. Project applicants shall implement construction management plans.	LTS

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
C. AIR QUALITY			
AIR-1: Construction of development associated with implementation of the Station Area Plan could generate air pollutant emissions that could violate air quality standards.	S	AIR-1: Consistent with guidance from the BAAQMD, the City shall ensure that the following language is included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • 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 tracked-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. • A publicly visible sign shall be posted with the telephone number and person to contact at the City of Larkspur regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations. The above measures would reduce construction-period air pollutant emissions to a less-than-significant level.	LTS

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
AIR-2: Implementation of the Station Area Plan could generate air pollutant emissions that would exceed the BAAQMD criteria and could substantially contribute to a violation of air quality standards.	S	AIR-2: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • All wood-burning devices, such as woodstoves and open hearth fire places, shall be prohibited in all residential units. Only natural gas fireplaces shall be permitted. With implementation of this mitigation measure, NO_x, PM_{10} and $PM_{2.5}$ emissions would be reduced to a less-than-significant level; ROG emissions would remain significant and unavoidable. Therefore, even with the prohibition of all wood burning in residential units, ROG emissions would exceed the BAAQMD's significance criterion, and this impact would remain significant and unavoidable.	SU
AIR-3: Implementation of the Station Area Plan could result in a significant cumulative net increase in criteria pollutant emissions.	S	AIR-3: Implement Mitigation Measures AIR-1 and AIR-2. While implementation of Mitigation Measure AIR-3 would reduce this impact, cumulative regional air quality impacts of the project would remain significant and unavoidable.	SU
AIR-4: Construction of new projects associated with implementation of the Station Area Plan could result in exposure of sensitive receptors to substantial pollutant concentrations.	S	AIR-4: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • For any development project that includes buildings within 1,000 feet of a residential dwelling unit, prior to issuing building permits, a construction health risk assessment shall be conducted to assess emissions from all construction equipment during that phase of construction. Equipment usage shall be modified as necessary to ensure that equipment use would not result in a carcinogenic health risk of more than 10 in 1 million, an increased non-cancer risk of greater than 1.0 on the hazard index (chronic or acute), or an annual average ambient $PM_{2.5}$ increase greater than 0.3 $\mu g/m^3$.	LTS

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
AIR-5: Implementation of the Station Area Plan could result in exposure of sensitive receptors to substantial pollutant concentrations.	S	AIR-5: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • As shown in Figure IV.C-2, residential units proposed within 500 feet of U.S. 101, Sir Francis Drake Boulevard and/or any of the stationary sources identified in Table IV.C-7 shall be evaluated for potential health risk exposure. The applicant for a residential project within the Plan area shall prepare a report using the latest BAAQMD permit data and roadway risk estimates to determine impacts to future residents. The report shall outline any measures that would be incorporated into the project necessary to reduce carcinogenic health risk of to less than 10 in 1 million, reduce the non-cancer risk of to less than 1.0 on the hazard index (chronic or acute), and ensure the annual average ambient $PM_{2.5}$ increase is less than 0.3 $\mu g/m^3$. Measures to reduce impacts could include upgrading air filtration systems of fresh air supply, tiered plantings of trees, and site design to increase distance from source to the receptor.	LTS
D. GLOBAL CLIMATE CHANGE			
GCC-1: Implementation of the Station Area Plan could result in GHG emissions that would have a significant impact and cumulatively contribute to global climate change.	S	GCC-1: To reduce GHG emissions associated with implementation of the Station Area Plan, the Plan shall include a vehicle trip cap and Transportation Demand Management (TDM) program to limit the increase in vehicle trips from the plan area to approximately 10 percent above the existing traffic generated by the site. The City shall monitor the program to measure traffic to ensure that traffic conditions are not worsened by development in the Plan area. Implementation of Mitigation Measure GCC-1would reduce vehicle emissions, however, the reduction in GHG emissions would not reduce impacts to a less-than-significant level. Therefore, this impact would be considered significant and unavoidable.	SU

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
E. NOISE			
NOISE-1: Development associated with implementation of the Station Area Plan could expose persons to noise levels from stationary noise sources that are in excess of normally acceptable land use compatibility standards.	S	NOISE-1: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • All proposed new development within the Plan area shall comply with the City's Municipal Code exterior noise limit standards as defined in Municipal Code 9.54.040 Exterior Noise Limits. In addition, the City shall require all proposed development of noise sensitive land uses within the Plan area, that would be exposed to average daily ambient noise levels in excess of the City's established normally acceptable standards for that land use, to submit an acoustical analysis prior to issuance of building permits. This analysis must be prepared by a qualified acoustical analyst and must specify noise insulation features to be incorporated into the project design that would reduce stationary noise impacts to meet the City's interior noise standard for such proposed land uses. Noise insulation features may include shielding to protect noise-sensitive outdoor activity areas or may include building sound insulation treatments such as sound-rated windows to protect interior spaces.	LTS
NOISE-2: Local traffic would generate long-term exterior noise exceeding normally acceptable levels (under the City's land use compatibility standards) within and in the vicinity of the Plan area and could expose sensitive land uses to unacceptable noise levels.	S	NOISE-2: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • All proposed new development of noise sensitive land uses within the Plan area, that would be exposed to average daily ambient noise levels in excess of the City's established normally acceptable standards for that land use, is required to submit an acoustical analysis prior to issuance of building permits. This analysis must be prepared by a qualified acoustical analyst and must specify noise insulation features to be incorporated into the project design that would reduce traffic noise impacts to meet the City's interior noise standard for such proposed land uses. Noise insulation features may include shielding to protect noise-sensitive outdoor activity areas or may include building sound insulation treatments such as sound-rated windows to protect interior spaces.	LTS

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
NOISE-3: Construction activities associated with implementation of the Station Area Plan could create significant short-term vibration impacts on nearby sensitive land uses.	S	NOISE-3: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • In the event that pile driving would be required for any proposed project within the Plan area, all residents within 600 feet of the project site shall be notified of the schedule for its use a minimum of one week prior to its commencement. The contractor shall implement "quiet" pile driving technology (such as pre-drilling of piles, the use of more than one pile driver to shorten the total pile driving duration, or the use of portable acoustical barriers) where feasible, in consideration of geotechnical and structural requirements and conditions. • The project contractor shall phase demolition, earth-moving, and ground-impacting operations so as not to occur in the same time period. Unlike noise, the total vibration levels produced could be significantly less when each vibration source operates separately. • The project contractor shall select demolition methods not involving impact, where possible (for example, milling generates lower vibration levels than excavation using clam shell or chisel drops). • The project contractor shall avoid using vibratory rollers and packers near sensitive areas whenever possible.	LTS

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
NOISE-4: Construction activities associated with implementation of the Station Area Plan could create significant short-term noise impacts on nearby sensitive land uses.	S	NOISE-4: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • Construction contractors shall ensure that all powered construction equipment are equipped with intake and exhaust mufflers recommended by the manufacturers thereof. Pavement breakers and jackhammers shall also be equipped with acoustical attenuating shields or shrouds recommended by the manufacturers thereof. • Where feasible, construction contractors shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site. • Construction contractors shall, to the maximum extent practical, locate on-site equipment staging areas so as to maximize the distance between construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction. • Construction contractors shall ensure that all noise producing construction activities, including warming-up or servicing equipment and any preparation for construction, shall be limited to the hours between 7:00 a.m. and 6:00 p.m. on weekdays (excluding holidays), and between 9:00 a.m. and 5:00 p.m. on Saturdays, Sundays, and legal holidays.	LTS

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
F. BIOLOGICAL RESOURCES			
BIO-1: Implementation of the Station Area Plan may result in the destruction of nests occupied by special-status bird species.	S	BIO-1: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • All proposed new development within the Plan area shall protect nesting birds by requiring pre-construction surveys prior to tree removal, ground disturbing, or construction activities on the site to locate and protect active nests on or immediately adjacent to the site. For example, pre-construction surveys shall be conducted no more than 14 days prior to the start of pruning, construction, or ground disturbing activities if the activities occur during the nesting season (February 1 to August 31). Pre-construction surveys shall be repeated at 14-day intervals until construction has been initiated in the area. Locations of active nests shall be described and protective measures implemented. Protective measures shall include establishment of clearly delineated (i.e., orange construction fencing) exclusion zones around each nest site as determined by a qualified wildlife biologist, taking into account the species of bird nesting on-site and their tolerance for disturbance. In general, exclusion zones shall be a minimum of 300 feet from the drip line of the nest tree or nest for raptors and 50 feet for passerines and other species. The active nest sites within an exclusion zone shall be monitored on a weekly basis throughout the nesting season to identify signs of disturbance. The radius of an exclusion zone may be increased by the project biologist if project activities are determined to be adversely affecting the nesting birds. Exclusion zones may be decreased by the project biologist only in consultation with CDFW. The protection measures shall remain in effect until the young have left the nest and are foraging independently or the nest is no longer active. A report shall be submitted to the City and CDFW at the end of the construction season documenting the observations made during monitoring.	LTS

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
BIO-2: Implementation of the Station Area Plan may impact western pond turtle or pond turtle habitat in the Plan area.	S	BIO-2: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • Pre-construction surveys for the western pond turtle shall be conducted in areas of suitable upland and/or aquatic habitat that is within 300 feet of Corte Madera Creek, Tubb Lake, Remillard Park, or other freshwater/brackish marsh in the Plan area. The survey shall be conducted immediately prior to ground disturbance to ensure that no turtles are in the construction area. If turtles are observed in the construction area, they shall be relocated to suitable habitat outside the construction zone prior to initiation of construction activities. All relocations will be made by a biologist qualified to handle turtles and with approval of the CDFW. • All construction activities within channels, lakes, ponds, and marshes within the Plan area shall be conducted during the period when pond turtles are active (May through September). Turtles are expected to be more easily observed during this period and able to escape construction activities that may pose a risk of mortality.	LTS

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
BIO-3: Implementation of the Station Area Plan may result in impacts to special-status plants.	S	BIO-3: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • Prior to ground disturbance, focused surveys for special-status plants shall be conducted in the development areas of the Plan area according to the CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Plant Populations and Natural Communities*. Plant surveys shall be conducted throughout the blooming period of those species for which suitable habitat is present. The number of surveys to be conducted shall be determined by a qualified biologist following the CDFW protocol. If populations/ stands of a special-status species are identified during the surveys and impacts are unavoidable, compensatory mitigation shall be implemented in one of the following ways: (1) establishment of an off-site mitigation area that supports the species being impacted; (2) purchase of credits in a mitigation bank that is approved to sell credits for the impacted species; or (3) relocation of the affected plants and/or collection and planting of seed of the impacted plants to a location that will be preserved in perpetuity and protected from future development. The location of the mitigation sites shall be determined in consultation with, and subject to approval of USFWS and/or CDFW (depending on the federal and/or State status of the plants). Compensatory mitigation shall be acquired at a minimum ratio of 3:1 (acquired:impacted) based on acreage of occupied habitat impacted (i.e., if one acre of occupied habitat is impacted, three acres of occupied habitat will be acquired) or the number of individual plants impacted (i.e., if a population of a 100 plants is impacted, a population of 300 plants must be reestablished at a mitigation site by the end of five years). Implementation of off-site mitigation shall include provisions for the long-term protection of the species through establishment of a conservation easement on the on the mitigation site and an endowment for the maintenance, monitoring, and long-term of management of the site. The amount of the endowment shall be determined by the City and appropriate resource agencies.	LTS

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
BIO-4: Implementation of the Station Area Plan may impact special-status tidal marsh animal species.	S	BIO-4: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • Ground disturbing activities within upland habitat in the vicinity of the tidal marsh shall be conducted only when high tides are not at their winter or summer extremes, to reduce the likelihood that tidal marsh rails and salt marsh harvest mice will be present in the construction footprint. Ground disturbance shall be avoided during the highest tides of June–July and December–January (± one week each month). • To avoid potential disturbance to nesting tidal marsh rails, construction shall be conducted during the non-breeding season (September 1 through January 31), unless current surveys indicate that marsh habitat within 100 feet of the construction footprint is not part of an active rail breeding territory. Such surveys must be conducted in accordance with a project-specific survey methodology prepared in accordance with the USFWS and CDFW protocols.	LTS

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
BIO-4 *Continued*		• No work shall be permitted within suitable habitat for salt marsh harvest mice (i.e., tidal marsh/mudflat and adjacent ruderal/non-native annual grassland) without the appropriate authorization from the USFWS and CDFW. Prior to ground disturbance within suitable salt marsh harvest mouse habitat, a qualified biologist experienced with salt marsh harvest mouse exclusion procedures shall prepare a site-specific salt marsh harvest mouse avoidance plan. The plan will be subject to approval by USFWS and CDFW and be consistent with the Biological Opinion and Incidental Take Permit issued by the USFWS and CDFW, respectively, for the project. At a minimum, the plan shall include: (1) installation of a barrier fencing around the entire portion of the work area that is within 100 feet of the edge of the marsh to exclude salt marsh harvest mouse from the work area; (2) clearing of all vegetation using hand-tools within the fenced work area prior to the initiation of construction activities; and (3) relocation to the marsh of any salt marsh harvest mouse found during vegetation removal (relocation must be approved by USFWS and CDFW prior to initiation of construction activities). Construction work shall start as soon as possible (and no longer than 3 days) after vegetation has been cleared. All exclusion measures and initial ground disturbance activities shall be monitored by a qualified biologist who is approved by the USFWS and CDFW to implement protection measures for salt marsh harvest mouse.	

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
BIO-4 *Continued*		• To protect sensitive habitats during construction activities, a permanent fence shall be constructed outside of the marsh along the southern edge of the Larkspur Ferry Terminal parking area to restrict access of humans and dogs into the tidal marsh/mudflat habitat. A qualified biologist shall provide advice regarding the location and design of the fence, and BCDC and the City shall approve fence design, dimensions and location. The upland habitat on the project site should be landscaped with native shrub species characteristic of the upper marsh zone such as gumplant, saltgrass, and/or coyote brush to buffer the tidal marsh from activity on the parking area and provide rails and other marsh birds with shelter during extreme high tides. Such vegetation (e.g., gumplant) could also provide potential nesting habitat for various species of birds inhabiting the marsh. • If any development occurs within the existing Larkspur Ferry Terminal parcel, the City shall require building design features to reduce predators and lighting that would impact tidal marsh species. Such design features may include anti-predator perching devices or building designs to discourage predatory birds from nesting or perching in proximity to the marsh and lights that are shielded and focused away from the marsh and sensitive habitat areas.	

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
BIO-5: Invasive plants introduced to the Station Area Plan area may invade the native riparian woodland and tidal marsh mudflat/mudflat and displace native habitat.	S	BIO-5: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • Species listed in California Invasive Plant Council's *Invasive Plant Inventory* shall be prohibited from being planted in the Plan area. Plant palettes for individual projects shall be reviewed by a biologist to ensure that the prohibited species are not included in the landscaping plans. • During construction activities, the following measures shall be implemented to the extent feasible to reduce the spread of invasive plants: o Avoid vehicle travel through weed-infested areas. o Avoid the disturbance of soil and vegetation to the extent feasible during construction activities. o Use only certified weed-free erosion control materials and native seed mixes.	LTS
BIO-6: Implementation of the Station Area Plan could impact up to approximately 5 acres of riparian woodland in the Plan area.	S	BIO-6: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • A Lake and Streambed Alteration Permit shall be obtained from the CDFW prior to the removal or damage of any riparian trees, shrubs, or other vegetation within CDFW jurisdiction (bed or bank of the lake, pond, river creek, or drainage and the riparian vegetation associated with these features).	LTS

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
BIO-6 *Continued*		• A tree survey shall be conducted within any portion of the riparian woodland that may be impacted by development. Riparian trees and shrubs removed or otherwise permanently impacted (i.e., limbs or trunk severely pruned or roots cut, trenches cut through root zone) as result of implementation of the Station Area Plan shall be replaced either onsite or at an off-site, public open space mitigation area (i.e., park or open space). Riparian trees and shrubs will be replaced at a 3:1 ratio (replaced: impacted). Replacement plant material will be of native, local stock. An endowment or other secure funding source will be established for the long-term maintenance and monitoring of the replacement trees. • Trees to be avoided or retained shall be enclosed in a tree protection zone (TPZ) to prevent direct damage to the trees and their growing environment during the construction process. A TPZ fence shall be established around the trees at a distance no less than 5 feet outside the dripline. In no case shall the TPZ fence be less than 10 feet from the trunk of the tree. The fencing shall be installed before site preparation, construction activities, or tree trimming begins and shall consist of blaze orange barrier fencing supported by metal “T rail” fence posts. • Heavy machinery shall not be allowed to operate or park within the Tree Protection Zone, nor shall any excess soil, chemicals, debris, equipment or other materials be dumped or stored within the TPZ or upslope of the protected trees. If it is necessary for heavy machinery to operate within the dripline of the preserved protected trees, then measures to reduce compaction of the soil within the dripline shall be employed as directed by a qualified arborist.	

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
BIO-7: Implementation of the Station Area Plan may impact waters of the United States and/or waters of the State within the Plan area.	S	BIO-7: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • For all activities within jurisdictional waters, the applicant shall obtain the appropriate permits from the regulatory agencies (Corps, RWQCB, CDFW, and BCDC). Each activity in jurisdictional areas will likely require a Section 404 Corps permit and Section 401 water quality certification from the Water Board. Creek restoration activities may also require a CDFW Lake or Streambed Alteration Agreement, depending on site-specific conditions. • Impacts to jurisdictional wetlands shall be mitigated at a minimum replacement ratio of 1:1 (i.e., one acre created [and preserved] for every acre impacted). Replacement habitat will be of the same type (i.e., marsh, channel, seasonal wetland) as the area impacted unless it can be shown that a different habitat type would provide greater value. Mitigation features should be created in the same general area as the original impact. Off-site mitigation may be approved by the City if the amount of required replacement habitat exceeds that which is available in the vicinity of the impact site. A wetland mitigation and monitoring plan (MMP) shall be developed for each mitigation site, detailing the mitigation design, wetland planting design, adaptive management, maintenance and monitoring requirements, reporting requirements, and success criteria for the created wetland(s). An endowment or other assured funding mechanism in an amount to be determined by the permitting agencies will be provided by the project applicant for the long-term maintenance, management, and monitoring of the wetland mitigation area.	LTS

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
BIO-7 *Continued*		As an alternative to establishing an on- or off-site mitigation area, the project applicant may purchase mitigation credits at an agency approved mitigation bank that includes the project site in its service area. Credits equivalent to the mitigation acreage requirement for a mitigation site will be purchased and proof of purchase of the credits will be provided to the City prior to issuance of a building permit. Credits will be for the same type of wetland that is impacted. A mitigation and monitoring plan and endowment will not be required if credits are purchased at a bank to fully cover the mitigation requirement.	
BIO-8: Implementation of the Station Area Plan could impact bird nests that are protected under the MBTA and California Fish and Game Code.	S	BIO-8: Implement Mitigation Measure BIO-1 to avoid impacts to nesting birds.	LTS
BIO-9: Implementation of the Station Area Plan may result in the loss of foraging and roosting habitat for the pallid bat and other special-status bat species and may result in injury or mortality to these species and their offspring.	S	BIO-9: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • Pre-construction surveys for bat roosts shall be required for all buildings or trees that will be removed or modified within the Plan area. The survey shall take place no more than 30 days prior to construction/demolition/removal activities. Preconstruction surveys shall be repeated if demolition or construction activities are delayed more than 30 days. • If a bat roost is found in a building or tree cavity, the species of bat using the roost shall be identified and methods to encourage the bats to leave the roost or to prevent them from returning to the roost shall be implemented prior to roost removal. A mitigation plan shall be developed by a biologist experienced in working with bats to specify the methods to be used and the timing of the activities. The mitigation plan shall be submitted to the City and CDFW for approval.	LTS

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
BIO-9 *Continued*		• Materials from roost sites shall be salvaged, when feasible, to be used in the construction of artificial roosts. • If special-status bats are found on-site, and the roost would be destroyed during development, a replacement roost shall be provided for the bats. The replacement roost shall be constructed and placed on-site prior to removal of the original roost. A mitigation plan specifying the construction details and siting of the replacement roost, performance standards, type of monitoring and maintenance required, remedial actions if the bats were not to use the replacement roost, and annual reports shall be prepared and approved by the City and CDFW prior to removal of the existing roost. If bats do not use the replacement roost, a different type of replacement roost shall be constructed or the replacement roost shall be moved to a different location. The project sponsor shall provide a secure source of funding for the monitoring of the replacement roost, including any relocated or rebuilt replacement, roosts for a period of at least five years to determine whether the bats used the replacement roost. The roost and roost site will be secured as wildlife habitat in perpetuity through placement of a conservation easement on the mitigation site where the roost is constructed. An endowment in an amount to be determined in consultation with CDFW will also be provided for the long-term maintenance and monitoring of the roost site. A report documenting the implementation of the plan shall be provided to the City within one month of completion of the replacement roost. The plan shall be completed and implemented prior to the issuance of the grading permit.	

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
BIO-9 *Continued*		If placement of the roost on the site is not feasible, the replacement roost may be constructed at an offsite location in the Larkspur area. The off-site mitigation site shall be placed in a conservation easement and an endowment shall be provided for the long-term maintenance and monitoring of the roost. The off-site mitigation site must be approved by CDFW. Conservation easements established for preservation of plant and animal habitat will be in favor of the CDFW or another qualified conservation organization that can legally hold conservation easements. The conservation easement shall be recorded within 6 months of acceptance of the mitigation and monitoring plan by the CDFW. • Removal of maternity roosts for special-status bats shall be coordinated with CDFW prior to removal. Maternity roosts for any species of bat, either common or special-status, shall not be demolished until the young are able to fly independently of their mothers.	
BIO-10: New buildings developed as part of implementation of the Station Area Plan could result in bird collisions.	S	BIO-10: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • Bird-safe design practices shall be incorporated into the building designs to the degree feasible, as determined by Community Development Department director. Design elements such as building facades that create "visual noise" via cladding, or other design features that make it easier for birds to identify buildings and not mistake windows for open sky or trees, and windows that are not clear or reflective shall be incorporated into the building designs. Examples of suitable materials include windows that incorporate glass types such as UV-A or fritted glass and windows that incorporate UV-absorbing and UV-reflecting stripe and grid patterns in locations with the highest potential for bird-window collisions (e.g., lower levels near trees).	LTS

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
BIO-11: Implementation of the Station Area Plan may result in the removal of trees that are protected under the City of Larkspur's Tree Protection Ordinance.	S	BIO-11: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • A tree survey shall be required prior to development by a certified arborist to identify trees protected by the City ordinance. Protected trees shall be avoided to the maximum practicable extent. Protected trees that are removed or damaged during project construction shall be replaced at a minimum 1:1 ratio (replaced: impacted) or according to the terms of the permit issued by the City, whichever is greater.	LTS
G. GEOLOGY, SOILS, AND SEISMICITY			
GEO-1: Implementation of the Station Area Plan could result in substantial risk related to geologic or seismic hazards.	S	GEO-1: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • Prior to the issuance of any grading or construction permits for development projects under the Plan, a design-level geotechnical investigation shall be prepared by a licensed professional and will be included in permit applications to the City Building Department for review and approval. The investigation shall determine the development's geotechnical conditions, including seismic shaking hazard and measures to address these hazards. In addition, the following guidance for the design-level geotechnical investigation shall be addressed: o Analysis presented in the geotechnical investigation shall conform to the California Division of Mines and Geology recommendations presented in the Guidelines for Evaluating Seismic Hazards in California. Briefly, the guidelines recommend that the investigation include: a site screening evaluation; evaluation of on- and off-site geologic hazards; quantitative evaluation of hazard potential; detailed field investigation; estimation of ground-motion parameters; evaluation of landslide, liquefaction, lateral-spreading and ground-displacement hazards; and recommendations to reduce identified hazards.	LTS

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
GEO-1 *Continued*		o Design review for the project shall include evaluation of fixtures, furnishings, and fasteners with the intent of minimizing collateral injuries to building occupants from falling fixtures or furnishings during the course of a violent seismic event. o The investigation shall describe the proposed project's geotechnical conditions and address potential geohazards, including subsidence, collapse, soil expansion, corrosion, and differential settlement. The investigation shall identify engineering techniques appropriate to minimize potential geohazard damage. All design measures, recommendations, design criteria, and specifications set forth in the design-level geotechnical investigation shall be implemented as a condition of permit approval.	
H. HYDROLOGY AND WATER QUALITY			
HYDRO-1: Implementation of the Station Area Plan could result in substantial risk related to exacerbated flooding hazards as a result of predicted sea level rise.	S	HYDRO-1: The City shall amend the General Plan to include the following policy in the Health and Safety Element: Development projects within a mapped flood hazard zone shall incorporate measures to protect future residents and users from exacerbation of flood hazards due to sea level rise. This shall include certification by a professional engineer or architect that floor elevations and other building requirements for construction in a flood hazard zone shall remain protective of persons and property in the event of a 55-inch sea level rise.	LTS

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
I. HAZARDS AND HAZARDOUS MATERIALS			
HAZ-1: Implementation of the Station Area Plan could result in an impact to human health and/or the environment related to hazardous materials present in soil, groundwater, and building materials within the Plan area.	S	HAZ-1: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • A Phase I Environmental Site Assessment (ESA) shall be prepared to American Society for Testing and Materials (ASTM) standards for development and redevelopment projects conducted under the Station Area Plan. If the Phase I identifies the potential for soil or groundwater contamination to be present at the site, a Phase II ESA shall be prepared by a qualified environmental professional. If contamination is identified during Phase I and II investigations, projects undertaken under the Plan shall incorporate any necessary measures to ensure that any potential added health risks to construction workers, maintenance and utility workers, site users, and the general public as a result of hazardous materials are reduced to a cumulative risk of less than 1 x10-6 (one in one million) for carcinogens and a cumulative hazard index of 1.0 for non-carcinogens, or as otherwise required by a regulatory oversight agency. The risk evaluation and any required response actions would be a condition of approval for construction, demolition, or grading permits and would be subject to review and/or approval by regulatory oversight agencies. These agencies could also require additional site investigation to more fully delineate the extent of contaminants of concern at the site. If extensive on-site excavation and/or soil off-haul is determined to be the appropriate response action, additional CEQA review may be required to evaluate potential impacts for the response related to air quality, noise, and traffic.	LTS

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
HAZ-1 *Continued*		• Hazardous building materials surveys shall be conducted by a qualified and licensed professional for all structures, not previously inspected or abated, proposed for demolition or renovation as part of a project associated with the Station Area Plan. All loose and peeling lead-based paint and ACM shall be abated by certified contractor(s) in accordance with local, State, and federal requirements. All other hazardous materials, such as "universal wastes," shall be removed from buildings prior to demolition in accordance with DOSH regulations. The completion of the abatement activities shall be documented by a qualified environmental professional(s) and submitted to the City for review with applications for issuance of construction and demolition permits.	
J. CULTURAL RESOURCES			
CULT-1: Ground-disturbing activities associated with new development and redevelopment allowed under the Station Area Plan could adversely affect significant paleontological deposits.	S	CULT-1: The following language shall be included as a Condition of Approval for projects associated with implementation of the Station Area Plan: • If paleontological resources are encountered during project subsurface construction, all ground-disturbing activities within 25 feet shall be redirected and a qualified paleontologist contacted to assess the situation, consult with agencies as appropriate, and make recommendations for the treatment of the discovery. Project personnel shall not collect or move any paleontological materials. Paleontological resources include fossil plants and animals, and trace fossil evidence of past life such as tracks. Ancient marine sediments may contain invertebrate fossils such as snails, clam, and oyster shells; sponges; and protozoa; and vertebrate fossils such as fish, whale, and sea lion bones. Vertebrate land mammals may include bones of mammoth, camel, saber tooth cat, horse, and bison. Paleontological resources also include plant imprints, petrified wood, and animal tracks.	LTS

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
CULT-2: Ground-disturbing activities associated with new development and redevelopment allowed under the Station Area Plan could adversely affect archaeological resources.	S	CULT-2: The following language shall be included as a Condition of Approval for projects associated with implementation of the Station Area Plan: • If deposits of prehistoric or historical archaeological materials are encountered during project activities, all work within 25 feet of the discovery should be redirected and a qualified archaeologist contacted to assess the situation, consult with agencies as appropriate, and make recommendations for the treatment of the discovery. Project personnel should not collect or move any archaeological materials. Archaeological materials can include flaked-stone tools (e.g., projectile points, knives, and choppers) or obsidian, chert, basalt, or quartzite toolmaking debris; bone tools; culturally darkened soil (i.e., midden soil often containing heat-affected rock, ash and charcoal, shellfish remains, bones, and other cultural materials); and stone-milling equipment (e.g., mortars, pestles, and handstones). Prehistoric archaeological sites often contain human remains. Historical materials can include wood, stone, concrete, or adobe footings, walls, and other structural remains; debris-filled wells or privies; and deposits of wood, glass, ceramics, metal, and other refuse.	LTS

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
CULT-2 *Continued*		• In the event that archaeological deposits are encountered during implementation of the Station Area Plan, it is recommended that adverse effects be avoided by project activities. If such deposits cannot be avoided, they should be evaluated for their California Register of Historical Resources eligibility. If the deposit is not eligible, a determination shall be made as to whether it qualifies as a "unique archaeological resource" under CEQA. If the deposit is neither an historical nor unique archaeological resource, avoidance is not necessary. If the deposit is eligible to the California Register, or is a unique archaeological resource, it will need to be avoided by adverse effects or such effects must be mitigated. Adverse effects will be mitigated through the implementation of a treatment plan developed in consultation with the City. Mitigation may consist of, but is not necessarily limited to, systematic recovery and analysis of archaeological deposits; recording the resource; preparation of a report of findings; and accessioning recovered archaeological materials at an appropriate curation facility. The report shall be submitted to the City for review and the Northwest Information Center at Sonoma State University. • If prehistoric archaeological deposits are identified, the City shall consult with FIGR regarding preparation of a Treatment Plan. • The City shall consult with the Federated Indians of Graton Rancheria (FIGR) prior to development of projects associated with implementation of the Station Area Plan regarding preparation and execution of a Treatment Plan. The Treatment Plan will identify procedures for the use of tribal monitors, and the appropriate treatment of Native American cultural materials and human remains identified during implementation of the Station Area Plan.	

Table II-1: Summary of Impacts and Mitigation Measures from the EIR

Environmental Impacts	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance With Mitigation
K. PUBLIC SERVICES			
PS-1: Implementation of the Station Area Plan could result in the need for additional firefighting equipment and personnel in order to meet the potential new demand generated by development within the Plan area.	S	PS-1: The City of Larkspur shall identify and implement a formula, which identifies a project applicant's fair share contribution towards station retrofits, staffing, or the purchase of additional firefighting equipment and vehicles in order to serve the additional fire protection services demand generated by new development. The City shall also identify an implementation plan and budget for use of the funds prior to implementing the formula. Payment into this fund shall be a condition of development approval.	LTS
L. UTILITIES AND INFRASTRUCTURE			
UTIL-1: Existing water supply available to the City of Larkspur may not be adequate to accommodate full implementation of the Station Area Plan.	S	UTIL-1: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • Until the Marin Municipal Water District (MMWD) updates their Urban Water Management Plan (UWMP) to account for water demands associated with the implementation of the Station Area Plan, and as a condition of approval, the City shall require all new development within the Plan area to confirm with the MMWD that adequate water to serve the project is available within current water allocations. This written confirmation of available water supply shall be provided prior to approval of any proposed development project.	LTS
UTIL-2: Implementation of the Station Area Plan could require replacement or expansion of existing wastewater infrastructure.	S	UTIL-2: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan: • As private properties within the Plan area are developed, project-specific capacity and condition analyses of applicable wastewater facilities on and adjacent to the project sites shall be performed to identify any impacts to the wastewater system. The project applicants shall be responsible for any required modifications to impacted facilities identified in the analyses.	LTS

Source: LSA Associates, Inc., 2014.

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III. PROJECT DESCRIPTION

This chapter describes the City of Larkspur SMART Station Area Plan ("Station Area Plan" or "Plan"), which is evaluated within this Draft EIR. This chapter provides an overview of the regional location and general setting, intended uses of this Draft EIR, project objectives for this EIR analysis, a detailed description of the proposed Station Area Plan, and a description of anticipated adoption and implementation of the Plan.

A. INTRODUCTION

The Sonoma-Marin Area Rail Transit (SMART) is a passenger train and multi-use pathway project extending 70 miles from Cloverdale in Sonoma County to the Larkspur Landing area in Larkspur, Marin County. SMART will utilize an existing rail corridor formerly used by the Northwestern Pacific Railroad (NWP), which generally parallels U.S. 101 through Sonoma and Marin Counties and will serve 14 stations when completed. The Larkspur Station will be located approximately ⅓ mile northwest of the Larkspur Ferry Terminal. The Central Marin Ferry Connection project will provide pedestrian access from the SMART Station over Sir Francis Drake Boulevard. While this connection will facilitate travel over Sir Francis Drake Boulevard, it does not provide direct access to the Larkspur Ferry Terminal.[1]

The first phase of the SMART project, expected to be operational by 2016, will connect Railroad Square in Santa Rosa with Downtown San Rafael. Service from Santa Rosa north to Cloverdale, and from San Rafael south to Larkspur, are included in the second phase of the SMART project and will be completed as SMART receives additional funding. SMART has made completion of the connection to the Larkspur station a priority during the second phase of the SMART project.

The Association of Bay Area Governments (ABAG) and Metropolitan Transportation Commission (MTC) have offered funding for planning future growth in the vicinity of the SMART stations to support and encourage ridership. The City of Larkspur received a Priority Development Area (PDA) Planning Grant (formerly Station Area Planning Grant) in May 2011, enabling the preparation of the Station Area Plan. The Plan is intended to evaluate opportunities to support long term SMART ridership by examining potential land use and regulatory changes for the area surrounding the planned Larkspur SMART Station and improve connectivity and multi-modal access within the Plan area. The goals of the grant program are**:**

- Boost transit ridership and reduce vehicle miles traveled.
- Increase walking, bicycling, carpooling, carsharing, local transit and other transportation options for people in the area.

[1] The Central Marin Ferry Connection Project is not proposed as part of implementation of the Station Area Plan.

- Increase the housing supply, particularly affordable housing near station areas.
- Locate key services and retail opportunities near station areas.

B. REGIONAL LOCATION AND GENERAL SETTING

The City of Larkspur is located in Marin County, bordered to the north by San Rafael, to the south-east by Corte Madera, to the south by Mill Valley, and to the west and north by the County of Marin. It is approximately 13 miles north of the Golden Gate Bridge from San Francisco, and approximately 9 miles west of the Richmond-San Rafael Bridge from Richmond and Contra Costa County. U.S. 101 runs north-south through the eastern portion of Larkspur and the Plan area, connecting south to San Francisco and north through Marin County to Sonoma County.

The Plan area consists of 405 acres located in eastern Larkspur, approximately 1.5 miles northeast of the City's downtown core, and is shown in Figure III-1. The Plan area is defined by a combination of the Larkspur municipal boundary and a ½-mile radius around the planned SMART Station location. The SMART Station, representing the southern terminus of the SMART rail line, is located in the SMART right-of-way that parallels U.S. 101, as shown in Figure III-1.

The Plan area is intersected by U.S. 101 (oriented in a north-south direction) and Sir Francis Drake Boulevard (oriented in a roughly east-west direction).

As shown in Figure III-2, the Plan area has been divided into three geographic sub-areas (sub-areas 1A, 1B, and 2). These sub-areas are briefly described below:

- **Sub-Area 1A**: Sub-area 1A is known as the Larkspur Landing Area. It is bounded by U.S. 101 and the SMART right-of-way to the west, a wooded ridgeline and the San Rafael city border to the north, the ½-mile radius from the proposed future SMART Station to the east, and Corte Madera Creek to the south. This sub-area includes the proposed SMART Station site, the Larkspur Ferry Terminal, and a diverse mix of uses including retail, hotel, offices, single- and multi-family residences, parks and open space, and a large, currently undeveloped parcel owned by Sanitary District #1 of Marin County.
- **Sub-Area 1B**: Sub-area 1B, known as the Greenbrae Area, is bounded on the west and north by the ½-mile radius and the Larkspur municipal boundary, to the east by U.S. 101, and to the south by Corte Madera Creek. North of Sir Francis Drake Boulevard is a portion of the larger Greenbrae Hills single-family neighborhood, while south of Sir Francis Drake Boulevard is a mix of office, retail, gas stations and a residential townhome community.
- **Sub-Area 2**: Sub-area 2 is the Redwood Highway Area, located in the southern portion of the Plan area. It is bounded by Corte Madera Creek to the north, Wornum Drive to the south, and the municipal boundary on both the east and west. The Redwood Highway Area consists of a mix of uses including retail, light industrial and high-density residential (two mobile home parks and one RV park).

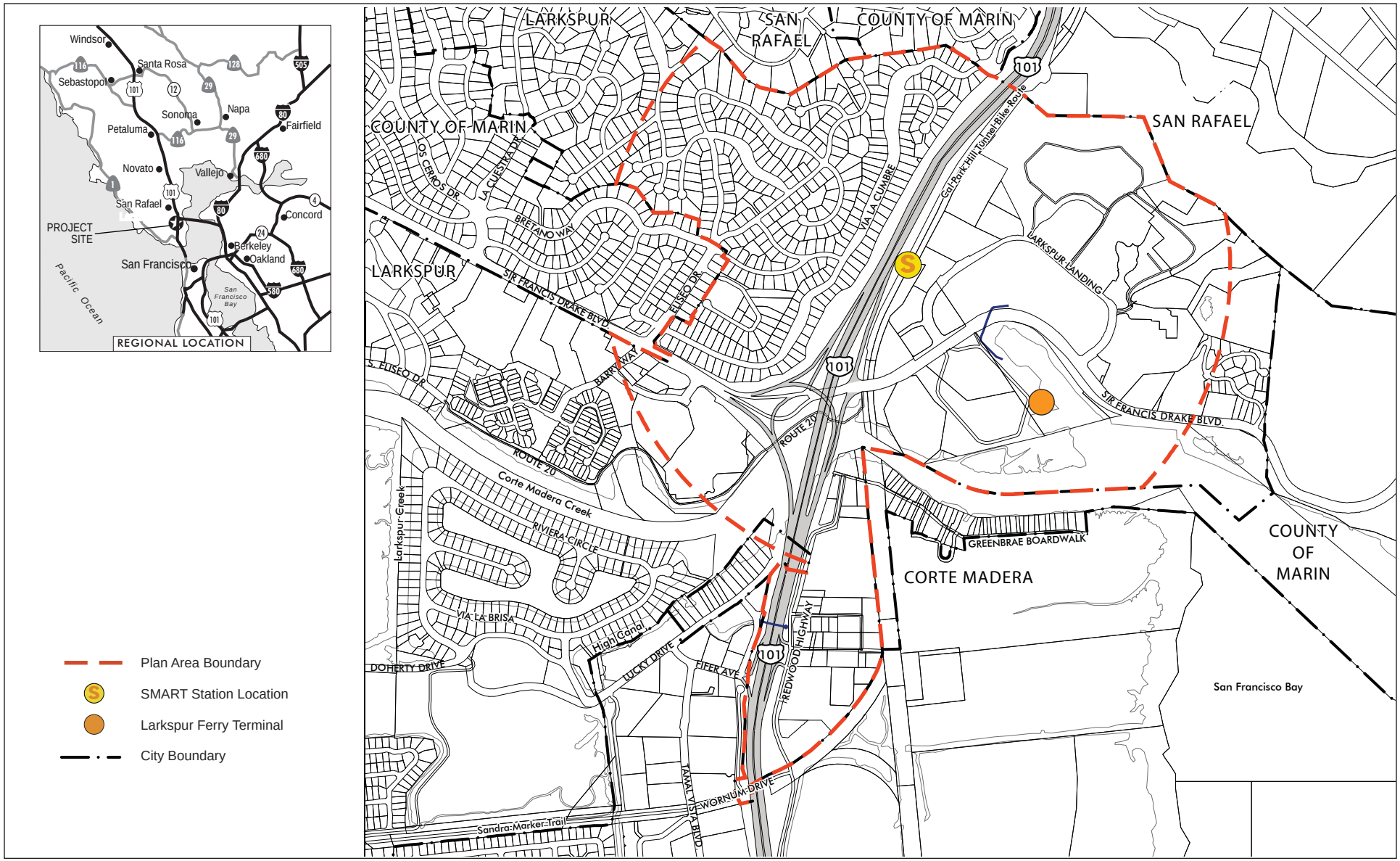

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FIGURE III-1

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SOURCES: CALIF. GOVERNOR'S OES; CITY OF LARKSPUR, 2011; BMS DESIGN GROUP; LSA ASSOCIATES, INC., 2013.

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City of Larkspur SMART Station Area Plan EIR

Project Location and Regional Vicinity Map

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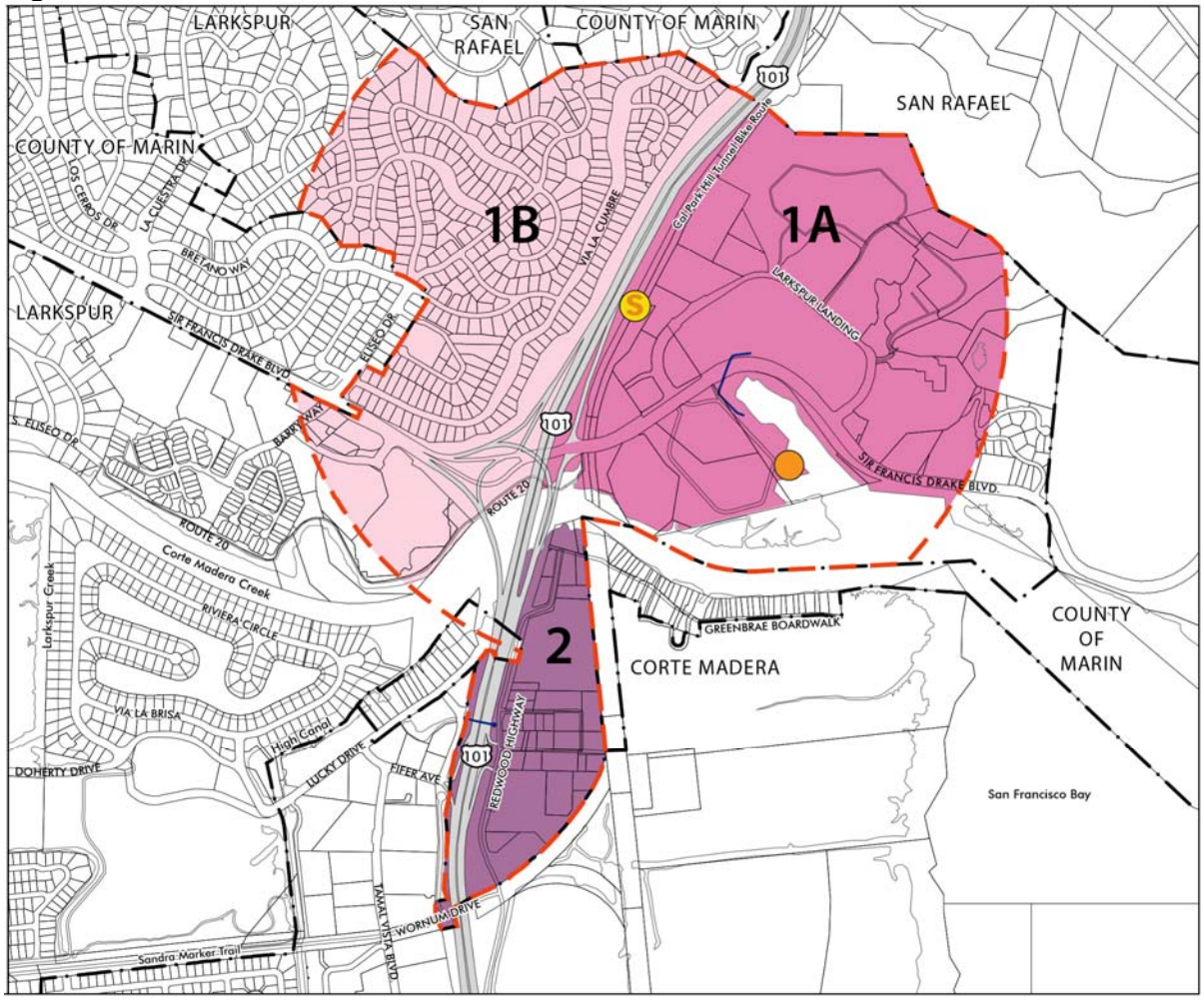
Figure III-2: Station Area Plan Sub-Areas



C. INTENDED USES OF THE DRAFT EIR

This Draft EIR is designed to fully inform City decision-makers, in addition to other responsible agencies, and the general public of the potential environmental effects associated with implementation of City of Larkspur SMART Station Area Plan.

This Draft EIR has been prepared in accordance with CEQA (PRC Section 21000 et seq.) and the State CEQA Guidelines (California Code of Regulations, Title 14, Section 15000 et seq.). As provided in the State CEQA Guidelines, for projects subject to CEQA, public agencies are charged with the duty to substantially lessen or avoid significant environmental effects where feasible. The Draft EIR is an informational document that informs public agency decision-makers and the public of the significant environmental effects and the ways in which those impacts could be reduced to less-than-significant levels, either through the imposition of mitigation measures or through the implementation of specific alternatives to the project.

This Draft EIR can be characterized either as a Program EIR prepared pursuant to State *CEQA Guidelines* Section 15168, or as a first-tier EIR prepared pursuant to State *CEQA Guidelines* Section 15152. These labels are complementary and not mutually exclusive. This document is intended to act as an analytical superstructure for subsequent, more detailed analyses associated with individual project applications consistent with the Station Area Plan. One of the City's goals in preparing the current document is to minimize the amount of new information that would be required in the future at the "project level" of planning and environmental review by dealing as comprehensively as possible in this document with cumulative impacts, regional considerations, and similar big-picture issues. Later environmental documents (EIRs, Mitigated Negative Declarations, Negative Declarations, or Categorical Exemptions) can incorporate by reference materials from the Program EIR regarding regional influences, secondary impacts, cumulative impacts, broad alternatives, and other factors (State *CEQA Guidelines* Section 15168[d][2]). These later documents need only focus on new impacts that have not been considered before (State *CEQA Guidelines* Section 15168[d][3]).

The City anticipates preparing Initial Studies whenever landowners within the Plan area submit applications for site-specific approvals, in order to determine the degree to which the environmental review for such applications may rely on this EIR. The City's intent is that new analyses for future site-specific actions will focus on issues and impacts regarding detailed site-specific information, which this Program EIR by definition has not evaluated. The new analyses for these site-specific actions will focus on impacts that cannot be "avoided or mitigated" by mitigation measures that either: (1) were adopted in connection with the Plan; or, (2) were formulated based on information in this Draft EIR.

1. Notice of Preparation

The City of Larkspur is the Lead Agency of environmental review for this Draft EIR. A Notice of Preparation (NOP) was submitted to appropriate agencies and publically noticed to identify any issues of concern prior to preparation of this Draft EIR. The NOP was circulated on January 8, 2013. A public notice was published in the Marin Independent Journal on January 8, 2013. The NOP and comments received during the scoping period are included in Appendix A of this Draft EIR.

2. Review by Other Agencies

The City of Larkspur is also responsible for submitting the Draft EIR to appropriate public agencies and for submitting the document to the State Clearinghouse.

D. PROJECT OBJECTIVES FOR EIR ANALYSIS

The following are the primary objectives for the Station Area Plan project. These objectives include both goals associated with the Station Area Planning Grant Program, as well as objectives identified by the City of Larkspur:

- Increase and support transit ridership and reduce vehicle miles traveled;
- Increase walking, bicycling, carpooling, carsharing, local transit and other transportation options for people in the area;
- Increase the housing supply, particularly affordable housing near the SMART Station, meeting the City's share of regional housing needs;

- Locate key services and promote retail opportunities within and near the Plan area;
- Promote a walkable, livable and accessible environment and provide safe and comfortable connections for pedestrians and bicyclists within the area and between the major transit nodes; and
- Identify mitigation measures to protect existing and new development from flooding and sea level rise, especially in the Redwood Highway Area.

E. DRAFT CITY OF LARKSPUR SMART STATION AREA PLAN

This section provides a brief description of the planning process, a summary of the components of the Plan, and the Station Area Plan projections (2035) analyzed within this Draft EIR. The Station Area Plan is hereby incorporated by reference into this Project Description, and should be referred to for a more detailed description. It can be viewed online through the City's website (www.cityoflarkspur.org).

1. The City of Larkspur SMART Station Area Plan Process

The Draft Station Area Plan was prepared by the City and a consultant team under the direction of the City Council and Planning Commission. Development of the Station Area Plan was initiated in May 2012. An Existing Conditions Report[2] was released for public review in July 2012 and includes a description of existing physical conditions with the Plan area, the regulatory context, and the utilities and infrastructure serving the Plan area.

In August 2012, a Market Analysis memo[3] was prepared describing the demographic and economic trends in the Plan area; housing, household unit, and employment projections; and real estate market conditions and demand.

To inform the discussion of potential land use alternatives, a Land Use Alternatives Analysis Report[4] was prepared in December 2012. Through preparation of this report, the preferred land use alternative, which is described in the Station Area Plan and evaluated in this Draft EIR, was identified. The identification of the preferred land use alternative included extensive discussions and public meetings, as summarized below.

- **Technical Advisory Committee**. The Technical Advisory Committee (TAC) included representatives from the following agencies: various City of Larkspur departments; the County of Marin; SMART; the Association of Bay Area Governments (ABAG); the Metropolitan Transportation Commission (MTC); the Golden Gate Bridge Highway and Transportation District (GGBHTD); the Transportation Authority of Marin (TAM); the San Francisco Bay Conservation and Development Commission (BCDC); and the Bay Area Air Quality Management District (BAAQMD). Meetings with the TAC were held on: May 9, July 18, and October 10, 2012, and June 5, 2013.

[2] BMS Design Group, 2012. *Larkspur SMART Station Area Plan, Existing Conditions Report*. July 31.

[3] bae Urban Economics, 2012. *Larkspur SMART Station Area Plan – Market Analysis.* August 16.

[4] BMS Design Group, 2012. *Larkspur SMART Station Area Plan, Land Use Alternatives Analysis Report.* December 3.

- **Citizen Advisory Committee**. The Citizen Advisory Committee (CAC) included residents, and business and property owners of the City. Meetings with the CAC were held on: May 7, July 30, October 18, and November 15, 2012; February 21, March 11, May 20, and June 17, 2013.
- **Community Workshops**. Community workshops were held on July 23 and November 5, 2012, and March 7 and December 3, 2013.

2. Station Area Plan Chapters

The Station Area Plan includes the following chapters:

- *Introduction.* Describes the project background, planning process, key participants, and community participation to develop the Station Area Plan.
- *Existing Conditions.* Describes the physical, regulatory, demographic, and market context of the Plan area.
- *Vision.* Describes the process that led to the vision for the Plan area.
- *Land Use.* Identifies the anticipated type, intensity and distribution of land uses within the Station Area as established in the preferred land use scenario.
- *Access, Circulation, and Parking.* Identifies pedestrian, transit, vehicular, and bicycle access to the future station and circulation throughout the Plan area. Accessible design to meet the needs of persons with disabilities and the elderly is a specific component of this element. Identifies parking demand and parking management strategies.
- *Urban Design Guidelines.* Incorporates public and private design policies and standards that will encourage pedestrian friendly design that promotes walkability and livability of the Plan area.
- *Infrastructure.* Identifies infrastructure improvements that will be needed to support implementation of the Plan including flooding/sea level rise mitigation and adaptation strategies.
- *Implementation.* Identifies regulatory/policy changes needed to implement the Plan (including General Plan, Zoning Ordinance, and Design Guidelines), responsible City departments, improvement phasing, and funding solutions or possibilities for the paths of travel, anticipated traffic and parking improvements, street improvements, and utilities. This chapter shall also include a list of measurable actions and estimated timeline for implementing new policies, land use changes, and creation of new programs.

3. Development Projections

Through development of the preferred Station Area Plan land use alternative, several opportunity sites were identified for potential land use or density changes within the Plan area. The opportunity sites that were selected are shown in Figure III-3. These sites were selected based on the following criteria:

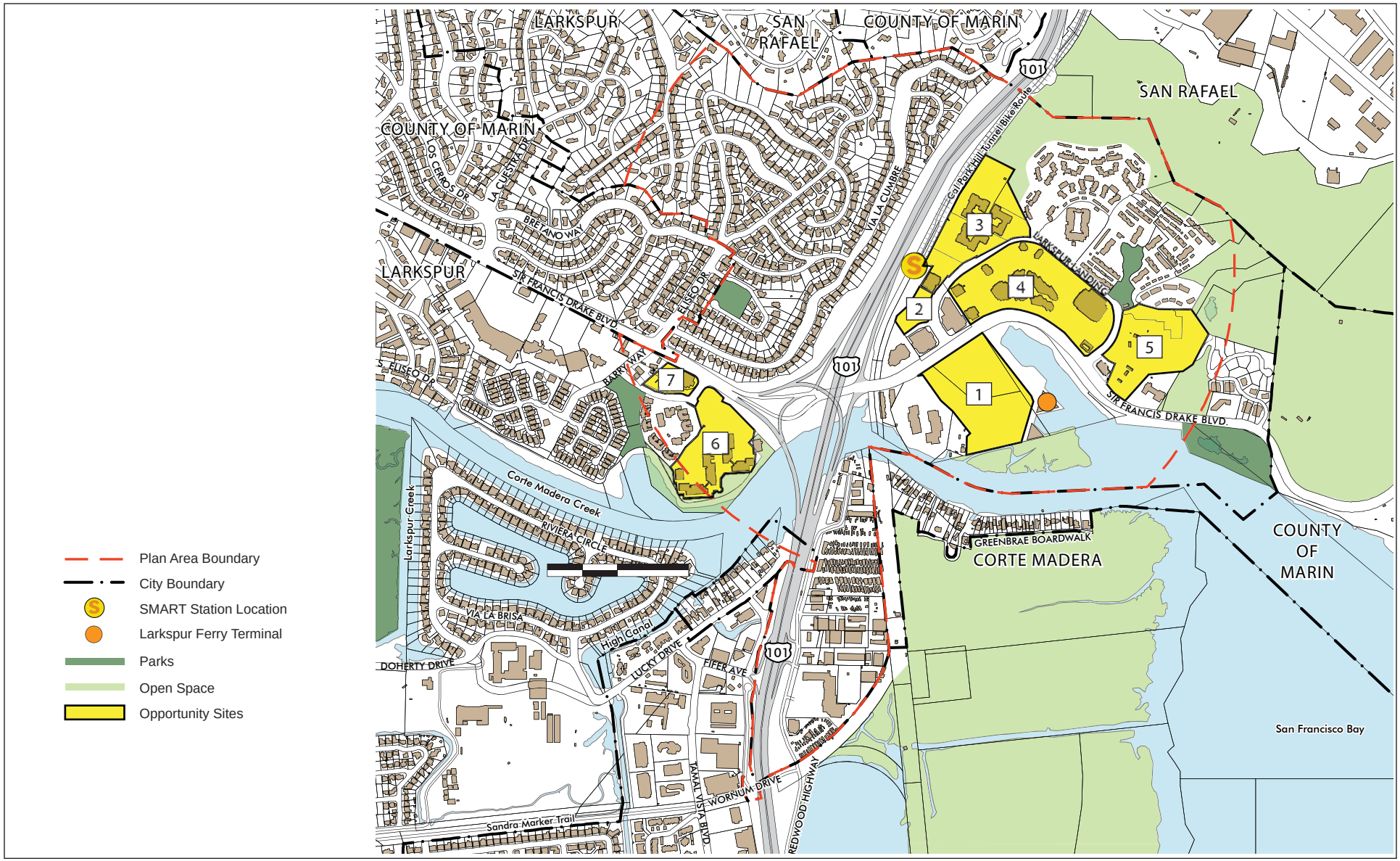


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FIGURE III-3

City of Larkspur SMART Station Area Plan EIR

Station Plan Area Opportunity Sites

SOURCE: CITY OF LARKSPUR, FEBRUARY 26, 2013.

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- Proximity to the SMART Station or Ferry Terminal;
- Physical development feasibility (e.g., low intensity of existing development or ability to structure parking and free up space currently dedicated to surface parking);
- Likelihood that new development will fit with neighboring uses; and
- Minimum effect on views from surrounding residential neighborhoods.

The Station Area Plan projections are the basis for measuring the environmental effects of the Plan, and may also be used in future years by the City to measure progress in implementation of the Station Area Plan. The potential development proposed at each opportunity site is identified in Table III-1, and Table III-2 shows a development summary for the Plan area. A description of each opportunity site, grouped by sub-area, is provided below.

Table III-1: Opportunity Site Development Projections Summary

Opportunity Site	Existing Development (square footage)		Proposed Station Area Plan New Development (square footage, dwelling units, acres)		Total Development on Opportunity Sites (Existing + Proposed) (square footage, dwelling units, acres)	
	Type	Amount	Type	Amount	Type	Amount
1. Ferry Terminal [a]	Public Facility/ Transit	25,000 sf	Public Facility/ Transit	– sf	Public Facility/ Transit (to remain)	25,000 sf
			Residential	300 DU	Residential	300 DU
			Retail	2,500 sf	Retail	2,500 sf
2. Marin Airporter	Public Facility/ Transit	2,500 sf	Public Facility/ Transit	– sf	Public Facility/ Transit (to remain)	2,500 sf
3. Larkspur Offices and Cinema	Office (Admin & Prof)	190,000 sf	Office	50,000 sf	Office	240,000 sf
	Retail (Cinema)	16,000 sf	Retail	35,000 sf	Retail (incl. Cinema)	51,000 sf
4. Marin Country Mart [c]	Office (Admin & Prof)	45,000 sf	Residential	300 DU	Residential	300 DU
	Retail (Cinema)	175,000 sf	Retail	40,000 sf	Retail	215,000 sf
5. Sanitary District	Vacant [b]	–	Residential	250 DU	Residential	250 DU
			Hotel	60,000 sf	Hotel	60,000 sf
			Office	12,500 sf	Office	12,500 sf
6. Drake's Landing Office Park	Office (Admin & Prof)	126,000 sf	Office	– sf	Office (to remain)	126,000 sf
			Residential	70 DU	Residential	70 DU
7. Offices on Drake's Landing Road	Office (Admin & Prof)	18,000 sf	Office	22,000 sf	Office	40,000 sf

[a] Shared parking strategies and parking counts on all sites will be subject to the parking ratios and parking demand management strategies described in Chapter 5 of the Station Area Plan.

[b] Ordinances 951 and 954 approved the precise development plans for residential (126 DUs) and hotel (64,000 sf) development, respectively. Reso. 34/05 amended the land use category for a portion of the parcel to Public Facilities; however, there was never a precise plan approval for exact square footage allowances and other development standards for the public facilities portion of the property.

[c] Under the Opportunity Site Development Projections, 45,000 sf of office space would be removed from Opportunity Site 4, the Marin Country Mart.

ac = acres
du = dwelling units
FAR = floor area ratio
sf = square feet

Source: Larkspur, City of, 2014. *Larkspur SMART Station Area Plan, Public Review Draft*. February.

Table III-2: Summary of Development in Plan Area

Land Use	Existing Development in Plan Area	New Development on Opportunity Sites	Total Development In Plan Area (Existing + Proposed)
Office/Public	750,800 sf	39,500 sf	790,300 sf
Hotel	119,000 sf	60,000 sf	179,000 sf
Retail/Cinema	317,000 sf	77,500 sf	394,500 sf
Residential	1,350 du	920 du	2,270 du
Industrial/Auto-Serving	245,000 sf	0 sf	245,000 sf

du = dwelling units
sf = square feet

Note: Please note that 45,000 sf of office space would be removed from Opportunity Site 4, the Marin Country Mart site..

Source: Larkspur, City of, 2014. *Larkspur SMART Station Area Plan, Public Review Draft*. February.

a. Larkspur Landing Area (Sub-Area 1A). The majority of development in the Plan area is proposed for the Larkspur Landing Area due to its proximity to the SMART Station and the Ferry Terminal. The Plan anticipates transit-oriented development in this area with a full complement of residential, office, retail and entertainment uses.

Full build-out of the potential development on each property in the Larkspur Landing Area would require construction of structured parking. In addition, replacement parking for ferry patrons would also be required. This Draft EIR does not analyze the potential environmental effects of the structured or replacement Ferry Terminal parking projects which would be addressed under a separate CEQA analysis on a project-by-project basis. Recommended land uses for each opportunity site in the Larkspur Landing Area are described below.

(1) Ferry Terminal (Opportunity Site 1). Per the planning process, it was determined that the Ferry Terminal site could accommodate new residential development, replacement parking for commuters, and an improved waterfront promenade and public park. Similar to other waterfront parks in southern Marin (Dunphy Park in Sausalito and Shoreline Park in Tiburon), this space could be the location for civic events or simply for daily enjoyment by residents and commuters. A small amount of ground-floor retail development, such as a café or convenience store, could be included for use by residents, park users, and ferry commuters.

(2) Marin Airporter (Opportunity Site 2). The Marin Airporter site is small but located in close proximity to the planned SMART Station. It serves an important regional transportation role, provides long-term parking for local airport users, and also accommodates overflow parking demand generated by ferry terminal users. The Larkspur General Plan includes a goal to retain the Marin Airporter in the Larkspur Landing area, and there was strong sentiment among community members to ensure the viability of this use. As such, the site is proposed to remain in use for the Marin Airporter, with the option to construct a parking structure to accommodate a variety of parking needs and ground-level office space or waiting areas for the Airporter.

(3) Larkspur Landing Offices and Cinema (Opportunity Site 3). The Larkspur Landing Offices and Cinema site is located directly adjacent to the SMART Station site. These conditions make the site suitable for additional office development in line with the Plan goals to foster transit

supportive development. There is also potential for expansion of the cinema and some additional retail amenities.

(4) Marin Country Mart (Opportunity Site 4). The Marin Country Mart site has the potential to accommodate new residential uses and additional retail. New residential development could be added around the periphery of the existing retail center, or the entire site could be redeveloped with vertical mixed-use (residential over a retail center). It is anticipated that parking to replace existing spaces and support additional development would be located either below structures (podium) or in a new parking structure.

(5) Sanitary District #1, 2000 Larkspur Landing, (Opportunity Site 5). Development on the Sanitary District #1 site would represent a significant change from the current condition, as the site is undeveloped at this time aside from occasional staging and other temporary uses by the Sanitary District #1. The Station Area Plan identifies residential, office, and hotel uses on the site. These uses are consistent with the currently approved preliminary and precise development plans for the site,[5] with the exception that the Station Area Plan would allow for higher residential densities than currently adopted.

b. Greenbrae Area (Sub-Area 1B) – (Opportunity Sites 6 and 7). There is potential for some additional office and residential infill development on the two identified opportunity sites west of U.S. 101 and south of Sir Francis Drake Boulevard. This development could occur on the existing surface parking lots or as part of site redevelopment over time. A planned multi-use path over Sir Francis Drake Boulevard will provide a connection for bicyclists and pedestrians from the Greenbrae area to and from the SMART Station.

c. Redwood Highway Area (Sub-Area 2). The Station Area Plan proposes no change in land use in the Redwood Highway Area. This area currently supports a viable range of industrial, commercial, and affordable housing uses which are unique within Larkspur, and there are significant infrastructure challenges to resolve before any additional development can be considered.

4. Access, Circulation and Parking

The Station Area Plan takes an integrated land use and transportation approach to provide flexibility but monitors development so as to minimize traffic impacts. To reduce the impact of new vehicle traffic on the roadway network, the Station Area Plan proposes a vehicle trip cap and a Transportation Demand Management (TDM) program.

The vehicle trip cap will limit the increase in vehicle trips from the Plan area to approximately 10 percent above the existing traffic generated by the uses in the area. A monitoring program will be implemented by the City to periodically measure this traffic to ensure that traffic conditions are not significantly worsened by development in the Plan area.

The mixed use, transit-oriented development proposed in the Station Area Plan has been proven to have lower trip generation rates than traditional, suburban-type development when located in

[5] City of Larkspur Ordinances 948, 951 and 954.

proximity to transit. To further manage traffic generation, a TDM program will be implemented in the area. Consisting of strategies such as parking pricing, transit discounts, and shared parking, the TDM program will further limit the generation of trips by new development in the Plan area. It is estimated that the combination of TDM measures and the mixed-use, transit-oriented development land uses called for in this Plan, will result in a mode shift of 5 to 10 percent from auto to non-auto modes.

To promote and encourage all modes of transport, the Station Area Plan encourages the concept of "Complete Streets." Complete street practices improve circulation for all modes because they encourage the design of streets with well-connected and comfortable sidewalks and bike paths, traffic calming measures to manage vehicle speeds, enhanced street crossings, and increased access to transit. Incomplete streets—those designed primarily for automobile access—can be a barrier in any community, particularly for people with disabilities, older adults, and children.

5. Urban Design Guidelines

Urban Design Guidelines are included in the Station Area Plan and are meant to assist property owners, residents, tenants, the community, and decision-makers when considering proposals for change within the Plan area. The Urban Design Guidelines address: guiding principles; the physical character of four geographic zones within the Plan area; building and site design components; sustainable building and site design; the public environment; and accessibility.

6. Amendments to the Zoning Ordinance

In order for the potential development identified in the Station Area Plan to occur, several amendments to the Zoning ordinance would be necessary. These proposed amendments are described below:

Zoning Map

The zoning designation of the Larkspur Ferry Terminal site would be changed from Study District (S) to Planned Development (PD). (Policy Recommendation LU-12)

Density Bonuses

- Adopt a density bonus ordinance to provide density bonuses and other incentives for projects including senior and affordable housing, consistent with State law. Encourage an increase in the supply of well-designed housing for extremely low, very low, low and moderate income households. Bonuses shall also be available for development projects that generate fewer vehicle trips. Bonuses shall be weighted to incentivize development that generates non-peak period trips. (Policy Recommendations LU-8 and LU-9)

Off-Street Parking and Loading

- Amend the Off-Street Parking and Loading chapter of the Larkspur zoning ordinance to:
    - Include required parking ratios for new land use designations recommended by the Plan;
    - Reduce off-street parking requirements and take advantage of shared parking opportunities in the station area;

  - Establish parking maximums;
  - Establish a parking management district utilizing innovative payment, information and monitoring technologies;
  - Allow developers to pay in-lieu fees to reduce parking provisions where appropriate; and
  - Allow for unbundled parking.
- Amend the bicycle parking requirement to increase required spaces and facilities. (Policy Recommendation LU-11)

Affordable Housing Fund and Inclusionary/In-Lieu Fee Requirements

- Update the City's existing Inclusionary Housing ordinance and conduct a new nexus study to implement an updated affordable housing in-lieu fee citywide. The fee will generate revenue for an affordable housing trust fund that provides gap financing for affordable housing projects, including any proposed in the Plan area.

Planned Development Districts

The key development opportunity sites identified in the Station Area Plan are located within the Planned Development (PD) zoning district. In Larkspur the PD District has been used to allow a mixture of uses, building intensities and design characteristics that would not normally be permitted in any single-use zoning district of the City. Generally, PD Districts are applied to tracts of land "subject to potential development and where coordination of such development is essential to achieve unique and innovative community design."

Continuation of the PD zoning will allow appropriate scrutiny and control of any development proposals in the Plan area and will require the following steps:

- Developer submits preliminary development plan showing the proposed land uses and densities.
- Planning Commission reviews and recommends approval to City Council.
- Preliminary development plan approved by ordinance by City Council.
- Developer submits precise development plan showing the design and location of all buildings, parking, recreation or open space, landscaping, and multi-modal circulation.
- Planning Commission reviews for conformance with preliminary development plan and recommends approval to City Council.
- Precise development plan approved by ordinance by City Council.

Project approvals in the PD district will be guided by the new General Plan land use designations – Mixed-use and Administrative and Professional Two – that apply to the Plan area opportunity sites.

7. Amendments to the General Plan

Several specific modifications are proposed to the General Plan to adopt and implement the Station Area Plan and are necessary in order for the potential development identified in the Station Area Plan to actually occur. These modifications are described below.

The draft Station Area Plan recommends that the City amend the land use designations within the Plan area to allow a mix of land uses at higher densities and intensities than are currently permitted. Thus, adoption of the Station Area Plan by the City Council would trigger a new, separate planning process to amend the General Plan; it would not automatically amend the General Plan. The General Plan amendment process would require public outreach and review, environmental analysis of the proposed amendments, and public hearings before both the Planning Commission and City Council for adoption.

Land Use Element

In order to allow for land use flexibility on most of the opportunity sites, the Station Area Plan proposes to add two new land use designations (Mixed-Use, and Administrative and Professional Two) requiring amendments to the General Plan Land Use element and Land Use Map. These land use designations are shown in Figure III-4 and are described below. These and other recommended General Plan amendments are described below:

> Policy Recommendation LU-1: Amend the Land Use Element of the General Plan to identify seven (7) sites within the Larkspur SMART Station Area as priority sites for possible future transit-supportive development with primary preferred/recommended land uses as follows:
>
> 1. Ferry Terminal (Opportunity Site #1) – residential
> 2. Marin Airporter (Opportunity Site #2) – parking structure and office support
> 3. Larkspur Cinema and Offices (Opportunity Site #3) – office and retail/cinema
> 4. Marin Country Mart (Opportunity Site #4) – residential, retail
> 5. Ross Sanitary District No. 1 (Opportunity Site #5) – residential, hotel, office
> 6. Drakes Landing Office Park (Opportunity Site #6) – residential, office
> 7. Drakes Landing Road (Opportunity Site #7) – office

Mixed-Use Land Designation. A new Mixed-Use land use designation is proposed by the Station Area Plan:

> Policy Recommendation LU-2: Amend the General Plan to add a new Mixed Use land use designation which will allow residential, office, retail and hotel in configurations and uses consistent with this plan, for the following sites:
>
> 1. GGBHTD Ferry Terminal (Opportunity Site #1)
> 2. Larkspur Cinema and Offices (Opportunity Site #3)
> 3. Marin Country Mart (Opportunity Site #4)

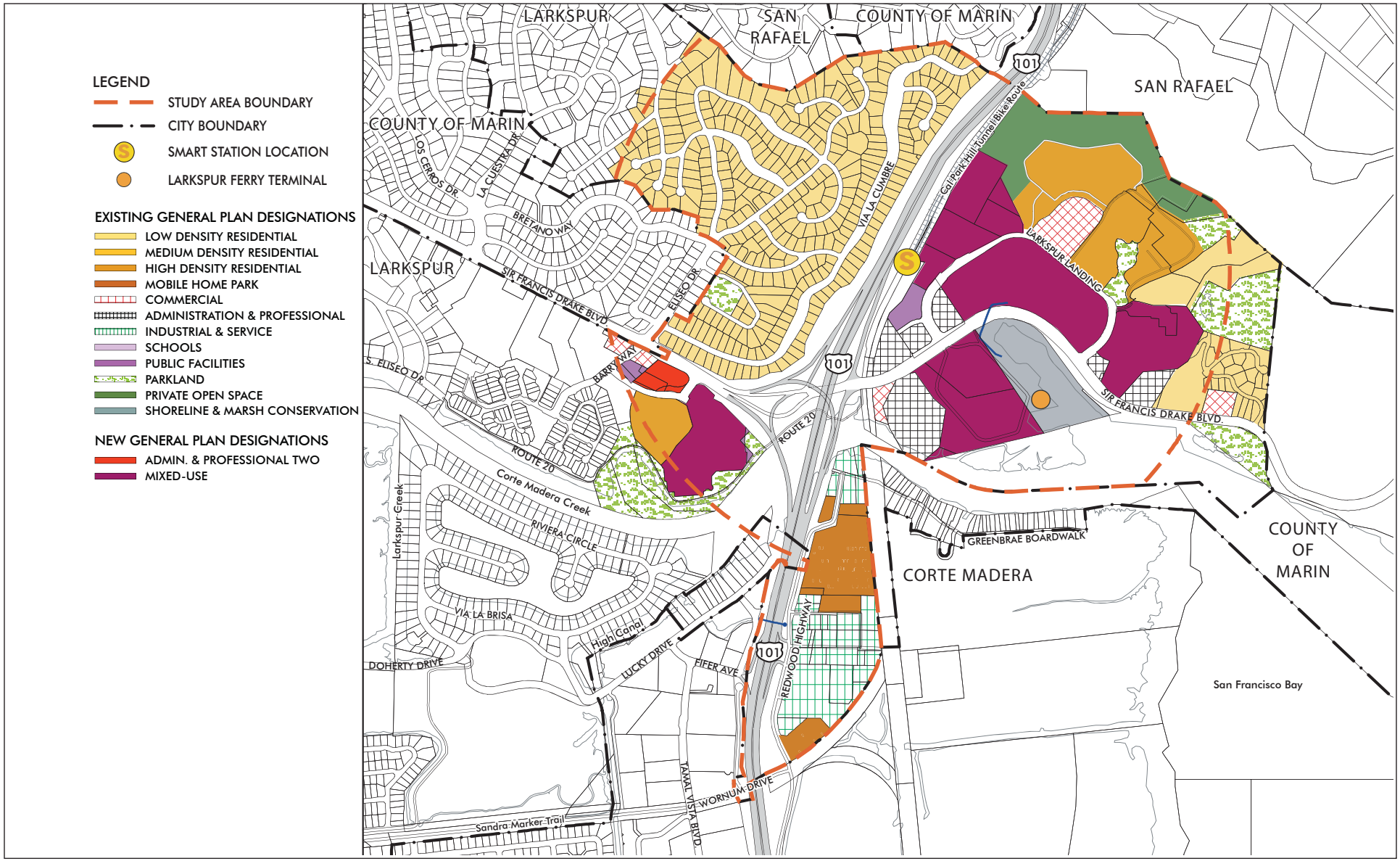

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FIGURE III-4

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City of Larkspur SMART Station Area Plan EIR

Existing and Proposed General Plan Designations

SOURCE: CITY OF LARKSPUR, DECEMBER 2013.

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4. Ross Sanitary District No. 1 Site (Opportunity Site #5)
5. Drakes Landing Office Park (Opportunity Site #6)

The Mixed Use land use designation should allow the following ranges of development density:

- Residential: 20-35 dwelling units per acre (net)
- Office: 0.5-1.0 FAR (floor area ratio)

The intensity ranges are indicative of the need to ensure that any new development in the area is implemented at densities that are transit-supportive. The lower end represents an intensity of residential or office development that is low by overall transit-oriented development standards, but still suitable to a "transit neighborhood" area, and consistent with the existing scale of development in Larkspur. The upper end of the range provides a benchmark for development that can be accommodated within a height and configuration that would not exceed the existing urban design character of the Plan area.

Administrative and Professional Two (Higher-Density). A new Administrative and Professional land use designation – Administrative and Professional Office Two – has been proposed to support increased office densities suitable in a transit-oriented village environment. This would be applied only to the Drakes Landing Road Offices opportunity site.

Policy Recommendation LU-3: Amend the General Plan to add a new land use designation – Administrative & Professional 2 (A-P2) to apply to the Drakes Landing Road site. The Administrative and Professional 2 (A-P2) land use designation should allow office development at a density of 0.5 – 1.0 FAR.

Other Land Use Element Policy Recommendations. The following recommendations are also proposed for the Land Use Element:

Policy Recommendation LU-4: The total maximum new development that would be allowed within the Station Area is illustrated in Table 4.1 of the Station Area Plan. Specific development on any individual parcel is not required to match the illustrative development assigned in this table.

Policy Recommendation LU-5: No new development would be approved in the Station Area until transportation and traffic management programs are in place.

Policy Recommendation LU-6: Amend the General Plan Land Use Map to incorporate the Larkspur SMART Station Area Plan land use designations (Figure 4.3 of the Station Area Plan).

Policy Recommendation LU-7: The PD zoning designation for properties in the SMART Station Area should be retained to ensure thorough review of all future development proposals.

Circulation Element

The following draft policy recommendations are proposed to be made to the Circulation Element:

Policy Recommendation ACP-1: The Circulation Element of the General Plan should be amended to address the City's intent to implement a Transportation Management Association and Trip Cap program that would apply to the station area. Participation in the TMA shall be required for all new development within the station area, and shall be strongly encouraged for all existing development within the station area. The vehicle trip cap program should include assessment of baseline data and annual monitoring of conditions as a means of managing development within the station area. The City should identify a proportional share of the 10 percent increase in traffic generation to each opportunity site so that traffic increases occur incrementally with each development.

Policy Recommendation ACP-2: Limit the future increase in vehicle trips from the station area to no more than 10 percent above the current traffic generated by the station area. Development that generates trips exceeding this trip cap should not be permitted until traffic improvements and TDM measures can reduce trip generation to this level.

Policy Recommendation ACP-3: Amend the existing Trip Reduction ordinance (LMC 18.13) to update program policies and ensure it adequately incorporates the Transportation Demand Management strategies proposed by this Plan.

Policy Recommendation ACP-4: All development projects within the station area should be required to submit a trip reduction and parking management plan as part of the development application. The zoning code should be modified to establish a threshold defining projects such as remodeling or additions to existing development within the station area that trigger comprehensive TDM requirements.

Policy Recommendation ACP-5: Work with SMART and GGBHTD to study an alternative location for the Larkspur SMART station in the vicinity of the ferry terminal.

Policy Recommendation ACP-6: In order to address existing traffic constraints, amend the Circulation Element of the General Plan to emphasize the City's intent to work with appropriate agencies to implement the following improvements to Sir Francis Drake Boulevard:

1. Add a third eastbound through lane approaching Eliseo Drive through to the U.S. 101 southbound on-ramp.
2. Stripe a third westbound through lane approaching Larkspur Landing Circle (West) through to northbound U.S. 101 on-ramp.
3. Work with Caltrans and the County of Marin to improve and re-time traffic signals between Eliseo Drive and Larkspur Landing Circle (East) to more effectively accommodate future traffic volumes.
4. Work with the City of San Rafael to study the feasibility of signalizing the intersection at Anderson Drive or considering alternate design solutions to improve traffic flow at that intersection.

Policy Recommendation ACP-7: Amend the Circulation Element of the General Plan to require Complete Streets improvements, as described in this Plan, to streets within the station area, to support pedestrian, bicycle and transit use in the station area, including:

- Improvements to Sir Francis Drake Boulevard such as extending sidewalks and improving the Remillard Park trail.
- Improvements to Larkspur Landing Circle including adding missing sidewalks, adding bicycle lanes if feasible, and adding complete crosswalks at all intersections.
- Along Redwood Highway, implement pedestrian improvements such as sidewalks, crosswalks and bicycle lanes to ensure safe multi-modal access.
- Require new lanes within development areas to be designed to calm traffic while providing adequately scaled sidewalks and pedestrian and bicycle amenities.
- Ensure that a fine grain of pedestrian walkways are provided throughout existing and new development to encourage walking to destinations within the station area and to transit facilities.

Policy Recommendation ACP-8: Ensure accessibility to pedestrians of all abilities, including seniors and the disabled, by implementing improvements described in this Plan on priority accessible paths of travel.

Policy Recommendation ACP-9: Incorporate standards and guidelines for street designs and improvements (e.g., to Larkspur Landing Circle) into capital planning and the General Plan.

Policy Recommendation ACP-10: Retain language in the General Plan that supports local and regional efforts to improvement pedestrian and bicycle circulation and facilities.

Policy Recommendation ACP-11: Retain language in the General Plan that supports working with Marin Airporter to ensure retention of this important service in the Larkspur Landing area.

Policy Recommendation ACP-12: Amend Chapter 18.56 of the Larkspur Municipal Code to reflect required parking ratios for new land use designations identified in the Station Area Plan.

Policy Recommendation ACP-13: Coordinate with GGBHTD to identify and manage ferry- related parking on site or in off-site locations, including opportunities for shared parking.

Housing Element

The following policy recommendations are proposed to be made to the Housing Element:

- The City shall ensure that existing affordable housing preservation and production policies are retained in subsequent updates of the Housing Element.
- Add policy language addressing the City's intent to conduct a study to assess the feasibility of creating new commercial and residential linkage fee that would generate revenues for an affordable housing trust fund.
- Add policy language addressing the City's intent to monitor the status of the two Redwood Highway mobile home parks and engage property owners and residents in discussions as necessary to explore options for replacing this vital housing resource with new affordable development at comparable area median income (AMI) levels on the existing sites or at other location in the Plan area.
- Add policy language addressing the City's intent to, as necessary and appropriate, plan for the provision of housing to replace the mobile home units in the Redwood Highway area as the existing units begin to become inhabitable and flooding issues become more acute.

Urban Design Guidelines

The following policy recommendations are proposed to be made regarding Urban Design Guidelines:

Policy Recommendation UDG-1: Amend the General Plan to reference the Urban Design Guidelines of the Station Area Plan and incorporate the guidelines into appropriate city documents.

Policy Recommendation UDG-2: Promote a development pattern in the SMART Station Area that accommodates convenient pedestrian and bicycle circulation.
Policy Recommendation UDG-3: Ensure that the design of any new buildings in the Station Area is consistent with the intent and guidelines of the Station Area Plan and, in so doing, respects the unique character of the Larkspur community.

Policy Recommendation UDG-4: Require incorporation of sustainable design strategies in new construction and renovations consistent with the Station Area Plan guidelines and with other City of Larkspur policies and plans.

Policy Recommendation UDG-5: Implement design improvements in the Station Area, in cooperation with local property owners, that will continue to reinforce the special identity of the Larkspur Landing area, including elements such as signage and public art.

Policy Recommendation UDG-6: Pursue implementation of enhanced public open space in two locations – at the southern edge of the Country Mart and at the southeastern edge of the ferry terminal parking lot – to provide special Larkspur open space with views to the Bay and surrounding hillsides and Mount Tamalpais.

Policy Recommendation UDG-7: Pursue improvements to Miwok and Remillard Parks to ensure their utility and enjoyment by a wide cross-section of the Larkspur community.

Public Facilities and Services

The following policy recommendations are proposed to be made regarding public facilities and services:

Policy Recommendation PFS-1: As projects are proposed in the Station Area, work with local utilities to ensure availability of service and to require improvements as needed.

Policy Recommendation PFS-2: Continue to coordinate with and support relevant school districts' efforts to provide adequate capacity for any increased demand associated with future development. Also work with the districts to consider reconfiguration of district boundaries to minimize community separation, especially in the Larkspur Landing area.

Policy Recommendation PFS-3: As new development is proposed in the Station Area, coordinate review with the Larkspur Fire Department and Central Marin Police Authority to identify and mitigate any additional service needs and ensure continuation of adequate public services.

Policy Recommendation PFS-4: Through the Planned Development (PD) review process, encourage land owners and/or developers to include publicly-accessible open space in new development.

F. ANTICIPATED ADOPTION AND IMPLEMENTATION

The Larkspur Planning Commission will review this Draft EIR, along with the accompanying draft version of the Station Area Plan. The Planning Commission will first review the Final EIR and consider whether to recommend certification to the City Council. The Planning Commission will then provide a recommendation on the Final EIR and the Station Area Plan to the City Council, who will then consider certification of the Final EIR and adoption of the Draft Station Area Plan. The City will be responsible for implementing the Station Area Plan through the development review process and the monitoring and issuance of permits.

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IV. SETTING, IMPACTS AND MITIGATION MEASURES

The chapter contains an analysis of each topic that has been identified as posing potentially significant impacts and, as such, constitutes the major portion of this Draft EIR. Sections A through L of this chapter describe the environmental setting of the City of Larkspur as it relates to each specific environmental topic. The impacts resulting from implementation of the Station Area Plan, and mitigation measures that would reduce impacts of the project, if necessary, are also presented in each section.

A. DETERMINATION OF SIGNIFICANCE

Under CEQA, a significant effect is defined as a substantial, or potentially substantial, adverse change in the environment.[1] The *CEQA Guidelines* direct that this determination be based on scientific and factual data. Each impact evaluation in this chapter is prefaced by criteria of significance, which are the thresholds for determining whether an impact is significant. Staff from the City of Larkspur and the consulting firm of LSA Associates, Inc., have developed these criteria in a cooperative process using the *CEQA Guidelines*.

B. ISSUES TO BE ADDRESSED IN THE DRAFT EIR

The following environmental issues are addressed in this chapter:

A. Land Use and Planning Policy
B. Transportation and Circulation
C. Air Quality
D. Global Climate Change
E. Noise
F. Biological Resources
G. Geology, Soils and Seismicity
H. Hydrology and Water Quality
I. Hazards and Hazardous Materials
J. Cultural Resources
K. Public Services
L. Utilities and Infrastructure

[1] Public Resources Code Section 21068.

C. FORMAT OF ISSUE SECTIONS

Each environmental issue section has two main subsections: 1) Setting, and 2) Impacts and Mitigation Measures. Any identified significant impacts are numbered and shown in bold type, and the corresponding mitigation measures are numbered and indented. Significant impacts and mitigation measures are numbered consecutively within each topic and begin with a shorthand abbreviation for the impact section (e.g., LU for Land Use). The following abbreviations are used for individual topics:

LU:	Land Use and Policy Planning
TRANS:	Transportation and Circulation
AQ:	Air Quality
GCC:	Global Climate Change
NOISE:	Noise
BIO:	Biological Resources
GEO:	Geology, Soils and Seismicity
HYDRO:	Hydrology and Water Quality
HAZ:	Hazards and Hazardous Materials
CUL:	Cultural Resources
PS:	Public Services
UTIL:	Utilities and Infrastructure

The following notations are provided after each identified significant impact and after identification of mitigation measures:

SU	Significant and Unavoidable
S	Significant
LTS	Less than Significant

These notations indicate the significance of the impact before and after mitigation.

CUMULATIVE IMPACT ANALYSES

CEQA defines cumulative impacts as “two or more individual effects which, when considered together, are considerable, or which can compound or increase other environmental impacts.” Section 15130 of the *CEQA Guidelines* requires that an EIR evaluate potential environmental impacts that are individually limited, but cumulatively significant. These impacts can result from the proposed project alone or together with other projects.

For the evaluation of cumulative impacts, CEQA allows the use of either a list of past, present, or reasonably anticipated relevant projects, including projects outside the control of the lead agency, a summary of the projections in an adopted planning document or a thoughtful combination of the two.

The cumulative impacts analysis is included in the topical sections in Subsection 2, Impacts and Mitigation Measures, of each section. For this EIR, the cumulative traffic analysis and, therefore,

cumulative air quality, noise, and global climate change analyses, is based on the projected conditions in 2035 with the project.[2]

For all other topic areas, the cumulative impacts analysis used information provided by the Association of Bay Area Governments (ABAG) in their ABAG Projections[3] that takes into account the adopted plans of all Bay Area jurisdictions, the most available U.S. Census data, and information concerning reasonably anticipated projects provided by the City of Larkspur.

[2] This scenario is based on the Highway 101 Twin Cities/Greenbrae Corridor Improvement Project (GCIP) "No Build" (no changes to U.S. 101) Cumulative Conditions scenario developed for the GCIP. The GCIP model assumed land uses in Sub-area 1A and Sub-area 1B that are similar to the proposed project. The Marin County Travel Demand Model served as the travel demand forecasting (TDF) model for the GCIP. The base year model was calibrated and validated for 2005 conditions and the forecast year model represents 2035 conditions. The future year model includes recently completed infrastructure projects and accounts for the increase traffic demand served through the Plan area due to these improvements. This model utilizes the EMME/2 software platform along with recent land use and road network information to forecast the regional demand to 2035. While the model was developed by Marin County, it covers the entire nine-county San Francisco Bay Area and includes detailed zone and network systems within Marin, Sonoma, and San Francisco Counties.

[3] As described in the 2009 ABAG report, development potential was estimated using general plans, specific plans and other municipal planning documents. For Larkspur, the General Plan document was adopted in 1990, long before the SMART rail line was considered or the Station Area Plan was prepared. The City is currently in the process of updating its 1990 General Plan, and the Larkspur SMART Station Area Plan will be incorporated into the General Plan Update, providing guidance for the future of the Station area.

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A. LAND USE AND PLANNING POLICY

This section describes existing land uses in the Plan area, land trends within the Plan area, and relevant planning documents and polices. Much of the information within this section is adapted from the Larkspur SMART Station Area Plan Existing Conditions Report[1] and the Draft Larkspur SMART Station Area Plan.[2] Potential land use and planning policy impacts that would result from the adoption and implementation of the Station Area Plan are also examined.

1. Setting

This section describes the Plan area context, development history, existing land uses, and applicable land use policy documents and regulations.

a. Plan Area Context. The City of Larkspur is located in Marin County, bordered to the north by San Rafael, to the southeast by Corte Madera, to the south by Mill Valley, and to the west and north by the County of Marin. U.S. 101 runs north-south through the eastern portion of Larkspur, connecting south to San Francisco, and north through Marin to Sonoma County.

The Plan area consists of 405 acres located in eastern Larkspur, approximately 1.5 miles northeast of the City's downtown core, at the edge of San Francisco Bay. It is defined by a combination of the Larkspur jurisdictional boundary and a ½-mile radius around the planned SMART station location. The SMART station, representing the end of the SMART rail line as it comes south from San Rafael, is located in the SMART right-of-way that parallels U.S. 101, near the terminus of the Cal Park Hill Tunnel bike path, and behind and above the Century Larkspur Landing Cinema.

The Plan area is located where several jurisdictions converge, including Larkspur, San Rafael, Corte Madera and the County of Marin. It is intersected by U.S. 101 running north-south, and Sir Francis Drake Boulevard running roughly east-west. The Corte Madera Creek flows east-west as well through the Plan area. As shown in Figure III-2, the Plan area has been divided into two geographic Sub-areas (1 and 2), with Sub-area 1 further divided into areas 1A and 1B.

b. Development History. This part of Larkspur was originally inhabited by the Miwok Indians. The Spanish came to the area in the early 1800s. In 1824 the area became part of the Mexican Republic, and it was then relinquished to the United States in the 1840s.

The first significant settlement occurred just outside the Plan area in the 1850s, with California's first prison, San Quentin State Prison, and the adjacent San Quentin Village. In the early 1890s, the Green Brae Brick Yard, owned by the Remillard Brick Company, began making bricks. The brick yard supported a small community of laborers who lived nearby. The community included 16 cabins for workmen, a cookhouse, stable, blacksmith shop, vegetable gardens, and an orchard.

Just outside the Plan area and under the jurisdiction of Marin County is Greenbrae Boardwalk, a small community of waterfront houses along Corte Madera Creek. The first ark (floating house) landed at

[1] BMS Design Group, 2012. *Larkspur SMART Station Area Plan Existing Conditions Report.* July 31.

[2] Larkspur, City of, 2014. *Larkspur SMART Station Area Plan, Public Review Draft.* February.

Greenbrae Boardwalk in 1903. The Greenbrae Boardwalk community developed in the 1920s and 30s. Over the years, the arks have transitioned from houses on barges to houses on foundations above the mean high tide line. Today there are 49 homes.

The Hutchinson Quarry began full-scale operations in 1924 in the area below the ridge in Larkspur Landing, using barges to supply quarried crushed rock to various locations around the Bay Area.

In the 1940s, residential development in the Greenbrae Hills neighborhood began. At that time, the Northwestern Railroad was extended south from San Rafael to provide a direct commute line to Point Tiburon. The GreenBrae Station stood near the future SMART station location. Rail freight traffic continued along this line until the 1980s.

The Larkspur Ferry Terminal began its operations in 1976. Development of the Larkspur Landing Area, with offices and the shopping center, was begun in 1978 and was designed to resemble a New England seaport town. Under new ownership and renamed, the Marin Country Mart has recently been renovated. The Courtyard by Marriott Hotel opened in 1987, and 248 condominiums (currently leased as apartments) at Larkspur Courts were added in 1991. Since then, the completion of Serenity and Drake's Way have created a large community of multi-family housing upon the hillside.

c. Existing Land Uses. A wide range of land uses exist within the Plan area. The area east of U.S. 101 includes the following uses: the Larkspur Ferry Terminal; shopping center; office uses; the theater; a hotel; and high density residential uses. West of the freeway, the Plan area is dominated by single-family residential, with a small amount of office and retail uses. Table IV.A-1 illustrates the overall breakdown of land uses within the Plan area. Figure IV.A-1 illustrates the existing land use pattern. Land uses within each Sub-area are described below.

Table IV.A-1: Existing Land Uses, Acres & Dwelling Units within the Plan Area

Existing Land Use	Acres	Dwelling Units	Square Feet
Residential – Low Density	93	453	–
Residential – High Density	11	614	–
Residential – Mobile Homes	11	279	–
Administrative & Professional	31	–	645,000
General Commercial	33	–	509,000
Auto-Serving Commercial	6	–	68,000
Industrial & Service	7	–	184,000
Vacant	17	–	–
Public Facilities/Utilities	26	–	28,000
Public Park/Open Space	8	–	–
Private Open Space	19	–	–
Shoreline & Marsh Conservation	12	–	–

Source: *Larkspur SMART Station Area Plan, Public Review Draft.* February, 2014.

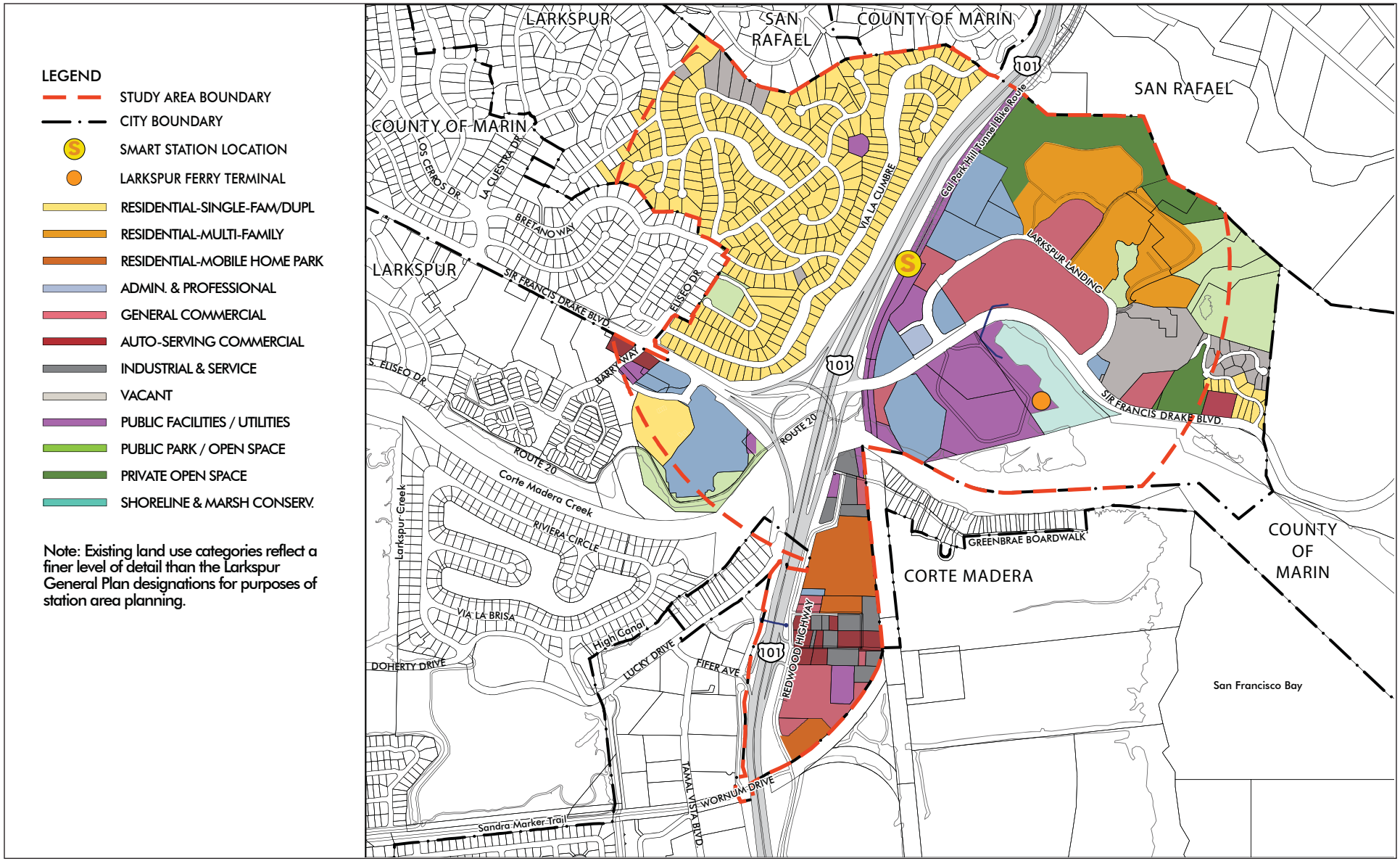

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FIGURE IV.A-1

City of Larkspur SMART Station Area Plan EIR

Existing Land Use

SOURCE: CITY OF LARKSPUR, OCTOBER 2013.

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(1) Sub-Area 1A – Larkspur Landing. Sub-area 1A (Larkspur Landing) consists of a mix of uses. The SMART railroad tracks parallel U.S. 101, and the proposed future SMART station site would be located behind the Century Larkspur Landing Cinema. North of Sir Francis Drake Boulevard, three-story offices line the western edge along the SMART railroad tracks in addition to the Marin Airporter terminal and parking lot, and the cinema. In the center of the Larkspur Landing Area, the Marin Country Mart is a one- and two-story shopping center consisting of over 35 shops, restaurants, services and professional offices in 12 buildings. The Marin Country Mart also includes outdoor uses, such as the farmers' market on Saturday and the Off the Grid Food Truck Extravaganza on Sunday.

Northeast of Marin Country Mart is the three-story Courtyard Hotel, a public park called Neighborhood Park, and three multi-family housing developments ranging from two to four stories in height: Larkspur Courts Apartments (248 units), Serenity at Larkspur (342 units) and Drake's Way (24 units). All three developments are comprised of rental properties. Drake's Way is an affordable housing development managed by EAH and provides housing to extremely-low and very-low income households.

Further east along Sir Francis Drake Boulevard are several office and commercial uses, ranging from two to four stories, the partially built-out single-family residential development of Drake's Cove, which ranges in height from one to three stories, and the parcel owned by Sanitary District No. 1. Above these parcels is a large expanse of hillside open space.

South of Sir Francis Drake Boulevard, the largest use is the Larkspur Ferry Terminal and its associated parking lot. Just west of the Larkspur Ferry Terminal site are four stories of office uses atop a tree-covered knoll (referred to as Wood Island), and two one- and two-story retail establishments adjacent to U.S. 101. East of the Ferry Terminal is an area of shoreline conservation. Remillard Park is located at the eastern edge of the Plan area along the waterfront.

(2) Sub-Area 1B – Greenbrae Area. The Greenbrae Area (Sub-area 1B) consists predominantly of the residential Greenbrae Hills neighborhood north of Sir Francis Drake Boulevard, and a mix of commercial, office, residential and open space uses south of the boulevard at Drake's Landing. The Greenbrae Hills neighborhood is a community of one- and two-story single-family homes built in the 1940s and 50s on small lots winding up the hillside. Within the Plan area are approximately 500 single-family homes. The Greenbrae School Park serves the neighborhood. There are a few vacant lots near the northern edge of the Plan area.

South of Sir Francis Drake Boulevard, at the western edge of the Plan area, are multi-family residential uses and the Bon Air Shopping Center, comprising a grocery store and over 50 shops and restaurants. East of Bon Air are two gas stations, Larkspur Fire Station No. 16, two office buildings, the Drake's Landing Office Park and the Drake's View Townhomes (42 units).

The Drake's Landing Office Park and Drake's View Townhomes are both two stories in height, and are set back from the waterfront to allow for the public waterfront multi-use path and open space. Niven Park, at the western edge of the Plan area, connects to the shoreline and a popular multi-use path that links this neighborhood east under the highway to Sir Francis Drake Boulevard and the Ferry Terminal.

(3) Sub-Area 2 – Redwood Highway Area. The Redwood Highway Area (Sub-area 2) consists of a mix of industrial, commercial and residential uses. The industrial uses, located at the northernmost point and in the center of the area, include storage facilities, light industrial manufacturing facilities, including a concrete manufacturing operation, and several auto-serving shops. The Cost Plus Plaza includes several large retailers, including a Cost Plus, BevMo and Trader Joe's. The residential communities in this area consist of three mobile home and RV parks. The buildings in this area are generally low in scale and height, predominantly one and two stories. The auto-serving and industrial uses provide necessary services not found elsewhere in the City, and the mobile home parks provide affordable housing.

d. Regulatory Setting. This subsection describes the federal, State, regional and local plans and regulations that address land use and development within and adjacent to the Plan area. A brief description of these regulatory documents is provided below.

(1) State Law. While not directly related to the Plan area, two statewide legislative efforts are shaping land use and transportation policy at the regional level. These legislative bills are described below.

Assembly Bill 32: Global Warming Solutions Act. The 2006 Global Warming Solutions Act (AB 32) requires specific actions for California to reduce greenhouse gas (GHG) emissions to 1990 levels by the year 2020, a reduction of approximately 25 percent statewide. A key focus of the measures is the reduction of total vehicle miles travelled (VMT) and a potential corresponding shift to alternative travel modes, including transit and bicycling. The SMART Station Area Plan supports AB 32 by planning for future growth to support ridership of the SMART train and Larkspur Ferry, thereby reducing VMT in single-occupancy vehicles.

Senate Bill 375: Sustainable Communities Act. SB 375 further implements the goals of AB 32 by directly linking land use planning with greenhouse gas emission reduction targets. The California Air Resources Board is required to set specific emissions reduction goals for metropolitan planning organizations, which in the Bay Area is the Metropolitan Transportation Commission (MTC). The GHG reduction targets for the Bay Area include a 7 percent reduction in per capita emissions by 2020 and a 15 percent reduction by 2035. SB 375 also requires regional planning agencies to create a Sustainable Communities Strategy (SCS) that includes a land use and transportation plan to meet the GHG targets. AB 32 and SB 375 have a direct influence on the future of public and multi-modal transportation and land use planning in Larkspur through State and regional mandates and funding programs.

(2) Regional and Local Initiatives. Regional and local initiatives that relate to the development of the Station Area Plan are described below.

Regional Housing Needs Allocation. The Regional Housing Needs Allocation (RHNA) is a State-mandated process for determining how many housing units, including affordable units, each community must plan to accommodate. The California Department of Housing and Community Development (HCD) determines the total housing need for a region. ABAG, working with local governments, develops an allocation methodology for assigning units, by income category, to each city and county in the nine-county Bay Area. Allocations for each jurisdiction are published in an

annual housing report. The SCS is required to incorporate the RHNA housing allocation statistics. In 2012, ABAG began developing a methodology for the next RHNA cycle (period 2014-2021).

Sustainable Communities Strategy/Plan Bay Area. Pursuant to SB 375, ABAG and MTC, in partnership with the Bay Area Air Quality Management District (BAAQMD) and the Bay Conservation and Development Commission (BCDC), have prepared the Bay Area's SCS. The SCS titled "Plan Bay Area," adopted in July 2013,[3] will serve as the regional blueprint for transportation, housing and land use focused on reducing driving and associated GHG emissions.

Plan Bay Area has three principal objectives:

1. Identify areas to accommodate all the region's population associated with Bay Area economic growth for the next twenty-five years.
2. Develop a Regional Transportation Plan that meets the needs of the region.
3. Reduce greenhouse-gas emissions from automobiles and light trucks.

A key focus of this effort is the reduction of greenhouse gas emissions through transportation and land use policies and funding incentives that would be implemented at the local level.

Moving Forward: A 25-Year Vision for Marin County. Moving Forward: A 25-Year Transportation Vision for Marin County (Moving Forward)[4] was produced by the Marin County Congestion Management Agency (commonly known as the Transportation Authority of Marin [TAM]), the Marin County Board of Supervisors, and the Marin County Transit District (Marin Transit). In response to growing congestion in Marin County, Moving Forward creates a framework for future decisions regarding transportation investments and improvements in the County. This vision for Marin includes the following key goals:

- Increasing travel choices is the only way to manage congestion and improve mobility.
- All modes will be linked together in a seamless, comprehensive transportation network.
- Local trips will be served by a variety of new and expanded options, improving mobility for all Marin County residents.
- Regional and inter-regional trips will be served by completion of the HOV system on U.S. 101, the implementation of a new commuter rail line, increased express bus service and increased ferry service.

Many of these goals build on current and planned projects and programs, such as the SMART system and Safe Routes to Schools. However, existing transportation funds only cover a fraction of the $1.6 billion in projects described in Moving Forward. In order to fill this funding gap, the report recom-

[3] Association of Bay Area Governments, Metropolitan Transportation Commission, 2013. *Draft Plan Bay Area, Strategy for a Sustainable Region*. March. Adopted with revisions July 18, 2013.

[4] Nelson\Nygaard Consulting Associates, 2003. *Moving Forward: A 25-Year Transportation Vision for Marin County,* prepared for the Marin County Congestion Management Agency.

mends developing an implementation plan that will prioritize projects, specify funding amounts, provide a phased implementation strategy, and establish performance measures.

San Quentin Area Bicycle and Pedestrian Access Study. Completed in February 2011, the San Quentin Area Bicycle and Pedestrian Access Study[5] looks at potential ways to improve bike and pedestrian access in the area surrounding San Quentin State Prison. As a key gap identified in the San Francisco Bay Trail Gap Analysis Study,[6] this area is also one of the top priority projects in the County as described in the 2008 Marin County Unincorporated Area Bicycle and Pedestrian Master Plan.[7] The 1.5-mile long study corridor runs along East Sir Francis Drake Boulevard and I-580, connecting the Richmond-San Rafael Bridge to the east and the existing bicycle path at Remillard Park to the west.

The western edge of the corridor abuts the eastern edge of the Plan area. The San Quentin Study presents three alternatives for bicycle and pedestrian facilities along East Sir Francis Drake, ranging from a Class I or II bike route along the south side and Class II or III bike route on the north side of East Sir Francis Drake Boulevard.

(3) City of Larkspur Plans, Policies and Programs. The following describes City of Larkspur policies and programs.

City of Larkspur 1990 General Plan. The 1990 General Plan[8] is the City's official policy document describing the City's vision and goals for the future. This policy document identifies the general location of future housing, office, commercial, industry, transportation facilities, parks and other land uses throughout the City. The General Plan includes the following elements: Land Use; Community Character; Circulation; Community Facilities and Services; Environmental Resources; Health and Safety; and Bicycle and Pedestrian Trails and Paths. The City is currently undertaking a General Plan update (as described below); however, until an updated General Plan is adopted, the 1990 General Plan serves as the existing guiding policy document for the City.

The 1990 General Plan includes a variety of goals, policies and actions related to land uses within the City, which are listed below:

Land Use Element

Goal 1: Maintain the overall residential character of Larkspur.

Goal 2: Preserve the integrity, cohesiveness, historic character, and residential environment of existing neighborhoods.

[5] Alta Planning + Design, 2011. *San Quentin Area Bicycle and Pedestrian Access Study.* February.

[6] Association of Bay Area Governments, 2005. *The San Francisco Bay Trail Project Gap Analysis Study.* August.

[7] Marin County Board of Supervisors, 2008. *Marin County Unincorporated Area Bicycle and Pedestrian Master Plan*. March.

[8] Larkspur, City of, 1990. *General Plan*.

- Policy a: Residential density standards shall consider neighborhood characteristics, existing uses, surrounding uses, impact on the traffic capacity of the street system, access to services, geotechnical conditions, and natural resources.
- Policy b: Residential development should not be at such a high density that it has an unacceptable impact on the street system serving the area.
    - Action Program [1]: Apply open residential standards (up to 0.2 unit per gross acre) to areas having special open space value. This designation is also suitable for areas with limited development potential because of their unusual configuration (e.g., railroad right-of-way) or difficult access.
    - Action Program [2]: Apply very low density residential standards (up to 1 unit per gross acre) to hillside areas with landsliding, seismic, or other geotechnical problems. This designation is also suitable for areas with special open space value.
    - Action Program [3]: Apply low density residential standards (up to 5 dwellings per gross acre) to hillsides and other environmentally sensitive areas, as well as within established low-density neighborhoods.
    - Action Program [4]: Apply medium density residential standards (up to 12 dwellings per gross acre) to areas near commercial districts, such as Old Downtown, if consistent with adjacent land uses.
    - Action Program [5]: Apply high density residential standards (up to 21 dwellings per gross acre) only in areas within easy reach of arterials, public transit, and commercial centers that provide a range of goods and personal services.
- Policy c: Allow maximum densities in the medium and high density residential categories as described in this Plan only in those developments that promote social and economic diversity and environmental benefits, and only where care is taken to preserve neighborhood scale and ambiance.

Goal 4: Maintain the existing neighborhood scale.

- Policy d: Limit the visual bulk of houses so that they fit in with neighboring homes and the physical setting.

Goal 5: Enhance the attractiveness and viability of existing commercial areas.

Goal 6: Encourage existing commercial districts (1) to provide an adequate mix of neighborhood-serving businesses, as well as second-story residential uses, and (2) to be accessible by means other than the auto.

- Policy e: Maintain existing retail commercial areas in attractive physical condition, and work to retain their special character and amenities.
    - Action Program [7]: For each defined commercial district, allow and encourage only those uses that reinforce the district's role, function, and scale.
- Policy f: Discourage the creation of new commercial areas.
- Policy g: Allow expansion of existing commercial areas only under conditions that will not be detrimental to the surrounding residential community or existing retail uses in the city, that will improve the City's economic base, and that will reinforce the role or function of the areas as defined in Action Program 7.
    - Action Program [8]: Require applicants for development approval to demonstrate conformance to Policy "g" satisfactory to the planning commission and city council.
- Policy h: Protect the integrity and cohesiveness of existing commercial areas.

- Action Program [10]: Minimize through traffic.
- Action Program [11]: Require new development to incorporate design features (building orientation, building materials, parking location, landscaping) that encourage pedestrian use and emphasize positive relationships with neighboring buildings and uses.

Goal 11: Maintain the present mix of retail, service, industrial, and residential uses in the Greenbrae East area.
Goal 12: Maintain and provide housing in Greenbrae East affordable to seniors and to young families.

- Policy o: Encourage trailer parks to remain in the Greenbrae East area.
  - Action Program [19]: Require new or expanded uses in Greenbrae East to be compatible with existing residential uses or to be sufficiently buffered from them to mitigate any negative impacts.
- Policy p: Ensure that new development in Greenbrae East retains a sense of the area's physical setting by providing vistas of the ridgelines and access to the adjacent creek, marshlands, and the Bay beyond.
- Policy q: Ensure that existing uses and new development in Greenbrae East are sensitive to the fragile environment of the adjacent marsh.
  - Action Program [20]: Allow access to the marshlands by people and pets only in designated areas.

Goal 13: On those lots where development or redevelopment is expected to occur, integrate natural features into new development, to the greatest extent reasonably feasible.

Goal 14: Maintain Larkspur's small-town character.

- Policy r: Establish guidelines for the use and development of properties where change is expected to occur.

Goal 15: Maintain the Northwestern Pacific Railroad right-of-way for public benefit.

Goal 18: Cooperate with other jurisdictions in solving regional problems, in protecting environmental resources, and in providing public services.

Community Character Element

Goal 2: Maintain Larkspur's livable and attractive environment.

- Policy b: Preserve the desirable features of the built environment as well as the remaining natural environment - trees, marshes, creeks, hillsides - as components of Larkspur's community character and identity.
- Policy k: Accommodate anticipated development and population growth in ways that will not damage Larkspur's historic, archaeological, and natural resources.
  - Action Program [14]: Establish design guidelines for property owners, developers, and public agencies to use with respect to land use and building construction in areas of identified historic, archaeological, or natural significance.
  - Action Program [15]: Review all public policies, and modify them as necessary, to support the policies of this chapter to protect and preserve historic, archaeological, and natural resources while protecting the general health, welfare, and safety of the public.

Open Space Element

Goal 1: Preserve and enhance a variety of open space features including ridgelines, the wetlands along the Bay and the creeks, wildlife habitats, view corridors, and other amenities which contribute to a sense of openness in Larkspur

Goal 4: Protect open space and shoreline/marsh conservation areas from degradation as a result of public facility needs such as roads, sewers or flood control.

- Policy i: Seek to balance the needs for community safety with the goal of protection of the environment.
  - Action Program [14]: When dredging Corte Madera Creek, protect the wetlands along the creek.
  - Action Program [15]: Plan future development of the ferry terminal so as to minimize impact on nearby creek and marshland habitats.

The General Plan includes a description of land use designations within the City and identifies the location of these on a Land Use and Circulation map. Land use designations define the type and intensity of development within the City. The General Plan land use designations located within the Plan area are described below and shown in the General Plan Land Use Map, shown in Figure IV.A-2.

- *Low Density Residential.* This category allows up to 5 dwellings per gross acre, which translates into approximately 10 persons per acre. One house is allowed on each lot, unless a building permit is granted for a second unit. The addition of second units could increase density up to 10 dwellings (20 persons) per gross acre. The lowest minimum lot size is 7,500 square feet on parcels that are flat or on slopes up to 10 percent and may increase up to 43,560 square feet (1 acre) for slopes ranging from 10 to 25 percent. (Some lots predate zoning restrictions and do not meet these requirements, but they are legal building sites.) The City may require minimum lot sizes as large as 10 acres for areas with Residential Master Plan zoning. The City may allow smaller lot sizes, multiple units on a single lot, and larger FARs where permitted by a specific plan or planned development district.
- *Medium Density Residential.* This category allows up to 12 dwellings per gross acre, which translates into about 24 persons per acre. Maximum density decreases with slope to a minimum of two units per gross acre for slopes greater than 45 percent.
- *High Density Residential.* This category allows up to 21 units (about 42 persons) per acre on a flat site (less than 10 percent slope). Maximum density decreases with slope to a minimum of two units per gross acre for slopes greater than 45 percent.
- *Mobile Home Park*. This is a residential category that allows only mobile homes and accessory uses, up to 14 units (about 28 persons) per gross acre. Its primary purpose is to protect existing mobile home parks from being converted to other residential or non-residential use. (Recreational vehicle parks are allowed with a conditional use permit.)
- *Commercial.* This designation provides for neighborhood shopping needs and the broader goods and service needs of residents of Larkspur and adjoining communities. It is characterized by businesses that rely on customers making trips by car, and those uses which do not necessarily benefit from the high-volume pedestrian concentrations found in shopping centers and Downtown. These include auto accessory stores, carpet stores, catering establishments, department stores, and the like, as well as uses allowed in Restricted Commercial areas. Second-story residential units over first story commercial uses are encouraged and

exempt from floor area ration restrictions, except as may otherwise be stated in a specific plan or planned development plan. Senior housing is preferred. Second-story residential density shall be limited by parking and height restrictions and mixed-use (i.e., commercial/ residential) housing shall not exceed 21 residential units per acre. Live/work units may be conditionally permitted. Buildings are comparable in scale to those in the Restricted Commercial category and have a maximum floor area ratio of 0.4. Hotels may be allowed to a maximum FAR of 1.0 where specific or master plans are required. The scale of such hotel structures would not be required to be comparable in scale to structures in the Restricted Commercial land use category, but shall be governed by an adopted specific or master plan.

- *Administrative and Professional.* This designation provides areas for office activities which serve local and regional needs. It allows administrative, executive, medical, dental, and business offices, some service establishments, medical supply sales, and laboratories. It is intended that Administrative and Professional Office areas will be characterized by buildings of low intensity and landscaped grounds. Floor area ratio should not exceed 0.35, and landscaped areas (including patios and walks) should cover at least 30 percent of the lot area.
- *Industrial and Service.* This designation provides for a wide variety of commercial, wholesale, service, and processing uses which are of value to the community at large. It allows warehousing, heavy commercial, auto sales and repair, food and drink processing, construction yards, print shops, and similar uses. Live/work units may be conditionally permitted. Floor area ratio should not exceed 0.4.
- *Schools.* This designation applies to public schools and their grounds. Floor area ratios should not exceed 0.25.
- *Public Facilities.* This designation applies to federal, State, County, special district, and publicly-owned City facilities, not including schools and colleges. Floor area ratio should not exceed 0.25.
- *Parkland.* This designation applies to active and passive parks, and linear parks (landscaped paths) in urban areas. The only structures allowed are shelters, restrooms, storage sheds, and other structures needed to accommodate public use or provide for maintenance of the land. Floor area ratio should not exceed 0.10.
- *Open Space.* This designation applies to any parcel of land or water which is essentially unimproved and is devoted to the preservation of natural resources, views, and wildlife habitats, the managed production of resources, outdoor recreation and education, or public health and safety. It may include publicly-owned lands as well as privately-owned lands set aside as open space through conditions of development approval. The only structures allowed are shelters, restrooms, storage sheds, and other structures needed to accommodate public use or provide for maintenance of the land. The floor area ratio should not exceed 0.10.

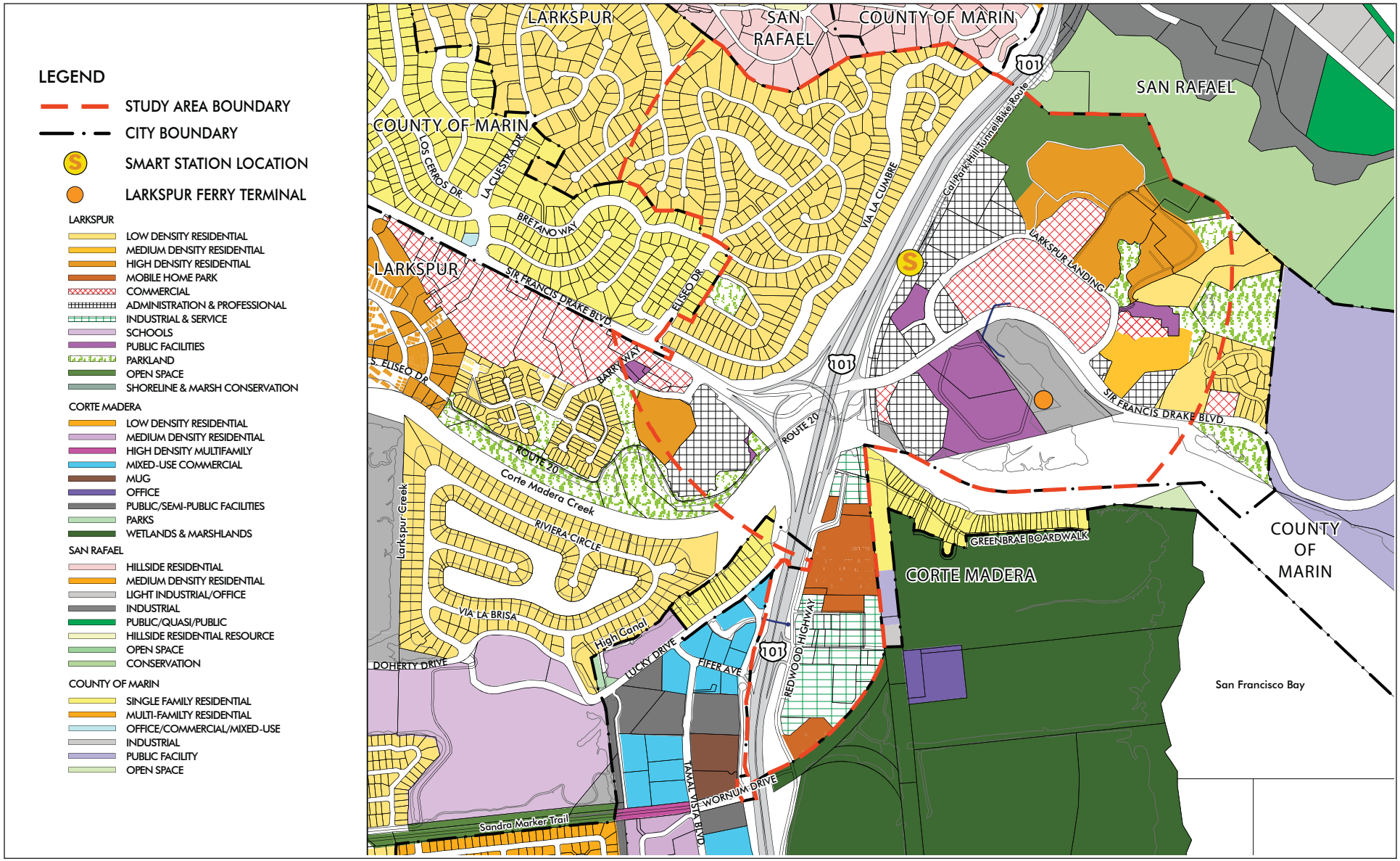

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FIGURE IV.A-2

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City of Larkspur SMART Station Area Plan EIR

General Plan Land Use Map

SOURCE: CITY OF LARKSPUR, DECEMBER 2013 .

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- *Shoreline & Marsh Conservation.* This designation applies to lands containing tidal marshes, seasonal marshes, beaches, rocky shorelines, mudflats, wetlands, low-lying grasslands overlying historic marshlands, streams, and riparian vegetation. It may include publicly-owned lands as well as privately-owned lands set aside as open space through conditions of development approval. Land uses which provide or protect wetland or wildlife habitat, and/or which do not require diking, filling, or dredging, are encouraged. Other uses which do not require diking, filling, or dredging but are less protective of habitat value may be permitted when it can be proven that the resulting public benefit exceeds environmental costs and liabilities. Public benefits shall include but not be limited to: public access, recreational, educational, or scientific opportunities, provision of essential water conveyance, transportation or utility services, and protection from flood or other natural hazards. The only structures allowed are shelters, restrooms, storage sheds, and other structures needed to accommodate public use or provide for maintenance of the land. Floor area ratio should not exceed 0.10.

City of Larkspur 2010-2030 General Plan Update. The City of Larkspur is currently in the process of updating its 1990 General Plan. A Citizen Advisory Committee completed review of the General Plan Elements on November 14, 2011, and an Administrative Draft was prepared on December 27, 2011. The Station Area Plan, in the form of a Local Area Plan, will be incorporated into the General Plan Update.

The 2010-2030 General Plan Update includes several themes that are particularly relevant to the Plan area. These include:

- Preserve and enhance Larkspur's unique built and natural environment, while accommodating suitable new development and redevelopment. Maintain the City's overall residential character and the scale of its neighborhoods. Encourage a diverse demographic mix (especially age, family and income).
- Enhance the attractiveness and viability of existing commercial areas. Ensure that they provide neighborhood-serving businesses and that they are accessible by means other than automobiles.
- Provide safe and efficient transportation facilities for all circulation system users. At the same time, give quality of life and protection of the environment a higher priority than vehicular traffic mobility, and ameliorate the negative impacts of local and regional vehicular traffic on Larkspur to the maximum extent feasible.
- Assure adequate public transit service in Larkspur (e.g., commuter rail, bus, ferry, Airporter) as alternatives to the automobile.
- Improve multi-modal connections (e.g., pedestrian, bicycle, and automobile) between the various parts of Larkspur and neighboring communities. Improve access from Larkspur to U.S. 101.
- Make it easier to move around Larkspur without using a car. Provide bicycle and pedestrian paths to schools, shopping areas, recreation facilities, open space preserves, and other common destination points. Improve traffic safety for bicyclists and pedestrians.
- Preserve, enhance, and strengthen Larkspur's livable and attractive environment, its community identity, and its special "sense of place."

- Provide park and recreation facilities and programs for Larkspur residents of all ages and abilities.
- Do what the City can, within reason, to protect the community from injury, loss of life, and property damage resulting from natural disasters and hazardous conditions. Increase public awareness of flooding, seismic, landslide, fire, and other natural hazards, and of methods to avoid or mitigate their effects. Deter development in areas prone to such hazards.

City of Larkspur 2010 Housing Element. The 2010 Larkspur Housing Element[9] reaffirms the City's General Plan goals. It acts as a guide for municipal decisions regarding the quantity and quality of housing, encourages housing growth within limits of available services, and encourages a balance of housing, quality of life, and environmental considerations for the 2007-2014 Regional Housing Need Allocation (RHNA).[10] The Housing Element was adopted by City Council in November 2010. The Housing Element recommends the following:

1. Strengthen the City's Residential Second Unit program as a viable way to provide smaller, affordable units by considering changing the requirement that to have a second unit, the parking must be brought up to current standards for the main unit and to allow for a higher building height limit for second units built over parking garages. Another action to be considered is lowering the parking requirement for the main unit.
2. Continue to support the creation of a Housing Assistance Team (HAT), coordinated by the Marin County Affordable Housing Strategist, that would be available to assist the staff in implementing Housing Element programs, maintaining Housing Element certification and providing technical assistance on housing matters.
3. Continue to seek opportunities for mixed use and transit oriented housing by investigating the feasibility of amending Planned District zoning districts, creating affordable housing overlay districts, and creating incentives to add residential uses to existing shopping centers, such as the Larkspur Landing and Bon Air Shopping Centers. Also, to increase the number of units likely to be added within the C-1 and C-2 Districts, consider allowing a height limit bonus and flexibility in applying development standards (FAR, lot coverage) for the construction of affordable housing units above commercial.
4. Continue to participate in countywide housing activities and coordination with other jurisdictions and special districts.

[9] Larkspur, City of, 2010. *Housing Element,* November.

[10] The Regional Housing Need Allocation (RHNA) is the State-mandated process to identify the total number of housing units (by affordability level) that each jurisdiction must accommodate in its Housing Element. As part of this process, the California Department of Housing and Community Development (HCD) identifies the total housing need for the San Francisco Bay Area for an eight-year period. ABAG and MTC must then develop a methodology to distribute this need to local governments in a manner that is consistent with the development pattern included in the sustainable Communities Strategy (SCS). Once a local government has received its final RHNA, it must revise its Housing Element to show how it plans to accommodate its portion of the region's housing need.

City of Larkspur Zoning Code. Zoning codes designate specific land uses permitted and restricted within a zone or district, and the development standards associated with that district. Where General Plans tend to emphasize the vision for how a community will develop over time, zoning codes prescribe the details for how development projects are to be implemented. Figure IV.A-3 shows zoning designations within the Plan area.

The Larkspur Landing area north of Sir Francis Drake Boulevard, as well as portions of Sub-area 1B, has a Planned Development (PD) zoning designation. The PD district is designed to allow a mixture of uses, building intensities or design characteristics which would not normally be permitted in any single use district. Requiring a precise development plan, PD land uses must comply with the General Plan and standards within the zoning code; however, exceptions may be allowed where the project would result in a more desirable development.

The Larkspur Ferry Terminal is in a Study District (S) zone. Zoning designations in Sub-area 1B include R-1 (First Residential), C-2 (Commercial), and PD. Zoning designations in Sub-area 2 include LI (Light Industrial), MHP (Mobile Home Park), and S.

City of Larkspur Climate Action Plan. The City of Larkspur City Council adopted a Climate Action Plan (CAP)[11] in 2010 with the understanding that climate change may significantly impact Larkspur's residents and businesses, as well as other communities around the world, and that local governments play a role in reducing greenhouse gas emissions and mitigating the potential impacts of climate change.

The CAP consists of strategies that the City and the community can take to reduce greenhouse gas emissions; for example, increasing building energy efficiency, encouraging less dependence on the automobile, and using clean, renewable energy sources. In tandem with the City's 2005 Greenhouse Gas Emissions Inventory, the CAP acts as the beginning of an ongoing planning process that includes assessing, planning, mitigating and adapting to climate change. Of specific relevance for the Station Area Plan, the CAP calls for the City to "Study the Larkspur Landing Circle area and enhance the opportunities presented by the location of the Larkspur Ferry, the Marin Airporter, and eventually the SMART train station."

City of Larkspur Bicycle & Pedestrian Master Plan. The Larkspur Bicycle and Pedestrian Master Plan[12] examines existing bicycle and pedestrian facilities within the City of Larkspur and lays the framework for development of future facilities and policies that will make bicycling and walking an integral part of daily life in Larkspur. Recommendations include improving the visibility of pedestrians around Sir Francis Drake Boulevard and local schools, providing secure bicycle parking at key destinations within the City, and improving east-west connections across U.S. 101.

2. Impacts and Mitigation Measures

This section discusses potential impacts related to land use and planning policy that could result from implementation of the Station Area Plan. This section begins with the significance criteria, which

[11] Larkspur, City of, 2010. *Climate Action Plan.* June.

[12] Larkspur, City of, 2004. *Larkspur Bicycle and Pedestrian Master Plan*, August.

establish the thresholds used to determine whether an impact is significant. The latter part of the section evaluates the potential impacts associated with implementation of the Station Area Plan, and identifies mitigation measures, if necessary.

a. Criteria of Significance. Implementation of the Station Area Plan would have a significant impact related to land use and planning if it would:

- Disrupt or physically divide an established community;
- Fundamentally conflict with the environmental goals, policies, or guidelines of a General Plan or Specific Plan;
- Fundamentally conflict with an ordinance or overlay zone adopted for the purpose of avoiding or mitigating an environmental effect; or
- Result in an incompatibility of proposed land uses with existing surrounding land uses.

b. Impact Analysis. The following discussion describes impacts on land use and planning policy associated within implementation of the Station Area Plan.

(1) Divide an Established Community. The physical disruption or division of an established community typically refers to the construction of a physical feature (such as an interstate highway or railroad tracks) or removal of a means of access (such as a local road or bridge) that would impair mobility within an existing community, or between a community and outlying areas. For example, the construction of an interstate highway through an existing community could constrain travel from one side of the community to another. Such a feature could also impair travel to areas outside of the community.

In the context of the policy document, such as the Station Area Plan, physical divisions within a community could also result from large-scale land use changes. For instance, the conversion of a large swath of a residential district into an industrial area could isolate residential uses from other nearby residential neighborhoods. Some large-scale comprehensive planning efforts during the post-World War II period, which resulted in the development of single-use neighborhoods bifurcated by high-volume freeways, created divisions within and between existing communities.

The Station Area Plan includes no large-scale infrastructure projects such as new freeways or high-volume roadways that would divide an established community. The Station Area Plan seeks to enhance mobility within the Plan area by expanding the existing multi-model transportation system. This expansion would allow persons to travel around the Plan area more easily via non-automotive means of transportation. In general, this objective would be achieved by enhancing existing bicycle and pedestrian infrastructure and encouraging development around the SMART station and ferry transit nodes, which would be achieved by adherence to Urban Design Guidelines within the Station Area Plan. The Urban Design Guidelines include: providing bicycle parking in all development; complete missing sidewalks; incorporate pedestrian lanes and amenities in new developments; and continue to coordinate with local and regional agencies to pursue possible enhancements to Sir Francis Drake Boulevard that will mitigate potential long-term traffic impacts and improve pedestrian and bicycle circulation.

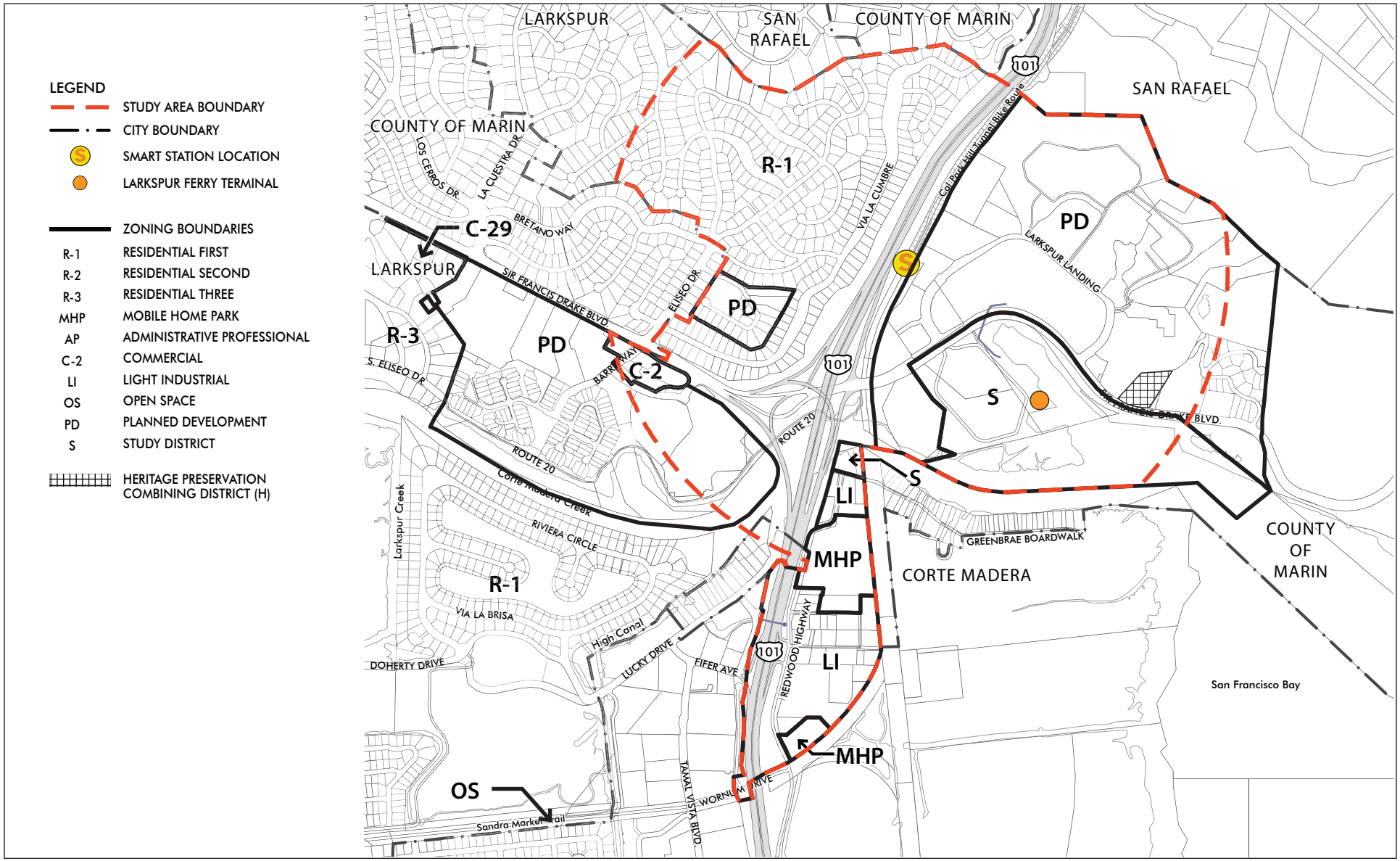

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FIGURE IV.A-3

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City of Larkspur SMART Station Area Plan EIR

Zoning Districts

SOURCE: CITY OF LARKSPUR, JULY 2012.

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In addition, the land uses associated with implementation of the Station Area Plan are land uses that currently exist within the Plan area. Given the size and location adjacent to major transportation corridors and near a transit node, the Plan area can accommodate increases in land use intensity and overall changes in land use character. Implementation of the Station Area Plan would include: increased commercial intensities near residential uses to encourage reduced dependence on private motor vehicles; increased office intensities to allow for business expansion; and focused growth in residential uses in close proximity to transit. Implementation of the Station Area Plan would not result in a significant impact related to division of a community.

(2) Conflict with a General Plan or Specific Plan. As noted previously, the General Plan was adopted in 1990, and the City is currently undertaking a General Plan update. The Station Area Plan, in the form of a Local Area Plan, would be incorporated into the General Plan Update. As noted previously, without adoption of the amendments proposed to the General Plan and Zoning Ordinance (as described in Chapter III, Project Description, of this EIR and the Draft Station Area Plan), the development envisioned by the Station Area Plan will not be realized. While the City is in the process of updating the General Plan, the 1990 General Plan is still in effect within the City of Larkspur and several land uses proposed on Opportunity Sites within the Station Area Plan are not permitted under current General Plan land use designations. These land use conflicts are described below:

- *Opportunity Site 1*: Larkspur Ferry Terminal. The General Plan identifies this site as Public Facility. This designation does not include residential or retail uses, as proposed under the Station Area Plan.
- *Opportunity Site 3*: Larkspur Landing Office. The General Plan identifies this as Administration and Professional land use designation. This designation does not include retail uses, which are proposed under the Station Area Plan.
- *Opportunity Site 6*: Drakes Landing. The General Plan identifies this site as Administration and Professional. This designation does not include residential uses as proposed under the Station Area Plan.
- *Opportunity Site 7*: Offices. The General Plan identifies this site as Commercial. This designation does not include office uses, as proposed under the Station Area Plan.

As noted in the Project Description, Chapter III, the General Plan Land Use Map will be amended to reflect the new Mixed-Use and Administrative and Professional Two land use designations.

Implementation of the Station Area Plan would generally adhere to the goals, policies and actions identified and described in the General Plan. However, it is possible that when site specific developments are proposed, there could be a conflict with selected goals, policies or actions included in the General Plan. The General Plan contains many policies, some of which may compete with each other. The Planning Commission and the City Council, in deciding whether to approve a proposed project, will decide whether, on balance, the project is consistent with the General Plan. Individual projects will be evaluated for potential environmental impacts, and further environmental review may be necessary if potential site-specific impacts have not been addressed in this EIR.

(3) Conflict with an Ordinance or Overlay Zoning. There is one overlay zone located within the Plan area (Historic Preservation Combining District); however, none of the Opportunity Sites include this overlay zoning. Implementation of the Station Area Plan would include zoning

amendments, as well as a rezoning for the Larkspur Ferry Terminal, as described in Chapter III, Project Description. All development that would be implemented as part of the Station Area Plan would be required to adhere to applicable development guidelines and standards. In addition, development proposed within the Plan area would undergo further environmental review by the City of Larkspur to identify and mitigate any potential site-specific environmental impacts. Implementation of the Station Area Plan would not conflict with an ordinance or overlay zone adopted for the purpose of avoiding or mitigating an environmental effect; this potential impact would be considered less than significant.

(4) Incompatible with Adjacent Land Uses. As noted above, while new land uses are proposed for specific Opportunity Sites, the land uses proposed as part of implementation of the Station Area Plan are land uses that currently exist within the Plan area. Implementation of the Station Area Plan would result in an increase in density and development on opportunity sites, and may bring new uses to a specific site but not the Plan area.

To allow for an increase in density within the Plan area, building heights east of U.S. 101 will be allowed to range from two to five stories. Buildings should step down in height from the higher elevations toward the Bay, with portions of buildings immediately adjoining the Bay shoreline not exceeding two floors in height. On sites with significant topography, taller buildings could be sited against hillsides to minimize impacts to views throughout the site. Urban Design Guidelines included to help ensure land use compatibility include:

- New development should build upon the existing pattern of vehicular circulation while focusing on improving pedestrian and bicycle circulation throughout the Plan area.
- Design buildings to conform to the height zones shown in Figure 6.4 of the Station Area Plan.
- Modulate building heights along public walkways and sidewalks to provide a comfortable pedestrian scale.
- Scale buildings to assure maximum daylight into public open space areas.
- Design buildings to avoid significantly blocking views to the bay, Mount Tamalpais, or other surrounding hillsides from public gathering places, parks, or event spaces.

Implementation of the Station Area Plan would not result in any new land uses that would be incompatible with existing land uses; this potential impact would be less than significant.

c. Cumulative Impacts of the Station Area Plan. CEQA defines cumulative impacts as “two or more individual effects, which, when considered together, are considerable, or which can compound or increase other environmental impacts.” Section 15130 of the CEQA Guidelines requires that an EIR evaluate potential environmental impacts that are individually limited but cumulatively significant. These impacts can result from the proposed project alone, or together with other projects. Section 15355 of the CEQA Guidelines states: “The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects.” Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

Expected population and employment growth in the region would result in extensive land use changes at the regional level. ABAG expects that the population of the Bay Area region will grow from 7,341,700 residents in 2010 to 8,719,300 residents in 2030. During that period, the number of employed residents is expected to grow from 3,410,300 to 4,547,100.[13]

To address this regional growth, ABAG and MTC developed and adopted Plan Bay Area,[14] a long-range transportation and land-use/housing strategy for the San Francisco Bay Area. Plan Bay Area marks the nine-county region's first long-range plan to meet the requirements of California's landmark 2008 Senate Bill 375, which calls on each of the State's 18 metropolitan areas to develop a Sustainable Communities Strategy to accommodate future population growth and reduce greenhouse gas emissions from cars and light trucks. The Plan advances initiatives to expand housing and transportation choices, create healthier communities, and build a stronger regional economy.

Plan Bay Area provides a strategy for meeting 80 percent of the region's future housing needs in Priority Development Areas (PDAs), which are neighborhoods within walking distance of frequent transit service, offering a wide variety of housing options, and featuring amenities such as grocery stores, community centers, and restaurants. While the Plan area was not identified as a PDA, the implementation of the Station Area Plan result in the features associated with a PDA: a variety of housing options and amenities located within walking distance of transit service.

While implementation of the Station Area Plan would allow for more development within the Plan area, this development would be entirely consistent with the regional growth Plan Bay Area. City development standards and design guidelines, including the design guidelines included in the Station Area Plan, would be applicable to new development and would reduce potential conflicts between existing and future uses. Implementation of the Station Area Plan would not result in cumulative land use impacts.

[13] Association of Bay Area Governments, Metropolitan Transportation Commission, 2013. *Draft Plan Bay Area, Strategy for a Sustainable Region*. March. Adopted with revisions July 18, 2013.

[14] Ibid.

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B. TRANSPORTATION AND CIRCULATION

This section evaluates potential transportation and circulation impacts, at a program-level of analysis, that may result from implementing the Larkspur SMART Station Area Plan (proposed project). The evaluation of environmental effects presented in this section focuses on the potential transportation and circulation impacts associated with the full range of transportation concerns, including vehicle traffic circulation, public transit use, bicycle circulation, and pedestrian circulation. Mitigation measures to reduce or eliminate potential significant impacts of the project are included, where feasible and necessary.

1. Setting

Implementation of the Station Area Plan includes a mix of new residential, retail, and office space in the Plan area. The proposed project includes new land uses in two locations: Larkspur Landing and the Ferry Terminal (Sub-area 1A) and Drakes Landing (Sub-area 1B). Figure IV.B-1 illustrates the Plan area and its relationship to the surrounding road system.

This section includes descriptions of the scope of analysis, methods used for the analysis, existing setting for multi-modal transportation and circulation issues, assumptions regarding future transportation and circulation conditions, and regulatory context. Transportation and circulation impacts that would likely occur with implementation of the Station Area Plan are analyzed and documented following the Setting section, as described below.

This section includes a description of the study locations, the traffic scenarios analyzed, the analysis methods, existing transportation conditions, and the regulatory context.

a. Study Locations. This analysis evaluates the impacts of the proposed project on key roadway facilities, including 10 intersections and five freeway segments. The study area for the traffic analysis was selected based on local traffic patterns, input from local authorities, and engineering judgment. The study area is comprehensive; the impacts of the proposed project are well-contained within it and no measurable impacts are anticipated beyond these borders. The study locations are listed below and shown on Figure IV.B-1.[1] All study intersections are controlled by a traffic signal, except Intersection #8 East Sir Francis Drake Boulevard/Andersen Drive.

Study Intersections

#1 Sir Francis Drake Boulevard/Wolfe Grade

#2 Sir Francis Drake Boulevard/Bon Air Road

#3 Sir Francis Drake Boulevard/Eliseo Drive

#4 U.S. 101 Southbound Ramps/Sir Francis Drake Boulevard

#5 U.S. 101 Northbound Ramps/Sir Francis Drake Boulevard

#6 Sir Francis Drake Boulevard/Larkspur Landing Circle (West)/Ferry Terminal Entrance

[1] Intersection #1 (Sir Francis Drake Boulevard/Wolfe Grade), Intersection #2 (Sir Francis Drake Boulevard/Bon Air Road), Intersection #8 (Sir Francis Drake Boulevard/Andersen Drive), and Intersection #9 (Tamal Vista Boulevard/Fifer Avenue) are located outside the Plan area.

#7 Sir Francis Drake Boulevard/Larkspur Landing Circle (East)

#8 Sir Francis Drake Boulevard/Andersen Drive (left turns from Andersen Drive are stop sign-controlled)

#9 Tamal Vista Boulevard/Fifer Avenue

#10 U.S. 101 Northbound Ramps/Redwood Highway/Industrial Way

Freeway Segments

A. U.S. 101 North of Sir Francis Drake Boulevard (Northbound and Southbound)

B. U.S. 101 Sir Francis Drake Boulevard to Industrial Way/Fifer Avenue (Northbound and Southbound)

C. U.S. 101 Tamalpais Drive to Industrial Way (Northbound); U.S. 101 Fifer Avenue to Madera Boulevard (Southbound)

b. Analysis Scenarios. The operations of the study intersections and the freeway segments were evaluated during the time periods when traffic volumes are highest, i.e., during the one hour when morning and evening traffic is highest between 7:00 to 9:00 a.m. and 4:30 to 6:30 p.m. The operations of these facilities were evaluated for the following scenarios:

- **Existing Conditions**: Existing traffic volumes on local roadways were obtained from counts collected in 2006 for the Highway 101 Twin Cities/Greenbrae Corridor Improvement Project (GCIP)[2] and cross-checked against counts collected in 2011. This comparison indicates that the 2011 counts were generally similar to or lower than the 2006 counts and that the GCIP analysis would serve as a conservative baseline. Mainline freeway counts obtained from counts collected in 2010 for the GCIP after the completion of the U.S. 101 Gap Closure Project.
- **Existing Plus Project Conditions**: Existing traffic volumes plus new traffic from the project.
- **Cumulative No Project Conditions**: Projected conditions in 2035 without the project.
- **Cumulative Plus Project Conditions**: Projected conditions in 2035 with the project. This scenario is based on the Highway 101 Twin Cities/Greenbrae Corridor Improvement Project (GCIP) "No Build" (no changes to U.S. 101) Cumulative Conditions scenario developed for the GCIP. The GCIP model assumed land uses in Sub-area 1A and Sub-area 1B that are similar to the proposed project.

[2]Fehr & Peers, 2012. *Highway 101 Greenbrae/Twin Cities Corridor Improvements Project Approval/Environmental Document - Final Traffic Operations Report.* October.

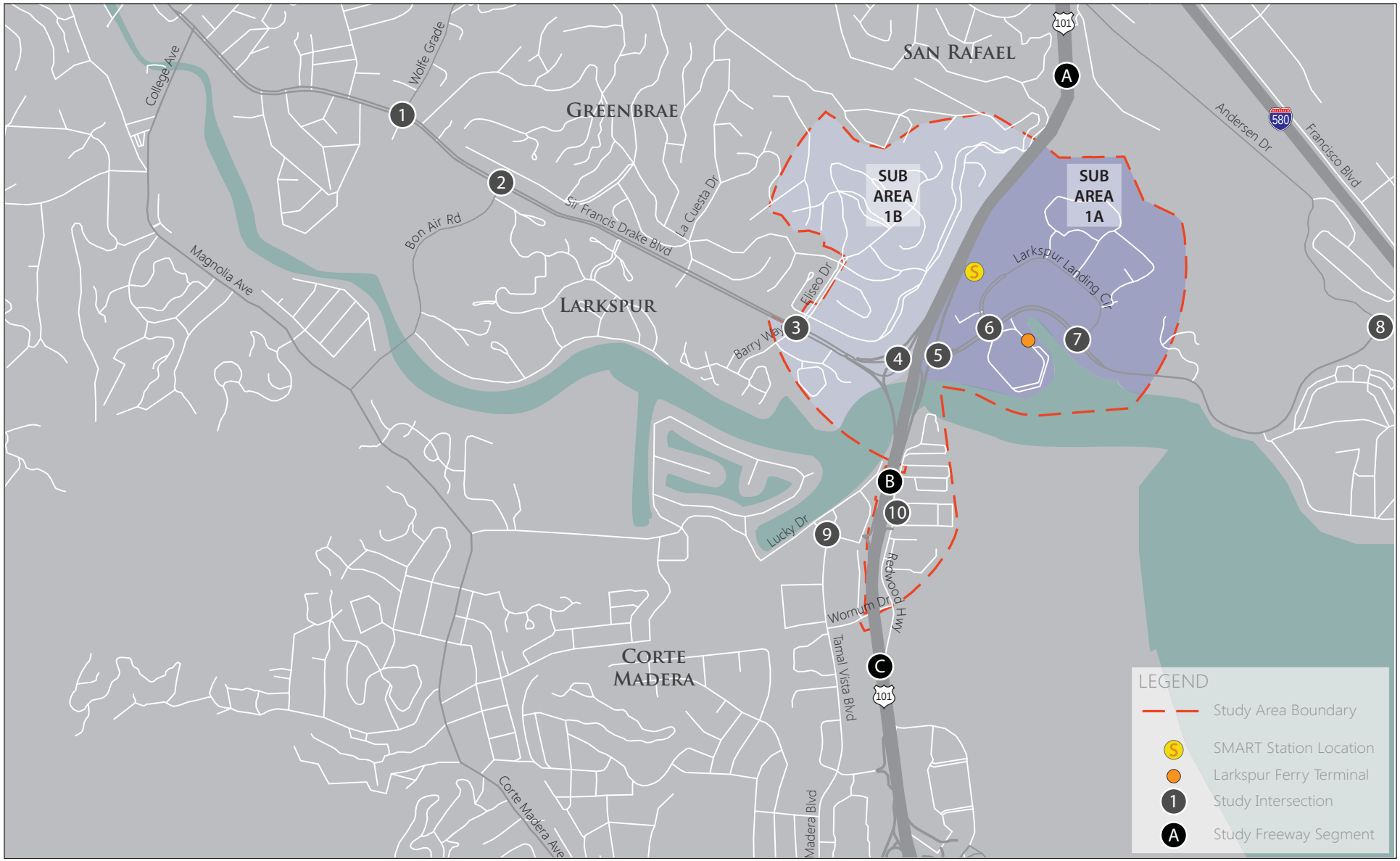

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FIGURE IV.B-1

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City of Larkspur SMART Station Area Plan EIR

Study Intersections and Freeway Segments

SOURCE: FEHR & PEERS, MAY 2013.

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Table IV.B-1 shows the maximum density of land uses included in the proposed project. The proposed project includes new land uses in two locations: Larkspur Landing and the Larkspur Ferry Terminal (Sub-area 1A) and Drakes Landing (Sub-area 1B). For conservative purposes, the maximum density of land uses, implemented over a 20-year period, was assumed for this analysis. Less intensive development within the Plan area would result in fewer traffic effects than described in this section.

Table IV.B-1: Land Use Assumptions for the Station Area Plan

	Existing		Proposed New Development		Total Proposed	
Opportunity Site	**Type**	**Amount**	**Type**	**Amount**	**Type**	**Amount**
Larkspur Landing and the Ferry Terminal (Sub-area 1A)						
1. Ferry Terminal [a]	Public Facility/ Transit	25,000 sf	Public Facility/ Transit	– sf	Public Facility/ Transit (to remain)	25,000 sf
			Residential	300 DU	Residential	300 DU
			Retail	2,500 sf	Retail	2,500 sf
2. Marin Airporter	Public Facility/ Transit	2,500 sf	Public Facility/ Transit	– sf	Public Facility/ Transit (to remain)	2,500 sf
3. Larkspur Offices and Cinema	Office (Admin & Prof)	190,000 sf	Office	50,000 sf	Office	240,000 sf
	Retail (Cinema)	16,000 sf	Retail	35,000 sf	Retail (incl. Cinema)	51,000 sf
4. Marin Country Mart [c]	Office (Admin & Prof)	45,000 sf	Residential	300 DU	Residential	300 DU
	Retail (Cinema)	175,000 sf	Retail	40,000 sf	Retail	215,000 sf
5. Sanitary District	Vacant [b]	–	Residential	250 DU	Residential	250 DU
			Hotel	60,000 sf	Hotel	60,000 sf
			Office	12,500 sf	Office	12,500 sf
Drake's Landing (Sub-area 1B)						
6. Drake's Landing Office Park	Office (Admin & Prof)	126,000 sf	Office	– sf	Office (to remain)	126,000 sf
			Residential	70 DU	Residential	70 DU
7. Offices on Drake's Landing Road	Office (Admin & Prof)	18,000 sf	Office	22,000 sf	Office	40,000 sf

Notes:

[a] Shared parking strategies and parking counts on all sites will be subject to the parking ratios and parking demand management strategies described in Chapter 5 of the Station Area Plan.

[b] Ordinances 951 and 954 approved the precise development plans for residential (126 DUs) and hotel (64,000 sf) development, respectively. Reso. 34/05 amended the land use category for a portion of the parcel to Public Facilities; however, there was never a precise plan approval for exact square footage allowances and other development standards for the public facilities portion of the property.

[c] Under the Opportunity Site Development Projections, 45,000 sf of office space would be removed from Opportunity Site 4, the Marin Country Mart.

Source: *Larkspur SMART Station Area Plan, Public Review Draft.* February, 2014.

c. Analysis Methods. Evaluation of traffic conditions on local streets involves analysis of intersection operations, as intersections typically represent the locations where the roadway capacity is most constrained, and freeway mainline segment operations. Intersection and freeway mainline segment operations were evaluated with level of service calculations. Level of service (LOS) is a qualitative description of operations ranging from LOS A, when the roadway facility has excess capacity and vehicles experience little or no delay, to LOS F, where the volume of vehicles exceeds the capacity, resulting in long queues and excessive delays. Typically, LOS E represents "at-capacity"

conditions and LOS F represents "over-capacity" conditions. At signalized intersections operating at LOS F, for example, drivers may have to wait through multiple signal cycles to proceed.[3]

Ten study intersections were analyzed during the AM and PM peak hours and six freeway segments (three northbound and three southbound) were analyzed during the PM peak hour. A comprehensive analysis of seven of the ten study intersections[4] along Sir Francis Drake Boulevard was completed recently for the Highway 101 Twin Cities/Greenbrae Corridor Improvement Project (GCIP). This intersection analysis was completed using a VISSIM traffic simulation model. VISSIM is a micro-simulation software that analyzes the traffic operations of cars, trucks, transit vehicles, pedestrians, and bicycles. This software is used to account for the closely spaced intersections and existing congestion through the Sir Francis Drake Boulevard and U.S. 101 interchange per guidelines set forth in the Transportation Research Board's 2000 Highway Capacity Manual (HCM). To determine whether the existing GCIP VISSIM model was adequate for use in this study, more recent traffic counts collected in 2011[5] were compared to the 2006 traffic counts that served as a baseline for the existing traffic analysis in the GCIP. This comparison indicates that the 2011 counts were generally similar to or lower than the traffic volumes in the existing GCIP VISSIM model. Therefore, the existing GCIP VISSIM model was determined to be adequate for this study and also represents a conservative roadway analysis. The remaining study intersections were analyzed using the Synchro traffic analysis software. Synchro is adequate for isolated intersections analysis per the HCM guidelines. Mainline U.S. 101 segments were analyzed using volume to capacity ratios per Marin County Congestion Management Program (CMP) standards.

As noted above, the VISSIM traffic simulation model and Synchro traffic analysis software were used to evaluate study area intersections and roadway segments; a different analysis method that evaluates an arterial roadway's segment volume to capacity ratio was considered but not included in this study, for the following reasons. While volume-to-capacity ratios can be used as an analysis technique for arterial roadways, this approach presents a less refined analysis than the corridor simulation analysis conducted in VISSIM, as it does not account for upstream or downstream bottlenecks (which act to limit the number of vehicles that can pass through a location), queuing between intersections, lane configurations at intersections, or cross street traffic volumes. In addition, conclusions based on a volume-to-capacity analysis of future conditions could be more speculative, as it tends to overestimate the number of vehicles on the roadway by not accounting for existing upstream bottlenecks that currently limit the traffic through the study area. The VISSIM analysis that was used is based on existing counts and conditions and, therefore, takes into account existing and projected bottlenecks and traffic operations.

[3] Often, some approaches of intersections may operate worse than others. Per Chapter 16 of the Highway Capacity Manual (HCM), the reported LOS for a signalized intersection is the average delay per vehicle of all the approaches. For example, if one approach is over capacity and operates at LOS F while another is under capacity and operates at LOS B, the reported LOS could be LOS C or D reflecting the average delay per vehicle.

[4] The GCIP VISSIM model includes all study intersections along Sir Francis Drake Boulevard between Eliseo Drive and Larkspur Landing Circle (East) in addition to the study intersections of Tamal Vista Boulevard/Fifer Avenue and Redwood Highway/Industrial Way/U.S. 101 Northbound Ramps south of Corte Madera Creek.

[5] The 2011 counts were collected for the recent County of Marin led signal timing study for Sir Francis Drake Boulevard. These counts are presented in the following report: TJKM, 2011, *Task 2A: Draft Existing Conditions Analysis, MTC Program for Arterial System Synchronization (PASS) for Marin County, City of Larkspur, and Caltrans* (Sir Francis Drake Boulevard PASS study).

Each method is briefly described below.

(1) Signalized Intersections – 2000 Highway Capacity Manual (HCM). The method from Chapter 16 of the HCM bases signalized intersection operations on the average control delay experienced by motorists traveling through it. Control delay incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. This method uses various intersection characteristics (such as traffic volumes, lane geometry, and signal phasing) to estimate the average control delay. Table IV.B-2 summarizes the relationship between average delay per vehicle and LOS for signalized intersections according to the 2000 HCM method.

(2) Signalized Intersections – Simulations. The Chapter 16 HCM method is appropriate only when intersection operations are not influenced by upstream or downstream intersections. When intersections are congested, or when their operations are otherwise influenced by adjacent intersections, the HCM recommends using simulation analysis tools. With simulation, detailed models are prepared to evaluate the effects of individual vehicles moving on the roadway system. Average delay values are obtained from the model output and correlated to LOS based on the thresholds presented in Table IV.B-2. A VISSIM simulation model was used for the following seven study intersections[6]:

#3 Sir Francis Drake Boulevard/Eliseo Drive

#4 U.S. 101 Southbound Ramps/Sir Francis Drake Boulevard

#5 U.S. 101 Northbound Ramps/Sir Francis Drake Boulevard

#6 Sir Francis Drake Boulevard/Larkspur Landing Circle (West)/Ferry Terminal Entrance

#7 Sir Francis Drake Boulevard/Larkspur Landing Circle (East)

#9 Tamal Vista Boulevard/Fifer Avenue

#10 U.S. 101 Northbound Ramps/Redwood Highway/Industrial Way

Table IV.B-2: Signalized Intersection LOS Criteria

Level of Service	Description	Average Control Delay Per Vehicle (Seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle length.	≤ 10
B	Operations with low delay occurring with good progression and/or short cycle lengths.	> 10 and ≤ 20
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	> 20 and ≤ 35
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	> 35 and ≤ 55
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	> 55 and ≤ 80
F	Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	> 80

Source: Transportation Research Board, 2000. *Highway Capacity Manual – Special Report 209*.

[6] Intersection #1 (Sir Francis Drake Boulevard/Wolfe Grade), Intersection #2 (Sir Francis Drake Boulevard/Bon Air Road), and Intersection #8 (Sir Francis Drake Boulevard/Andersen Drive) operate as isolated intersections and were analyzed in Synchro.

(3) Unsignalized Intersections. Traffic conditions at Intersection #8 Sir Francis Drake Boulevard/Andersen Drive (the only stop sign-controlled study intersection) were evaluated using the method from Chapter 17 of the 2000 HCM. With this method, operations are defined by the average control delay per vehicle (measured in seconds) for each stop-controlled movement or movement that must yield the right-of-way. At four-way stop-controlled intersections, the control delay is calculated for the entire intersection and for each approach. The delays and corresponding LOS for the entire intersection are reported. At two-way stop-controlled intersections the movement with the highest delay and corresponding LOS is reported. Table IV.B-3 summarizes the relationship between delay and LOS for unsignalized intersections. Generally, the delay ranges for each LOS are lower than for signalized intersections because drivers expect to have less delay at unsignalized intersections.

Table IV.B-3: Unsignalized Intersection LOS Criteria

Level of Service	Description	Average Control Delay Per Vehicle (Seconds)
A	Little or no traffic delays	≤ 10
B	Short traffic delays	> 10 and ≤ 15
C	Average traffic delays	> 15 and ≤ 25
D	Long traffic delays	> 25 and ≤ 35
E	Very long traffic delays	> 35 and ≤ 50
F	Extreme traffic delays with intersection capacity exceeded	> 50

Source: Transportation Research Board, 2000. *Highway Capacity Manual – Special Report 209.*

(4) Freeway Mainline Operations. Freeway segments on U.S. 101 are analyzed using volume-to-capacity (V/C) ratios. The capacities of the study freeway facilities were obtained from the 2000 HCM.

According to the HCM, for a freeway segment with minimum 12-foot travel lane widths, 6-foot shoulder widths, 2-foot median lateral clearance, a traffic stream composed entirely of passenger cars, interchange spacing greater than two miles, level terrain, and a driver population composed principally of regular users, the ideal freeway capacity is 2,400 vehicles per hour per lane. However, segments of U.S. 101 through the Plan area have many features that reduce the capacity flow rates from the ideal, including:

- Heavy vehicles, including trucks, buses, and recreational vehicles, represent approximately five percent of vehicles on U.S. 101;
- Locations with short merge distances for on-ramps; and
- Interchange spacing substantially less than two miles.

Therefore, the capacity of 2,200 vehicles per hour per lane was selected as an appropriate approximation of freeway lane capacity. Through the Plan area, U.S. 101 is three lanes in each direction with a high occupancy (HOV) lane in the peak direction. This analysis assumes HOV lane capacity is 50 percent of a mixed-flow lane. Although an HOV lane has a lower vehicle flow rate, there is a higher passenger flow rate due to the increased number of passengers per vehicle. Table IV.B-4 summarizes the relationship between V/C and LOS for freeway segments.

Table IV.B-4: Freeway Segment LOS Criteria

Level of Service [a]	Description	Maximum Volume-to-Capacity Ratio
A	Free flow operations with average operating speeds at, or above, the speed limit. Vehicles are unimpeded in their ability to maneuver.	0.30
B	Free flow operations with average operating speeds at the speed limit. Ability to maneuver is slightly restricted. Minor incidents cause some local deterioration in operations.	0.50
C	Stable operations with average operating speeds near the speed limit. Freedom to maneuver is noticeably restricted. Minor incidents cause substantial local deterioration in service.	0.71
D	Speeds begin to decline slightly with increasing flows. Freedom to maneuver is more noticeably restricted. Minor incidents create queuing.	0.89
E	Operations at capacity. Vehicle spacing causes little room to maneuver. Any disruption to the traffic stream can cause a wave of delay that propagates throughout the upstream traffic flow. Minor incidents cause serious breakdown of service with extensive queuing. Maneuverability is extremely limited.	1.00
F	Operations with breakdowns in vehicle flow. Volumes exceed capacity causing bottlenecks and queue formation.	N/A

[a] Freeway mainline LOS based on a 65 mph free-flow speed.

Source: Transportation Research Board, 2000. *Highway Capacity Manual*.

d. Existing Conditions. This section describes the existing transportation system in the Plan area encompassing the project site. First, the major components of the transportation system are described. Then the existing AM and PM peak-hour traffic volumes and lane configurations for the study intersections are presented, followed by the operational analysis results (LOS calculations and VISSIM model results). Existing freeway volumes and operations are also presented.

(1) Public Transit System. Public transit services in the Plan area include local buses, express buses, shuttles, and ferry service. A majority of the public transit trips through the area are commuters who use the bus stops at Lucky Drive, students heading to and from school, and people using the corridor along Sir Francis Drake Boulevard. In addition to the local and regional bus service, ferry service is provided via the Larkspur Ferry Terminal, which provides commuter service to San Francisco. The Larkspur Ferry Terminal is heavily used by commuters, with approximately 5,300 people passing through the terminal each day.

Bus Service. Bus service in Marin County is provided by the Golden Gate Transit (GGT) and Marin County Transit District (Marin Transit). The two public transit operators provide service as follows:

- GGT is provided through the Golden Gate Bridge, Highway and Transportation District and operates bus service in Marin, San Francisco, and Sonoma counties. GGT provides basic and commuter service between Marin County and San Francisco, as well as local service within Marin County. Whistlestop Wheels is the paratransit service for GGT. The Larkspur Ferry Terminal and the San Rafael Transit Center serve as major hubs and transfer points to the system.

- Marin Transit is responsible for providing local public transit service within Marin County. Marin Transit directly operates public transit, but also contracts with other providers, including Golden Gate Transit and Whistlestop Wheels, for local bus and paratransit services.

Types of Bus Service. Currently GGT operates a majority of the basic and commuter routes that provide service within the various communities of Marin as well as San Francisco, Sonoma, and Contra Costa counties, while Marin Transit is responsible for the local community routes. The routes that serve the Plan area are shown in Figure IV.B-2 and are described as follows:

- **Local Routes**: These routes are provided by GGT within Marin County on weekdays with limited weekend service under contract with Marin Transit. Local routes through the corridor include Routes 17, 29, 36, and 71.
- **Basic Routes**: Basic routes provide daily service throughout the day and evening between San Francisco, Marin, Sonoma and Contra Costa counties. Basic routes through the corridor include Routes 70 and 80, which both provide express service from Santa Rosa to San Francisco. Neither of these routes stop in the Plan area.
- **Commute Routes**: These bus routes provide commute period service, mornings and evenings, Monday through Friday except holidays, between San Francisco, Marin, and Sonoma counties. Commute service making stops within the Plan area includes Route 24 and 97.
- **Community Shuttles**: Shuttles provide limited service for local schools and other destinations. Route 222 shuttle provides service to areas near the Plan area, including Marin General Hospital, Bon Air Shopping Center, and Cost Plus Plaza (Cost Plus, Trader Joe's, BevMo and other stores).

Bus Connections to Larkspur Ferry. There are three bus routes that connect with the Larkspur Ferry Terminal:

- Route 24, a GGT service, operates along Sir Francis Drake Boulevard between Olema Boulevard in Fairfax and U.S. 101, on U.S. 101 between Sir Francis Drake Boulevard and the Golden Gate Bridge, and in San Francisco between the Golden Gate Bridge and the South of Market neighborhood. Route 24 headways are between 9 and 70 minutes during commute periods on weekday mornings and evenings. The bus stops at Larkspur Ferry Terminal only one time during the day, at 4:51 a.m. in the inbound direction. This bus arrives at 8th Street and Folsom Street in San Francisco at 5:32 a.m. All other times, the bus avoids this detour, which occurs between adjacent stops at the Greenbrae Hills neighborhood and the Lucky Drive Bus Pad on U.S. 101, located at Fifer Avenue.
- Route 97, a GGT service, operates on U.S. 101 between the Ferry Terminal and the Golden Gate Bridge, and in San Francisco between the Golden Gate Bridge and the South of Market neighborhood. Route 97 operates once a day, departing the Larkspur Ferry Terminal at 5:22 a.m. and arriving at 8th Street and Folsom Street in San Francisco at 6:07 a.m. It does not operate in the reverse direction.

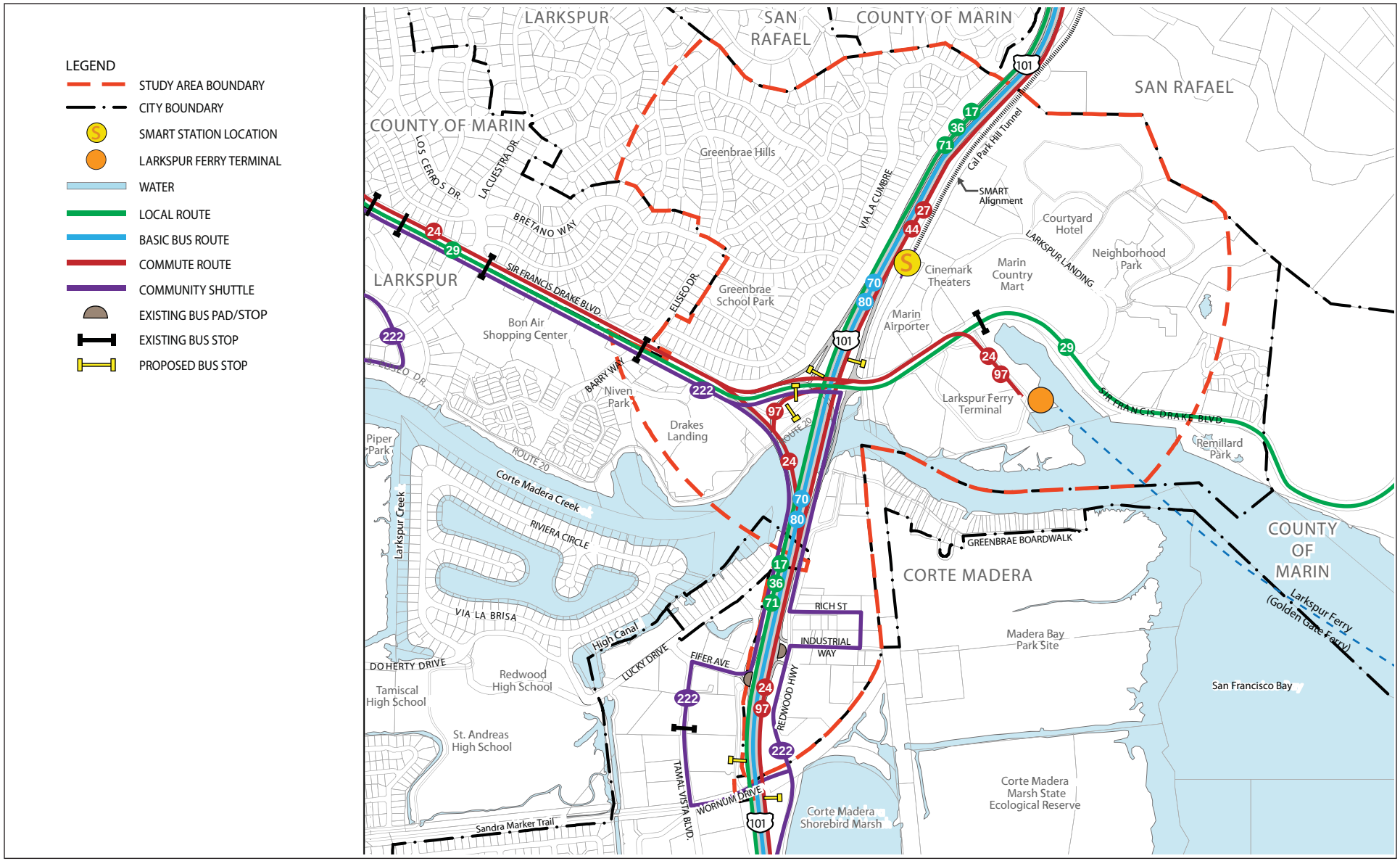

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FIGURE IV.B-2

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City of Larkspur SMART Station Area Plan EIR

Existing and Proposed Transit Facilities

SOURCE: FEHR & PEERS, MAY 2013.

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- Route 29 is a local bus service under contract with Marin Transit. It operates on weekdays only. It operates along Sir Francis Drake Boulevard between Olema Boulevard in Fairfax/San Anselmo Transit Hub and Larkspur Ferry Terminal, and east of the Ferry Terminal to San Rafael Transit Center at 3rd Street and Hetherton Street in southeast San Rafael. Headways are 30 minutes during peak periods (AM and school) for routes departing or arriving at the San Anselmo Transit Hub and 60 minutes for routes departing or arriving at Olema Boulevard in Fairfax, and 60 minutes otherwise during its service hours of 6:30 a.m. and 9:00 p.m. Weekend service along this route is provided by Route 28 with headways of 60 minutes between 6:30 a.m. and 7:30 p.m.

Ferry Service. The Larkspur Ferry Terminal is a heavily used passenger ferry terminal that provides commuter service to the San Francisco Ferry Terminal. Ferries run approximately 39 times per day between 6:00 a.m. and 10:00 p.m. on weekdays. Ferry service is provided approximately every 30-40 minutes in the peak direction during the peak periods (7:00 a.m. to 8:30 a.m. and 4:30 p.m. to 6:30 p.m.) and approximately hourly for the remainder of the ferry service. Ferry service on weekends includes four trips in each direction between 9:30 a.m. and 8:00 p.m.

Commuter traffic to the Ferry Terminal is a major contributor to peak hour congestion along Sir Francis Drake Boulevard. Most commuters using the ferry service are solo drivers who park in the terminal parking lot. Studies conducted to determine how to expand the ferry ridership have focused on improving the multi-modal connections or car-pooling as the current parking lot is at capacity.

Since 2006, nearly 2,000 vehicles are parked at and around the Larkspur Ferry Terminal on most weekdays. The parking lot regularly fills up on weekdays by 8:00 a.m. to 9:00 a.m. and overflows onto the periphery of the lot, onto the north side of East Sir Francis Drake Boulevard, at the Marin Country Mart, and on the overflow lot located on the railroad right-of-way above the Marin Airporter facility. With ferry ridership continuing to grow, the Golden Gate Bridge Highway and Transportation District (GGBHTD) has been exploring options for addressing the parking shortage, including building a parking garage on the Ferry Terminal site.

Currently, multi-modal connections to the Larkspur Ferry Terminal are limited. Connecting bus service is mainly provided by Route 29, which stops on Sir Francis Drake Boulevard outside the Ferry Terminal. Bus Route 24 offers limited service to the Ferry Terminal, with only one inbound trip available in the morning. Bus Route 97 operates one trip to San Francisco from the Larkspur Ferry Terminal before ferry service begins in the morning. Pedestrian and bicycle connections to the Larkspur Ferry Terminal are provided through several multi-use paths and signed bicycle routes. Secure bicycle parking provided within the station itself.

Marin Airporter. Marin Airporter is a privately operated bus that offers service between Marin County and the San Francisco International Airport (SFO) seven days a week, 365 days a year. There is scheduled bus service from six locations in Marin County, including Larkspur Terminal. The Larkspur Terminal is located at 300 Larkspur Landing Circle, next to the Larkspur Landing Century Theater. Buses leave from Larkspur every 30 minutes, on the hour and half-hour, from 4:00 a.m. until 11:00 p.m. The trip to SFO takes a minimum of one hour, depending on traffic conditions. Parking is available for $4.00 per day.

(2) Bicycle System. Like many communities around the United States, Marin County continues to experience a strong growth in bicycling as a means of transportation. Marin County has a network of signed bicycle routes consisting of several different types of facilities. These facilities are based on Caltrans standards, which provide for three distinct types of bikeway facilities, as generally described below, and shown in Figure IV.B-3:

- **Class I Bikeway (Multi-Use Path)**: Class I bikeways have independent rights-of-way physically separated from vehicle travel lanes. Motorized vehicle activity is prohibited. Paths are typically 10 to 12 feet wide.

  Multi-use paths located adjacent and within the Plan area are also designated Class I Bike Paths within the Marin County Bicycle Network. These paths include Route 20 along the Corte Madera Creek, and Route 5, which uses the recently opened Cal Park Hill Tunnel. Immediately south of the Plan area is the Sandra Marker Trail (Route 16), and Route 17 along Redwood Highway.

- **Class II Bikeway (Bike Lane)**: Class II bike lanes are on-street lanes dedicated and demarcated for bicycle travel. A bicycle lane is a portion of a road or highway that is designated by striping, signing, and pavement markings to provide preferential or exclusive use of the lane by bicyclists. Bike lanes are typically four to six feet wide. Due to their multi-modal function, improved roadway maintenance is particularly important to improve rider safety. In some cases, a curbside parking lane can be striped to allow a shared parking lane and bicycle travel. This is typically done in areas where a full bicycle lane is not feasible; however, it is discouraged where alternative means of providing a bicycle lane are possible.

  A new Class II bicycle lane was recently added to the west side of Redwood Highway between the Corte Madera Creek overcrossing and Industrial Way, serving southbound bicyclists.

- **Class III Bikeway (Bike Route)**: Class III bikeways provide for a right-of-way designated by signs or pavement markings for shared use with pedestrians or motor vehicles. These are often located along roadways where dedicated bicycle lanes cannot fit or are not needed (for example, on a low volume street), but where providing continuity in a bicycle system is nevertheless important.

  A shared-use arrow, or "sharrow," can be marked in the outside lane on a Class III route to show the suggested path of travel for bicyclists. This is often done when the route has on-street parking, in order to encourage cyclists to ride a safe distance away from the parked vehicles' "door zone."

  A new designated Class III route, with sharrows, was recently provided on the east side of Redwood Highway between Industrial Way and the Corte Madera Creek overcrossing, serving northbound bicyclists.

The most popular bicycle paths around and through the Plan area include the multi-use path along the Corte Madera Creek, the path along the southbound U.S. 101 on-ramp from Sir Francis Drake Boulevard, and the Cal Park Hill Tunnel Multi-Use Pathway. These paths are all heavily used by commuters and recreational users alike to access such destinations as the Larkspur Ferry Terminal and the shopping centers located south of the Plan area. Bicycle counts are shown in Table IV.B-5.

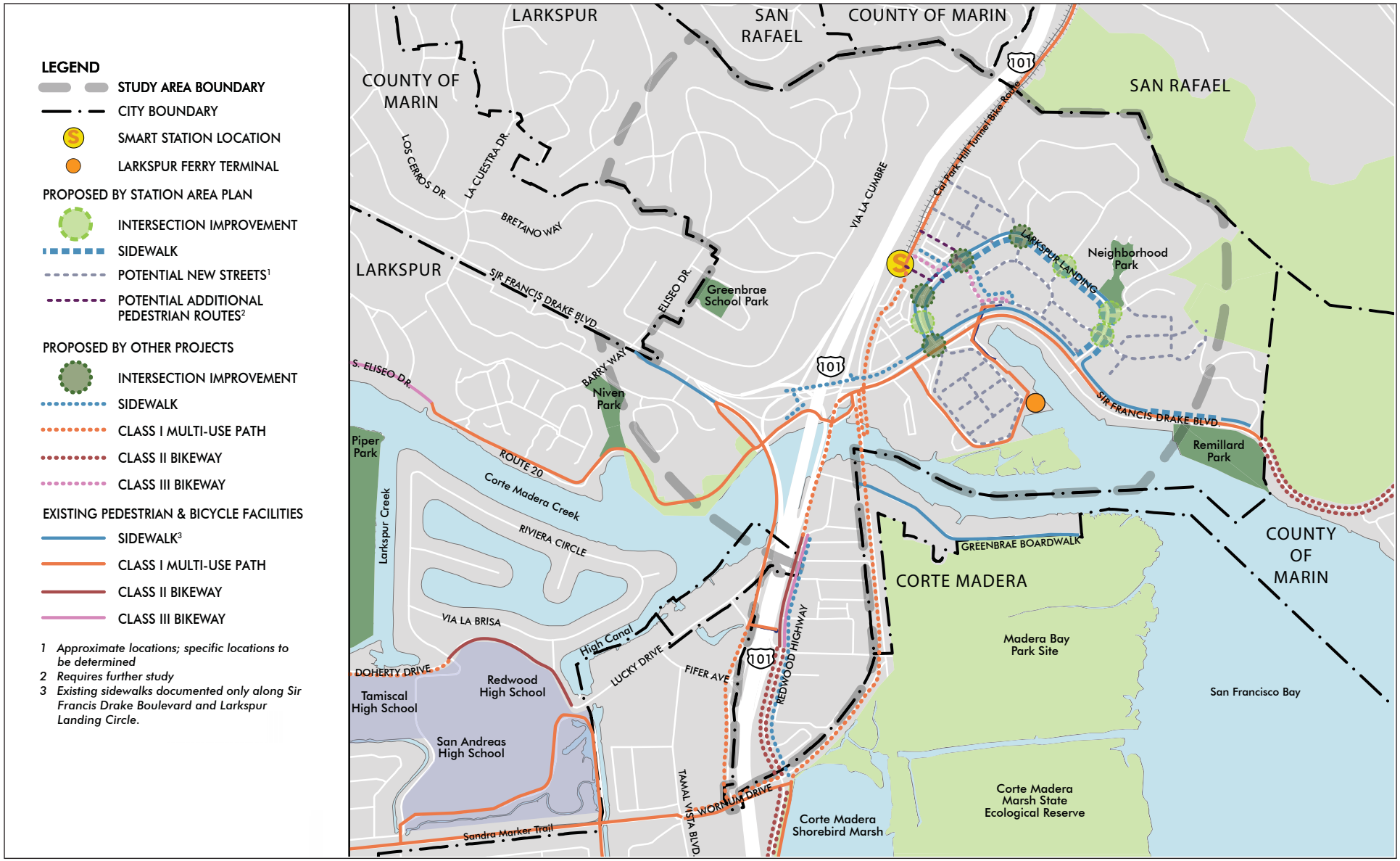

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FIGURE IV.B-3

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City of Larkspur SMART Station Area Plan EIR

Existing and Proposed Bicycle Facilities

SOURCE: CITY OF LARKSPUR, DECEMBER 2013.

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Table IV.B-5: Study Area Bicycle Counts

Count Location	Daily Counts (24-Hour Counts)	Weekday Peak Period Counts (Two Hour)			Weekend Mid-day (4 hour)
		AM	Mid-day	PM	
On-Street Counts					
Sir Francis Drake Boulevard/Wolfe Grade [a]	–	5	2	4	–
Sir Francis Drake Boulevard/Bon Air Road [a]	–	5	2	3	–
Sir Francis Drake Boulevard/Eliseo Drive/Barry Way [a]	–	8	4	6	–
Sir Francis Drake Boulevard/U.S. 101 Southbound Ramps [a]	–	1	1	2	–
Sir Francis Drake Boulevard/U.S. 101 Southbound Ramps [a]	–	0	1	2	–
Sir Francis Drake Boulevard/Larkspur Landing Circle (West) [a]	–	4	7	8	–
Sir Francis Drake Boulevard/Larkspur Landing Circle (East) [a]	–	0	0	1	–
Off-Street Counts					
Cal Park Tunnel [b]	327	73	–	–	166
Larkspur Ferry Terminal Bridge [b]	–	23	–	–	91
Sir Francis Drake Boulevard/Larkspur Landing Circle (West) [b, c]	–	74	–	–	151
Corte Madera Creek Path at U.S. 101 Northbound Off-Ramp [b]	533	103	–	–	216
U.S. 101 Pedestrian Crossing at Lucky Drive [d]	59	9	7	11	19

Notes: "–" No counts collected during this period.

[a] Counts collected in October 2011 for the *MTC Program for Arterial System Synchronization for Marin County, City of Larkspur, and Caltrans* (TJKM, 2012).

[b] Counts collected in March 2013 for the *Central Marin Ferry Connection Project (CMFCP) Use Projections and Benefit Assessment, DRAFT* (April 5, 2013, Alta Planning + Design/Transportation Authority of Marin)

[c] Off-street counts collected at Sir Francis Drake Boulevard/Larkspur Landing Circle (West) include movements across intersection and on adjacent Class I multi-use path. Approximately two-thirds of these counts were noted to be exclusively using the Class I multi-use path.

[d] Counts collected in May 2013 for the *Highway 101 Twin Cities/Greenbrae Corridor Improvement Project*.

Source: TJKM, Alta Planning + Design/Transportation Authority of Marin, Fehr & Peers, 2011-2013.

Though the Plan area and surrounding area have a number of bicycle paths and lanes, several obstacles limit the connectivity for bicyclists, including U.S. 101, the Corte Madera Creek, and Sir Francis Drake Boulevard.

U.S. 101 is a major barrier that hinders east-west connectivity. The only locations to cross U.S. 101 within the Plan area are at Wornum Drive, the pedestrian bridge at Lucky Drive, and the Corte Madera Creek multi-use path.

- Wornum Drive has an existing Class I path on the south side of the road under U.S. 101. However, Wornum Drive is not ideal for bicyclists traveling south on Redwood Highway to west on Wornum Drive as they have to cross Wornum Drive to access the multi-use path on the south side of the roadway. Many cars turn right onto Wornum Drive from Redwood Highway coming from the ramps at Industrial Way, making this crossing uncomfortable for less-experienced bicyclists.
- While the Lucky Drive pedestrian bridge is an important east-west pedestrian and bicycle link over U.S. 101, the bridge is not currently American with Disabilities Act (ADA) accessible and has substandard touchdown areas.

In addition, Corte Madera Creek and Sir Francis Drake Boulevard create north-south barriers to both pedestrians and bicyclists.

- The Corte Madera Creek crossings are considered acceptable for short-term, but will be inadequate to accommodate future demand. These crossings are a key link to any north-south bicycle route through Marin County.
- The path along the northbound off-ramp is very narrow and most bicyclists dismount before they cross the creek. The path on the southbound on-ramp is similar to the northbound ramp, but bicyclists are able to ride across as it is wider and has a concrete barrier separating it from traffic instead of a metal railing.
- The only place to cross Sir Francis Drake Boulevard via a grade separated crossing in the Plan area is at the bridge at the Larkspur Ferry Terminal. With the completion of the Cal Park Tunnel, this crossing is inconvenient as there is no direct north-south path connecting the terminus of the Cal Park Hill Tunnel across Sir Francis Drake Boulevard and the Corte Madera Creek.
- For residents in the Greenbrae Hills neighborhood, traveling east requires crossing several lanes of Sir Francis Drake at Eliseo Drive in order to reach the Corte Madera Creek trail. In addition, the topography of Greenbrae Hills presents a challenge for both pedestrians and bicyclists.

South of the creek, north-south connectivity is limited on either side of U.S. 101 due to the lack of dedicated bike facilities on either side of U.S. 101.

- An existing multi-use path connects the Corte Madera Creek crossing on the west side of U.S. 101 with the base of the Lucky Drive pedestrian bridge. The path across the creek is narrow and requires cyclists traveling in opposite directions to dismount in order to pass. From the base of the bridge, bicyclists travel south on Nellen Avenue, which is a low-volume roadway and ideal for most bicyclists but does not include a separated facility for bicyclists who are not comfortable to ride in the street, such as children.
- While recently added bike lanes on the east side of U.S. 101 have made bicycling safer, the lanes have some short gaps along Redwood Highway.

Bicycle access improvements are proposed throughout the Plan area as a part of the GCIP, Central Marin Ferry Connector, and San Quentin Area Bicycle and Pedestrian Access Study. Proposed improvements associated with other plans or potential projects in and adjacent to the Plan area are shown in Figure IV.B-3.

(3) Pedestrian Facilities. The primary pedestrian connection within the Plan area is the Corte Madera Creek Trail, a dedicated pathway that runs along East Sir Francis Drake Boulevard, starting near Drake's Cove and continuing west past the Larkspur Ferry Terminal, under the freeway overpass to Drake's Landing and the communities to the west. This path also connects to two Corte Madera Creek crossings, one on the U.S. 101 northbound off-ramp and the other on the southbound on-ramp. The Cal Park Hill Multi-Use Pathway is the other major pedestrian connection in the Plan area, linking Larkspur to San Rafael. Lastly, two multi-use pathways – the Sandra Marker Trail and the trail along Redwood Highway (south of Wornum Drive) – connect the Plan area to nearby schools and residential communities to the south. A map of these multi-use paths is shown in Figure IV.B-4.

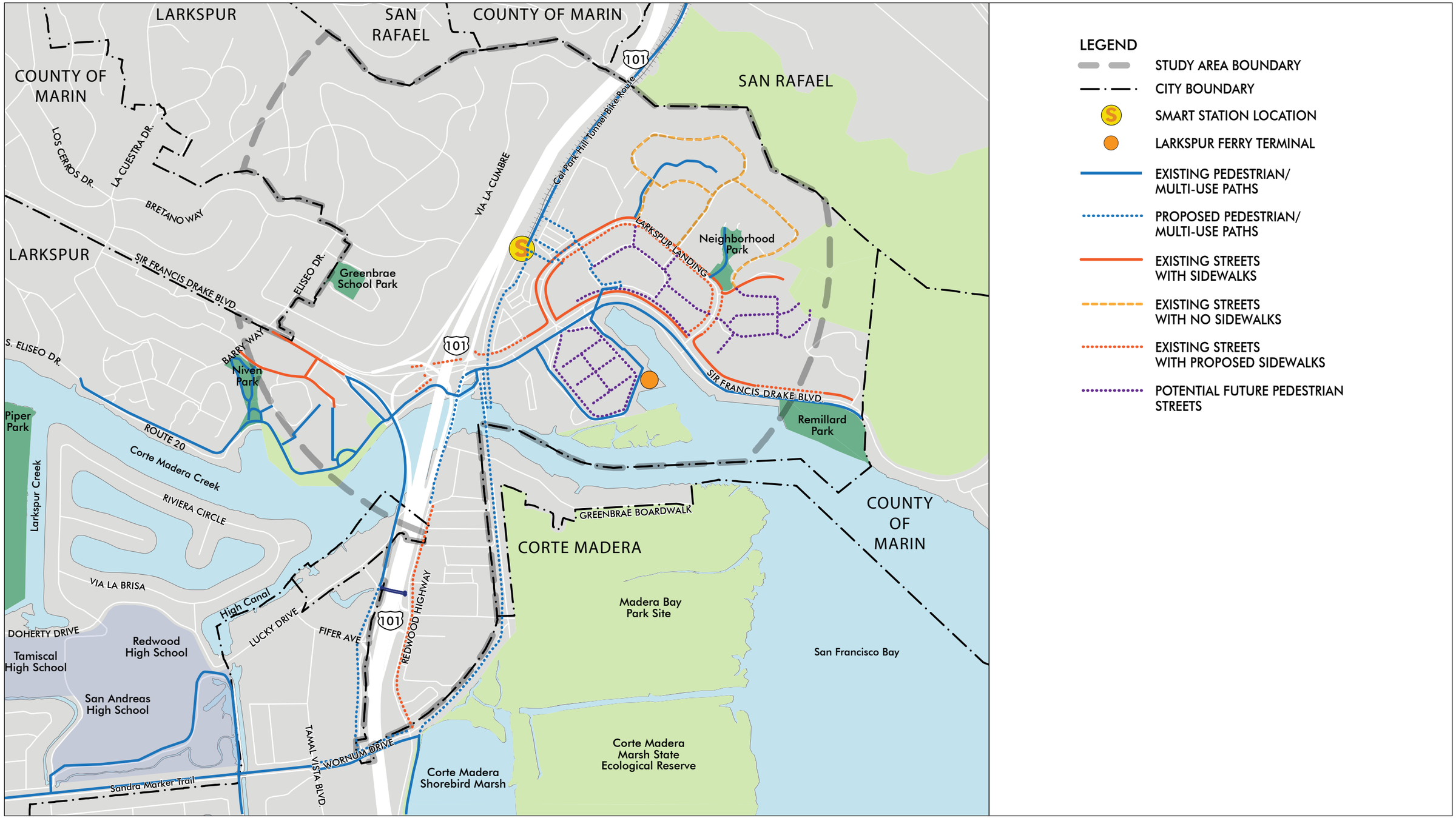

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FIGURE IV.B-4

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City of Larkspur SMART Station Area Plan EIR

Existing and Proposed Pedestrian Facilities

SOURCE: CITY OF LARKSPUR, DECEMBER 2013.

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The heaviest pedestrian use is located around the major constraint points, such as the pedestrian bridge at Lucky Drive, and public transit facilities including the Larkspur Ferry Terminal. These areas are used heavily for commuters parking their cars nearby and riding the bus or ferry. Pedestrian count locations are shown in Table IV.B-6.

Table IV.B-6: Study Area Pedestrian Counts

Count Location	Daily Counts (24-Hour Counts)	Weekday Peak Period Counts (Two Hour)			Weekend Mid-day (4 hour)
		AM	Mid-day	PM	
On-Street Counts					
Sir Francis Drake Boulevard/Wolfe Grade [a]	–	13	21	5	–
Sir Francis Drake Boulevard/Bon Air Road [a]	–	2	6	12	–
Sir Francis Drake Boulevard/Eliseo Drive/Barry Way [a]	–	11	16	39	–
Sir Francis Drake Boulevard/U.S. 101 Southbound Ramps [a]	–	0	0	0	–
Sir Francis Drake Boulevard/U.S. 101 Southbound Ramps [a]	–	0	0	0	–
Sir Francis Drake Boulevard/Larkspur Landing Circle (West) [a]	–	26	58	64	–
Sir Francis Drake Boulevard/Larkspur Landing Circle (East) [a]	–	6	10	10	–
Off-Street Counts					
Cal Park Tunnel [b]	61	1	–	–	36
Larkspur Ferry Terminal Bridge [b]	–	90	–	–	367
Sir Francis Drake Boulevard/Larkspur Landing Circle (West) [b, c]	–	32	–	–	120
Corte Madera Creek Path at U.S. 101 Northbound Off-Ramp [b]	400	33	–	–	178
U.S. 101 Pedestrian Crossing at Lucky Drive [d]	280	51	29	48	58

Notes: "--" No counts collected during this period.

[a] Counts collected in October 2011 for the *MTC Program for Arterial System Synchronization for Marin County, City of Larkspur, and Caltrans* (TJKM, 2012).

[b] Counts collected in March 2013 for the *Central Marin Ferry Connection Project (CMFCP) Use Projections and Benefit Assessment, DRAFT* (April 5, 2013, Alta Planning + Design/Transportation Authority of Marin)

[c] Off-street counts collected at Sir Francis Drake Boulevard/Larkspur Landing Circle (West) include movements across intersection and on adjacent Class I multi-use path. Approximately two-thirds of these counts were noted to be exclusively using the Class I multi-use path.

[d] Counts collected in May 2013 for the *Highway 101 Twin Cities/Greenbrae Corridor Improvement Project*.

Source: TJKM, Alta Planning + Design/Transportation Authority of Marin, Fehr & Peers, 2011-2013

Although the Plan area has a number of sidewalks and pedestrian paths, several obstacles limit the connectivity for pedestrians. These include poor east-west connections across U.S. 101 and limited north-south connections across Corte Madera Creek and Sir Francis Drake Boulevard:

- There are limited sidewalks on the east side of Redwood Highway between Wornum Drive and Industrial Way. This is a heavily used connection between the Lucky Drive pedestrian bridge and Corte Madera Creek crossing to the multi-use trails at Redwood Highway and Wornum Drive.
- Crosswalks across Sir Francis Drake are long and across multiple travel lanes serving high traffic demands. This is an issue for Greenbrae Hills residents accessing the Corte Madera Creek trail, as well as pedestrians and bicyclists getting off at the Cal Park Hill Tunnel and crossing at Larkspur Landing Circle (West).
- The sidewalk on the north side of Larkspur Landing Circle terminates at Drake's Way, i.e., there is no sidewalk between Drakes Way and Sir Francis Drake Boulevard.

- Additional community concerns regarding pedestrians include improving access to regional bus stops and local schools.

Pedestrian access improvements are proposed throughout the Plan area as a part of the GCIP, Central Marin Ferry Connector, and San Quentin Area Bicycle and Pedestrian Access Study. Proposed improvements associated with other plans or potential projects in the Plan area are shown in Figure IV.B-4.

(4) Roadway Network. Regional auto access to the Plan area is provided by U.S. 101. City streets in the Plan area are Sir Francis Drake Boulevard, Redwood Highway, and Larkspur Landing Circle.

U.S. 101 is the only continuous north-south roadway in Marin County, connecting the communities of Marin and Sonoma counties to job centers and major destinations in San Francisco to the south and Contra Costa County to the east. Within the Plan area, U.S. 101 bisects the communities of Larkspur, and Corte Madera and serves both as the primary connection to regional destinations as well as the largest east-west barrier within the communities themselves. Local access interchanges are provided at Sir Francis Drake Boulevard, Lucky Drive/Fifer Avenue, and Industrial Way. Within the Plan area, the majority of the freeway segments consist of eight lanes (four lanes in each direction).

U.S. 101 in Marin County currently experiences heavy traffic congestion in the southbound direction during the AM peak hour and in the northbound direction during the PM peak hour due to commute traffic between Sonoma, Marin, San Francisco, and Contra Costa counties. The increasing congestion and delays experienced by motorists on U.S. 101 are a reflection of the increasing population and employment growth in Sonoma and Marin counties. As new housing and employment centers develop in both counties, commute trips within and between Sonoma and Marin counties are also increasing.

Sir Francis Drake Boulevard is an east-west principal arterial street that runs through Marin County, connecting the rural communities in the west to U.S. 101 and I-580. Within the Plan area, Sir Francis Drake Boulevard carries approximately 50,000 vehicles per day and has four through travel lanes at U.S. 101. Access to U.S. 101 is provided at an interchange in the City of Larkspur. The Larkspur Ferry Terminal is located on Sir Francis Drake Boulevard east of U.S. 101 and is a major generator of commuter traffic during the AM and PM peak periods.

Redwood Highway is the only north-south local street on the east side of U.S. 101 in the Plan area. This two- to four-lane roadway provides access to a variety of commercial, service and industrial uses as well as mobile home parks to the north of Wornum Drive. Redwood Highway provides access to northbound U.S. 101 at the Industrial Way on- and off-ramps. Redwood Highway carries approximately 7,000 vehicles per day south of Wornum Drive.

Larkspur Landing Circle is a two- to four-lane local street that circles the Marin Country Mart and has two signalized intersections with East Sir Francis Drake Boulevard. It provides access to the Cal Park Hill Tunnel, as well as the Marin Airporter, Century Larkspur Landing Theater, and various commercial and residential uses. Sidewalks are provided on most of the north side of the street, but are limited on the south side, between Sir Francis Drake Boulevard and the Theater.

(5) Intersection Traffic Volumes and Lane Configurations. Traffic count locations are illustrated in Figure IV.B-1. Figure IV.B-5 shows AM and PM peak hour vehicle turning movement counts, lane geometries, and intersection control for the study intersections. The counts were conducted during typical weekdays (Tuesday through Thursday) in September 2006 when schools were in session. The peak hour reflects the hour of the day that observes the highest traffic volumes for that intersection, typically occurring between 7:00–9:00 a.m. and 4:00–6:00 p.m. The count results were compared to the traffic counts used for the Sir Francis Drake Boulevard PASS Study conducted in 2011 and found that the 2011 counts were generally similar to or lower than the traffic volumes in the existing GCIP VISSIM model. The counts collected in 2006 and 2011 are shown in Appendix B. Each study intersection was analyzed using existing lane configurations and existing traffic signal timing data provided by the County of Marin, Caltrans, or the Town of Corte Madera.[7]

(6) Existing Intersection Operations. The locally accepted LOS standards for intersection operation and freeway segments are shown in Table IV.B-7. The jurisdictions call for LOS D to be maintained at signalized intersections for acceptable operations. However, as shown in Table IV.B-7, the Marin County Congestion Management Program (CMP) notes that Sir Francis Drake Boulevard operates at LOS E and F on several sections from east of Bon Air Road to I-580 including at the County controlled intersection of Sir Francis Drake Boulevard/Eliseo Drive. The primary cause of peak congestion on Sir Francis Drake Boulevard is the combination of heavy through volumes, traveling between Ross Valley, U.S. 101, and the Richmond-San Rafael Bridge. The Marin County General Plan notes the following regarding the segment between U.S. 101 and Eliseo Drive: "Consider widening from two to three lanes in each direction from U.S. 101 to Eliseo Drive" (p.3-155). In addition, Larkspur's General Plan acknowledges that the intersections of Sir Francis Drake Boulevard with Eliseo Drive and Bon Air Drive currently operates at LOS E or F. However, it also notes that capacity improvements to Sir Francis Drake Boulevard would not be desirable for the community due to upstream and downstream bottlenecks and potential impacts to the Larkspur quality of life.

Table IV.B-7: Locally Acceptable LOS Criteria

Jurisdiction	Facility Type	Worst Acceptable LOS	Maximum Acceptable Average Vehicular Delay or V/C Ratio
City of Larkspur	Signalized Intersections	LOS D [a]	55 seconds/vehicle [b]
City of Larkspur	Unsignalized Intersections	LOS C	25 seconds/vehicle [b]
Town of Corte Madera	Signalized Intersections	LOS D	55 seconds/vehicle [b]
County of Marin	Signalized Intersections	LOS D	55 seconds/vehicle [b]
City of San Rafael	Signalized Intersections	LOS D	55 seconds/vehicle [b]
City of San Rafael	Unsignalized Intersections	LOS D	35 seconds/vehicle [b]
Transportation Authority of Marin	Freeway Segments	LOS E	V/C = 1.00 [b]

[a] The Larkspur General Plan Policy Quality of Life Goal 4, Policy d states that the following intersections are recognized to operate at LOS "E" and should not be improved due to the undesirable impacts which the improvements would cause: Sir Francis Drake Boulevard with Eliseo Drive, La Cuesta Drive, and Bon Air Drive.

[b] Based on 2000 Highway Capacity Manual (HCM).

Sources: City of Larkspur General Plan, 1990; Town of Corte Madera General Plan, 2009; The City of San Rafael General Plan 2020, 2004; Marin County Congestion Management Program, 2011.

[7] Signal timings along Sir Francis Drake Boulevard were updated in May 2012 based on the findings of the *MTC Program for Arterial System Synchronization for Marin County, City of Larkspur, and Caltrans*. These signal timings were updated in the VISSIM simulation model to reflect the existing conditions at the time of the NOP.

The results of the existing intersection LOS analysis are presented in Table IV.B-8. The table shows that during the AM and PM peak hours, the following three intersections currently operate at LOS E or F:

#1 Sir Francis Drake Boulevard/Wolfe Grade – LOS F during the AM and PM peak hours

#3 Sir Francis Drake Boulevard/Eliseo Drive – LOS F during the AM peak hour and LOS E during the PM peak hour

#8 Sir Francis Drake Boulevard/Andersen Drive – LOS F during the AM and PM peak hours

Table IV.B-8: Existing Intersection LOS Results

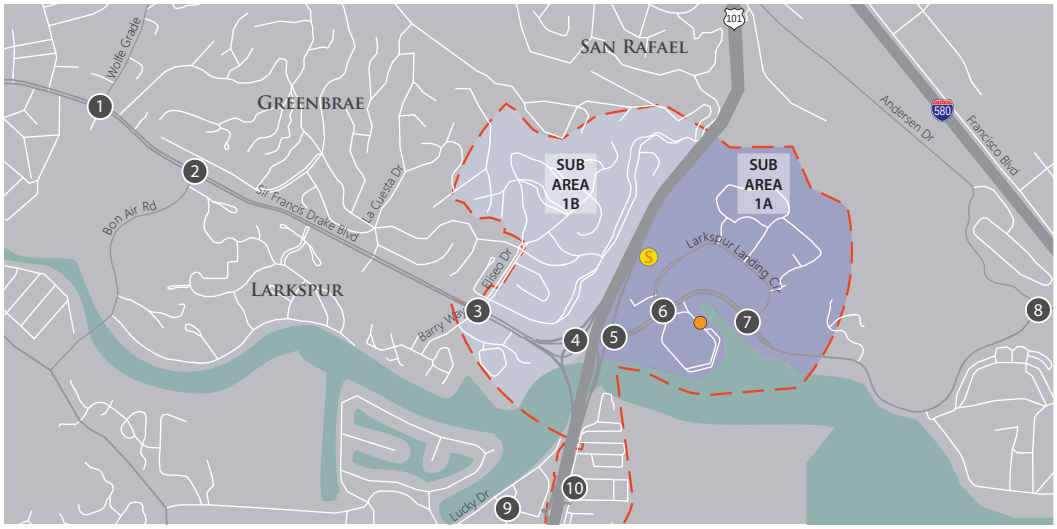
Intersection	Control	AM Peak Hour		PM Peak Hour	
		Delay[a]	LOS	Delay[a]	LOS
#1 Sir Francis Drake Boulevard/Wolfe Grade	Signal	**>80**	**F**	**>80**	**F**
#2 Sir Francis Drake Boulevard/Bon Air Road	Signal	43	D	34	C
#3 Sir Francis Drake Boulevard/Eliseo Drive b	Signal	**>80**	**F**	57	E
#4 Sir Francis Drake Boulevard/U.S. 101 Southbound Ramps[b]	Signal	29	C	22	C
#5 Sir Francis Drake Boulevard/U.S. 101 Northbound Ramps[b]	Signal	31	C	53	D
#6 Sir Francis Drake Boulevard/Larkspur Landing Circle (West)/Ferry Terminal Entrance[b]	Signal	44	D	35	C
#7 Sir Francis Drake Boulevard/Larkspur Landing Circle (East)[b]	Signal	<10	A	28	C
#8 Sir Francis Drake Boulevard/Andersen Drive	SSS [c]	**>50**	**F**	**>50**	**F**
#9 Tamal Vista Boulevard/Fifer Avenue[b]	Signal	17	B	20	B
#10 U.S. 101 Northbound Ramps/Redwood Highway/ Industrial Way[b]	Signal	<10	A	15	B

Notes: **Bold** = unacceptable LOS.
[a] For signalized and all-way stop controlled intersections, the delay shown is the weighted average for all movements in seconds per vehicle. For side-street stop controlled intersection, the delay shown is the worst-operating approach delay.
[b] Intersection analyzed using the VISSIM microsimulation model.
[c] SSS = Side-street stop.

Source: Fehr & Peers, May 2013.

The poor intersection operations at these locations are primarily due to the through traffic volumes traveling on Sir Francis Drake Boulevard between Ross Valley, U.S. 101, and I-580. In addition, two primary causes of congestion at Eliseo Drive are the high eastbound traffic on Sir Francis Drake Boulevard destined for the southbound on-ramp during the AM peak hour and westbound traffic turning left or making U-turns at Barry Way during the AM and PM peak hours. The southbound traffic on Andersen Drive and eastbound left-turning traffic on Sir Francis Drake Boulevard cause this side-street stop controlled intersection to operate at LOS F during the AM and PM peak hours due to the limited gaps in traffic along Sir Francis Drake Boulevard at this intersection.

The LOS calculations for the isolated intersection analysis and the VISSIM simulation model are included in Appendix B.



MAP KEY

- Study Area Boundary
- SMART Station Location
- Larkspur Ferry Terminal
- Study Intersection

VOLUMES KEY

- XX (YY) — AM (PM) Peak Hour Traffic Volumes
- Traffic Signal
- Stop Sign

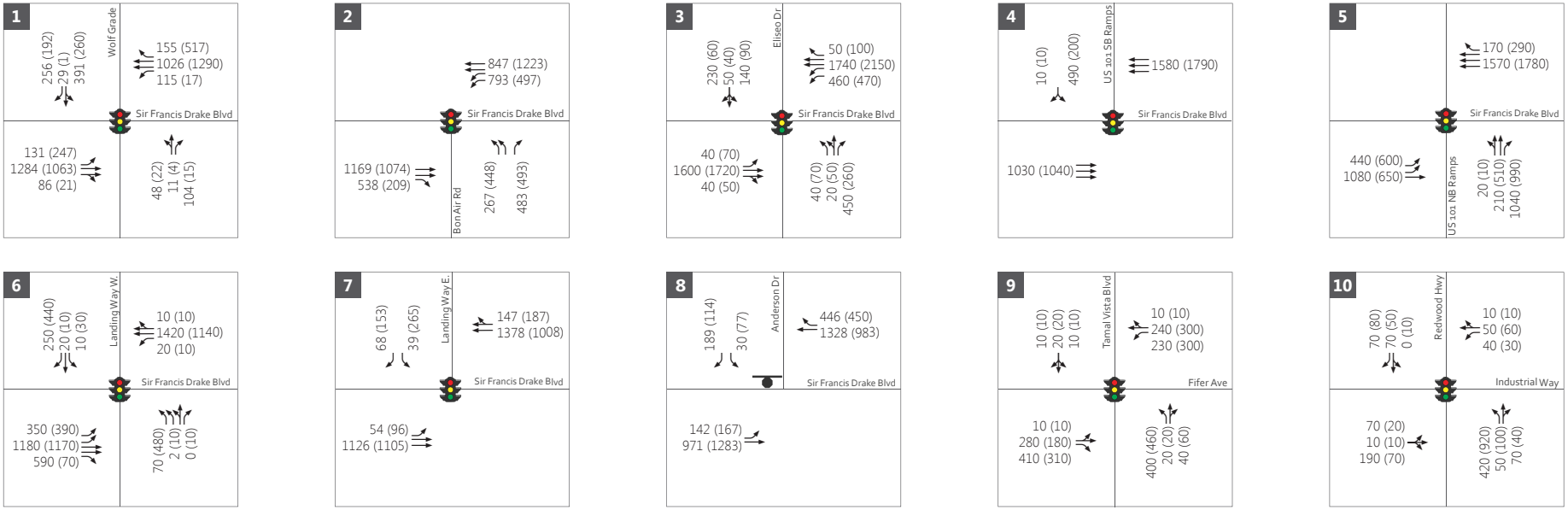


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FIGURE IV.B-5

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City of Larkspur SMART Station Area Plan EIR

Existing Intersection Peak Hour Volumes, Lane Configurations and Traffic Control Devices

SOURCE: FEHR & PEERS, MAY 2013.

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In addition to these intersections, several intersections operate at LOS D. Although LOS C or D conditions are typical during peak hours on East Sir Francis Drake Boulevard, occasionally traffic operates at near-capacity conditions (i.e. LOS E or F) between U.S. 101 and the Richmond-San Rafael Bridge. It is important to note that the LOS standard is calculated based on the average vehicle delay for all the vehicle movements over the course of the peak hour at the study intersections. Therefore, some vehicle movements may operate worse than the total intersection at different times of the peak hour, which causes congestion and queues to develop on some approaches but not others. The VISSIM simulation model analyzes the effects of the closely spaced intersections and existing congestion along Sir Francis Drake Boulevard between Eliseo Drive and Larkspur Landing Circle (East). Vehicle movements along this section of Sir Francis Drake Boulevard that currently operate at LOS E or F include the following:

#3 Sir Francis Drake Boulevard/Eliseo Drive

a. All eastbound movements – LOS F in the AM peak hour
b. Eastbound left movement – LOS E in the PM peak hour
c. Westbound left movement – LOS F in the AM and PM peak hours
d. Westbound through movement – LOS E in the PM peak hour

#5 Sir Francis Drake Boulevard/U.S. 101 Northbound Ramps

a. Westbound through movement – LOS E in the AM and PM peak hours

#6 Sir Francis Drake Boulevard/Larkspur Landing Circle (West)/Ferry Terminal Entrance

a. All westbound movements at Larkspur Landing Circle (West) – LOS E in the AM peak hour

#7 Sir Francis Drake Boulevard/Larkspur Landing Circle (East)

a. Eastbound left movement – LOS E in the AM and PM peak hours

These results match observed congestion along Sir Francis Drake Boulevard where vehicles traveling westbound between Larkspur Landing Circle (East) and Eliseo Drive, and eastbound between Eliseo Drive and U.S. 101, currently sit through one or more signal cycles and experience reoccurring queues. At Intersection #6 Sir Francis Drake Boulevard/Larkspur Landing Circle (West)/Ferry Terminal Entrance, traffic congestion on Sir Francis Drake Boulevard increases substantially before each ferry departure in the morning and after ferry arrivals in the evening. Peaks in Ferry Terminal traffic cause vehicle queues to extend along westbound Sir Francis Drake Boulevard between the Northbound U.S. 101 Ramps and Larkspur Landing Circle (East). However, the calculated total intersection LOS at these locations remains at LOS C or D during the AM and PM peak hours primarily due to the comparably low vehicle delay on eastbound Sir Francis Drake Boulevard.

Other congested movements that operate at LOS D eastbound left-turn at Larkspur Landing Circle (West) during the AM and PM peak hours, and westbound through movement at Larkspur Landing Circle (West) during the PM peak hour. On average over the course of the peak hour, vehicles on both of these approaches are served in one signal cycle and queues do not regularly extend to upstream intersections.

The detailed LOS calculations for the vehicle movements at all study intersections are shown in Appendix B.

(7) Freeway Volumes and Operations. Freeway volume count data were collected for the GCIP from the Performance Measurement System (PeMS) in 2010 and ramp volumes provided by Caltrans in 2010. PeMS is an online California Department of Transportation (Caltrans) database for traffic counts that includes traffic volume data from detectors embedded in the freeway at certain points. Volume data was collected from the detector station located in San Rafael (post mile 9.05) just north of Sir Francis Drake Boulevard off-ramp. The PeMS data gathered included PM (4:00-6:00 p.m.) peak period counts for all midweek days (Tuesday through Thursday) in May 2010, following the completion of the U.S. 101 Gap Closure Project through the Plan area. After discarding days where less than 100 percent of traffic was observed (potentially due to faults in the detector readings), the average of the peak hours was taken for each day to determine the overall average mainline peak hour volume. Northbound volumes were determined in a similar manner from data from the PeMS detector station located at post mile 7.00 to the south of Tamalpais Drive. The GCIP Traffic Operations Report documents that traffic volumes on the U.S. 101 mainline in and around the Plan area have increased by approximately 3 to 21 percent between 2006 and 2010. Therefore, the 2010 volumes represent a conservative analysis.

The resulting traffic volumes and freeway analysis results are presented in Table IV.B-9. The freeway operations vary depending on the direction and segment, ranging from LOS A to LOS E. No segments on U.S. 101 currently exceed their Congestion Management Program (CMP) LOS threshold.

Table IV.B-9: Existing Freeway Segment LOS Results

Direction	Freeway Segment	Theoretical Capacity[a]	Peak Hour	Volume	V/C[b]	LOS
Northbound U.S. 101	A. North of Sir Francis Drake Boulevard	9,900	PM	5,920	0.60	A
	B. North of Industrial Way	8,800	PM	7,910	0.90	D
	C. North of Tamalpais Drive, South of Industrial Way	7,700	PM	7,120	0.92	E
Southbound U.S. 101	A. North of Sir Francis Drake Boulevard	9,900	PM	5,370	0.54	A
	B. North of Fifer Avenue	8,800	PM	6,650	0.76	C
	C. South of Fifer Avenue, North of Madera Boulevard	8,800	PM	6,190	0.70	C

Notes: LOS F represents unacceptable LOS per Marin CMP. Only PM peak hour conditions are analyzed per the Marin CMP.

[a] Assumes a mixed flow freeway capacity of 2,200 vehicles per hour per lane. HOV lane (peak direction only) capacity is 50 percent of a mixed flow freeway lane. Auxiliary lane (an added lane between interchanges) capacity is 50 percent of a mixed flow lane.

[b] Freeway segment level of service based on volume to capacity ratio according to the Highway Capacity Manual. *Highway Capacity Manual, Transportation Research Board, 2000.*

Source: Fehr & Peers, May 2013.

e. Regulatory Context. Applicable State and local laws, regulations, and orders that pertain to project-related transportation issues are presented below. The City of Larkspur has jurisdiction over all City streets and City-operated traffic signals. State Routes, including U.S. 101, are under the jurisdiction of the California Department of Transportation (Caltrans). Public transit agencies with operations in the Plan area are the Marin County Transit District and Golden Gate Transit. In addition, there are several regional and local agencies with jurisdiction related to transportation in the Plan area.

(1) California Department of Transportation. Caltrans is responsible for the maintenance and operation of State routes and highways. In Larkspur, Caltrans is responsible for U.S. 101 including the on- and off-ramp connections to local streets. Caltrans maintains a volume monitoring program and reviews local agency planning documents (such as EIRs) to assist in its forecasting of future volumes and congestion points. The Guide for the Preparation of Traffic Impacts Studies (December 2002) published by Caltrans is intended to provide a consistent basis for evaluating traffic impacts to State facilities. The City recognizes that "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 and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. In addition, Caltrans states that for existing State highway facilities operating at less than the target LOS, the existing LOS should be maintained.

(2) Metropolitan Transportation Commission. The Metropolitan Transportation Commission (MTC) is the transportation planning, coordinating, and financing agency for the nine-county San Francisco Bay Area (Bay Area). It is responsible for developing the regional transportation plan and prioritizing regional transportation projects for State and federal funding.

(3) Transportation Authority of Marin. The Transportation Authority of Marin (TAM) is the Congestion Management Agency for Marin County, which includes maintaining a Congestion Management Plan (CMP). The CMP monitors levels of service on the County's roadways and works to improve all methods of transportation locally and regionally. The CMP documents the existing levels of service (LOS) at key County roadways through the Plan area including U.S. 101 and Sir Francis Drake Boulevard.

The LOS for the CMP 2011 is determined by measuring the time travel and vehicle speeds for each segment. All of the CMP roadway segments in the Plan area have been identified as "grandfathered" roadway segments, which means that they have operated at a lower LOS than the standard which was established in 1991. The County of Marin allows grandfathered roadway segments to continue to operate at a lower LOS standard level until such time as they *are* improved or the traffic load is diverted.

The 2011 CMP Update includes PM peak hour LOS for the roadway segments shown in Table IV.B-10. The roadway segments studied in the CMP include northbound U.S. 101 from south of Tamalpais Drive to I-580, southbound U.S. 101 from I-580 to Sir Francis Drake Boulevard, as well as Sir Francis Drake Boulevard east of U.S. 101. The CMP defines U.S. 101 as a freeway and Sir Francis Drake Boulevard as an arterial. It is important to note that the roadway operations shown for Sir Francis Drake Boulevard do not necessarily reflect the congestion at individual intersections along the corridor.

The CMP states that the method of analysis for freeway segments should be based on segment weekday PM peak hour volume to capacity ratios, based on Chapter 23 and 24 of the 2000 Highway Capacity Manual.

Table IV.B-10: Marin CMP PM Peak Hour Roadway Segment Operations

Freeway Segment	From	To	LOS
Northbound U.S. 101	State Route 131 (Tiburon)	Tamalpais Drive	F
	Sir Francis Drake Blvd	I-580	D
Southbound U.S. 101	I-580	Sir Francis Drake Blvd	A
	Tamalpais Drive	State Route 131 (Tiburon)	A
Eastbound Sir Francis Drake Boulevard	College Avenue	U.S. 101	B[a]
	U.S. 101	Larkspur Landing Circle	C
Westbound Sir Francis Drake Boulevard	Larkspur Landing Circle	U.S. 101	D
	U.S. 101	College Avenue	A[a]

[a] The actual roadway segment studied in the CMP is located between College Avenue and Wolfe Grade, to the east of the Larkspur SMART Plan area.

Source: TAM, 2011 CMP update.

(4) City of Larkspur General Plan. The City of Larkspur General Plan currently in place was adopted in 1990 and is currently in the process of being updated. The applicable circulation goals, policies, and programs related to transportation impacts are included below. It should be noted that the Station Area Plan recommends that the City amend the land use designations within the Plan area to allow a mix of land uses at higher densities and intensities than are currently permitted. Thus, adoption of the Station Area Plan by the City Council would trigger a new, separate planning process to amend the General Plan; it would not automatically amend the General Plan. The General Plan amendment process would require public outreach and review, environmental analysis of the proposed amendments, and public hearings before both the Planning Commission and City Council for adoption.

Circulation Element

Goal 1: Regard quality of life in Larkspur as more important than mobility of traffic.

Goal 2: Provide safe and efficient local-serving transportation facilities and services for the movement of people and goods.

Goal 3: Improved local or regional transit service should not negatively affect Larkspur.

- Policy a: Develop a coordinated system of roads, bike paths, foot paths, public transit, and Transportation demand Management (TDM) programs.
- Policy b: Remove hazards from the traffic system.
- Policy c: To minimize traffic increases on Sir Francis Drake Boulevard, properties north of Corte Madera Creek shall not generate additional PM peak traffic over existing levels by a change of use or building addition. Exempt from this policy are: (1) singly-developed single-family homes, (2) vacant properties, and (3) residential development projects where no less than: 15 percent of the units are dedicated to very-low income households and 10 percent to low-income households and 25 percent to moderate-income households, or where 50 percent of the units are senior and/or disabled housing. TSM (transportation system management) should be considered and may be used to maintain existing levels of traffic generation, where feasible.
- Policy d: Wherever possible, maintain standards for acceptable traffic Levels of Service during peak periods. Acceptable Level of Service (LOS) shall be defined for signalized intersections at the D level using planning procedures defined in Transportation Research Circular 212 or successor. The

City acknowledges that LOS E exists at the following intersections and that most measures which would alleviate traffic congestion there would not be desirable:

- Sir Francis Drake Boulevard at Eliseo Drive;
- Sir Francis Drake Boulevard at La Cuesta Drive; and
- Sir Francis Drake Boulevard at Bon Air Road.

For unsignalized intersections, service level C shall be the lowest level acceptable during peak periods. Because poor service levels at unsignalized intersections do not represent the same level of delay to motorists as at signalized intersections, the City should develop specific requirements on a case-by-case basis.

- Policy e: Conform to standard traffic engineering practices where practical.
- Policy h: Design circulation facilities that minimize disruption of neighborhoods and communities.
- Policy m: Sir Francis Drake Boulevard shall not be widened to allow additional through-traffic lanes.
  - Action Program [2]: Actively cooperate with the County of Marin to seek workable capacity improvements to Sir Francis Drake Boulevard that are not disruptive to the community.
  - Action Program [3]: Maintain and improve the existing median strip landscaping on Sir Francis Drake Boulevard.
  - Action Program [5]: Perform the following specific capacity and safety related improvements:
    - Add a southbound-to-eastbound left-turn lane on Eliseo Drive at the intersection with Sir Francis Drake Boulevard.

Goal 5: Encourage attractive alternatives to the use of single-occupant automobiles.

Goal 6: Increase transit service in Larkspur.

Goal 7: Aim for lower levels of peak hour automobile traffic.

Goal 8: Keep airport transit service for Larkspur.

- Policy o: Coordinate circulation and development so higher intensity uses such as commerce, professional offices, public services, and higher density residences are near major transit routes and are served by public transit facilities.
- Policy p: Encourage increased transit ridership and use of Transportation Demand Management (TDM) techniques.
- Policy r: Encourage all employers to cooperate in reducing peak hour automobile traffic.
- Policy t: Require adequate park-and-ride facilities.
- Policy u: Work with transit operators to provide service in Larkspur and to resolve any parking difficulties through designation of parking facilities controls as needed.
- Policy v: The following are the City's policies regarding future regional transit service in the Highway 101 Corridor:
  - Minimize the impact on Larkspur and the existing road system.
  - Use discrete and separate rights-of-way.

        - Support a direct rail connection from the north via a new grade separation with Sir Francis Drake Boulevard along the approximate alignment of the existing trestle.
        - Encourage eventual expansion of the rail line to the south.
    - Action Program [7]: Cooperate with Golden Gate Transit, Marin Transit, and private transit providers to periodically review, modify, and upgrade transit service to best meet the needs of Larkspur residents, businesses, and schools.
    - Action Program [8]: Cooperate with the transit agencies to provide amenities at transit stops, such as benches, shelters, lights, maps, and telephones.
    - Action Program [9]: Using a Transportation Demand Management ordinance, encourage employers to allow flexible work hours and to help employees create vanpools or carpools.
    - Action Program [12]: Encourage shared-ride service to or from transportation terminals, and consider an ordinance to allow jitney service.

Goal 10: Create better ties between Larkspur, neighboring communities, and the region.

    - Action Program [13]: Encourage and cooperate with the appropriate jurisdictions to accomplish the following specific improvements:
        - Signalize the Sir Francis Drake Boulevard/Andersen Drive intersection.

Goal 11: Obtain safe freeway access for Larkspur.

    - Action Program [14]: Actively cooperate with Caltrans, County of Marin, City of Corte Madera, and City of San Rafael to find workable capacity and safety improvements to the Greenbrae and Lucky Drive interchanges with Highway 101.

Goal 12: Reduce the need for long distance and/or frequent shopping travel by private automobile.

- Policy ab: Reduce demand for parking at retail areas.
    - Action Program [15]: Explore the feasibility of providing a free shuttle service on one or more routes connecting Downtown, North Magnolia, Bon Air Shopping Center, Larkspur Landing, the Village in Corte Madera, and the Corte Madera Town Center.

Goal 14: Reduce the number and severity of transportation-related accidents.

- Policy ae: Place higher priority on safety as opposed to efficient traffic flow and speed.
    - Action Program [17]: Install stop signs, pedestrian cross walks, and other safety-related improvements as warranted.

Goal 16: Circulation Improvements should not adversely affect the environment.

Goal 17: Mitigate the traffic impacts of new developments.

- Policy ak: Development should contribute to measures to mitigate local and regional traffic impacts.
- Policy al: Developers should pay for improvements to the existing street system to mitigate unacceptable impacts where such improvements are appropriate.
- Policy am: Improvements based on traffic mitigation are not to be considered the only way to reduce traffic impacts.
    - Action Program [22]: Continue to collect a traffic impact fee from developers to fund improvements.

- Action Program [24]: The City will use its traffic mitigation fees to carry out projects as soon as sufficient funds are received.

Bicycle and Pedestrian Trails and Paths Element

Goal 1: Make it easier to travel around Larkspur by non-motorized transportation modes.

Goal 2: Provide safe bicycle and pedestrian routes for all users, to schools, shopping and business areas, recreation facilities, open space preserves, and other communities, and associated amenities.

Goal 3: Coordinate existing and planned bicycle and pedestrian routes with the circulation plans of neighboring communities and the County.

- Policy e-e: Locate and design pedestrian and bike trails separate from streets and automobile traffic wherever possible. Designate on-street bike lanes where off-road paths are not possible.
- Policy f: Freeway improvements should include protected crossings for pedestrians and bicycles.
- Policy i: Secure better trail access to San Rafael.

  Trail connections are needed between Tubb Lake and the Southern Heights Ridge; at Anderson Drive and East Sir Francis Drake Boulevard; and along Wolfe Grade.
- Policy j: Encourage neighborhood and local consumer services that can be reached by walking and bicycling.
- Policy k: Encourage means of travel to and between retail areas other than by private automobiles.
- Policy p: Develop and adopt design standards to reduce trail user conflicts and protect adjacent environmental resources.

  The minimum paved width of most paths should be eight feet. Where more than modest use is anticipated, the paved section should be 10 feet, and an unpaved shoulder 18 inches wide should be provided along each side of the path for joggers.
- Policy r: Provide bicyclists and pedestrians with safe facilities for circulation.
- Policy s: Place higher priority on safety as opposed to efficient traffic flow and speed.
- Policy t: Identify streets that create a safety problem for pedestrians and bicyclists.
  - Action Program [1]: Require the submittal of a trails and paths plan for all new development or redevelopment.
  - Action Program [2]: Implement the Bicycle/Pedestrian Circulation Plan.
  - Action Program [8]: Require new development or redevelopment to provide appropriate sidewalks or paths.
  - Action Program [9]: Require, by ordinance, bike racks in commercial and park and recreation areas, and outside schools and other public buildings.

f. Related Plans and Projects. Related plans and projects that include proposed transportation improvements in and around the Plan area are discussed below.

(1) Sonoma Marin Area Rail Transit (SMART). SMART is a passenger train and multi-use pathway project that is planned to run along 70 miles of the historic Northwestern Pacific Railroad alignment. The rail line will serve 14 stations from Cloverdale in Sonoma County to the San Francisco-bound Ferry Terminal in Larkspur.

The SMART rail parallels U.S. 101 and will provide an alternative to this already-congested corridor. The rail project is projected to take more than 1.4 million car trips off U.S. 101 annually and reduce greenhouse gases by at least 124,000 pounds per day. SMART's environmental studies project 5,000 to 6,000 passenger trips per day will be made on the train and 7,000 to 10,000 daily trips will be made on the bicycle/pedestrian pathway.

Commuter-oriented passenger train service will be provided by an estimated 14 round-trip trains per day, operating at 30-minute intervals in the morning and evening peak commuting hours during the week. Bicycles will be allowed on board the trains; weekend service also is planned.

Larkspur SMART Station. The future SMART Larkspur Station will be located within the SMART corridor right-of-way behind the Century Larkspur Landing Cinema. It will be a double-track, two-platform station. Current plans show provision of 80 parking spaces. It is approximately 1,500 feet north of the existing Larkspur Ferry Terminal. In order to access the ferry terminal, passenger rail riders will use the Cal Park Hill Tunnel Multi-Use Pathway to reach Larkspur Landing Circle, cross Larkspur Landing Circle in an improved crosswalk and utilize the existing sidewalk and crosswalks at Sir Francis Drake Boulevard to reach the Ferry Terminal. Alternatively, SMART riders will be able to utilize the new bridge and improved connections implemented as part of the Central Marin Ferry Connection Multi-Use Pathway project.

Shuttle System. SMART proposes a local shuttle system, using small 12-25 passenger vehicles, to distribute SMART passengers at the work-end of their trip. The shuttles would be free, and would operate during the same hours as trains, in the morning and afternoon peak commute periods. There are nine proposed shuttle routes, each designed to complete a one-way loop in less than 30 minutes or the headway of the train. The shuttle route for Larkspur Ferry Station will serve four major activity centers—Larkspur Landing Circle, San Quentin Prison/Marin Country Mart and nearby offices, Marin General Hospital, and the College of Marin.

(2) Central Marin Ferry Connection Project (CMFC). In 2004, a study examined the feasibility of constructing a bicycle and pedestrian bridge over the Corte Madera Creek to improve connections to destinations south of the creek with the Larkspur Ferry Terminal and the Cal Park Hill Tunnel and multi-use trail. This site is located at the crossroads of many bicycle trips between central and southern Marin County and will improve pedestrian and bicycle connectivity and safety throughout the Plan area.

Subsequent to the feasibility study, the Transportation Authority of Marin (TAM) initiated an effort to develop and refine recommendations for the CMFC. This process has involved an additional feasibility study and a series of workshops to solicit public input. The Project has been divided into two phases as follows:

Phase 1. Phase 1 includes construction of a pedestrian and bicycle bridge across Sir Francis Drake Boulevard to connect the southern terminus of the Cal Park Hill Tunnel to the south side of Sir Francis Drake where the existing Route 20 multi-use path of the Marin County bicycle network is located. This overpass will provide connections from the Cal Park Hill Tunnel and the proposed SMART terminus to the Larkspur Ferry Terminal and locations to the south of Corte Madera Creek. It will also increase bicyclist and pedestrian safety as it will allow them to avoid crossing Sir Francis Drake Boulevard, which with 50,000 vehicles per day is one of the most heavily used roadways in

Marin County. Phase 1 also includes modifications to Redwood Highway to improve bicycle connectivity south to Wornum Drive from the existing Corte Madera Creek crossing.

In November 2011, TAM held an open house to solicit public input on the type of structure crossing over Sir Francis Drake. The preferred design was the Warren Truss, which was accepted by TAM and the Larkspur City Council. This project is expected to begin construction in 2014.

Phase 2. Phase 2 would continue the structure in Phase 1 across the Corte Madera Creek and extend the multi-use pathway along the railroad right-of-way or U.S. 101 off-ramp to Wornum Drive to connect with the existing multi-use trails at Wornum Drive and Redwood Highway. Currently, to cross Corte Madera Creek, bicyclists must dismount and walk their bikes along the heavily used four-foot-wide path along the Sir Francis Drake Boulevard off-ramp. This path is not appealing as vehicles exiting the freeway are just a few feet away, separated by a concrete barrier and metal railing. One option is to build a new structure to replace the existing railroad trestle across the Corte Madera Creek. The second option would be to widen and enhance the existing narrow path along the U.S. 101 off-ramp to Sir Francis Drake Boulevard. With the completion of Phase 2, bicyclists and pedestrians will have a direct connection along dedicated facilities all the way from San Rafael in central Marin County to Corte Madera and Larkspur as well as destinations to the south. These two options are included for further study in the Transportation Authority of Marin proposed studies described below.

(3) Transportation Authority of Marin Proposed Studies. The following are a list of improvement projects recommended for Regional Measure 2 funding by the Transportation Authority of Marin Board in the September 26, 2013 meeting, for consideration by MTC.

- Resolution #1 – Study feasibility of widening East Sir Francis Drake Boulevard from one to two lanes where lane drop occurs. This study would include an Andersen Drive evaluation of intersection improvements.
- Resolution #2 – Study feasibility of building a freeway to freeway connector between northbound U.S. 101 to eastbound I-580.
- Resolution #3 – Create new regional and local bus stops at the Sir Francis Drake Boulevard/U.S. 101 interchange. Install new pedestrian-friendly intersection improvements and access routes (including new sidewalks) to existing and new bus stop locations.
- Resolution #4 – Widen the existing pedestrian and bicycle path along the northbound off-ramp to provide 10-12 foot Class I multi-use pathway.
- Resolutions #5 and 7 – Conduct further study on Phase 2 of the Central Marin Ferry Connector to continue the structure in Phase 1 across the Corte Madera Creek and extend the multi-use pathway along the railroad right-of-way to Wornum Drive to connect with the existing multi-use trails at Wornum Drive and Redwood Highway. These studies include potential intersection undercrossing along Wornum Drive.
- Resolution #6 – Construct a sidewalk on the east side of Redwood Highway between Wornum Drive and Industrial Way.
- Resolution #8 – Construct a Class I multi-use path along Nellen Avenue on the west side of U.S. 101 between Wornum Drive and Fifer Avenue.
- Resolution #9 – Enhance pedestrian and bicycle crossings of U.S. 101 at Wornum Drive.

- Resolution #10 – Widen eastbound Sir Francis Drake Boulevard to three lanes from just west of Eliseo Drive to the southbound U.S. 101 on-ramp.
- Resolution #11 – Extend Sir Francis Drake Boulevard eastbound auxiliary lane to eastbound I-580.
- Resolution #12 – Re-direct Regional Measure 2 funds to SMART for the extension to Larkspur.

The Transportation Authority of Marin is currently studying these improvement projects which is expected to be complete in 2015-2016.

(4) Marin County Unincorporated Bicycle and Pedestrian Master Plan (2008).[8] This plan was developed to analyze the bicycle and pedestrian facilities in unincorporated Marin County. Although this Plan focuses on unincorporated Marin County, it contains countywide recommendations for best practices and proposed facilities. Key recommended facilities include the north-south bikeway, which would extend from the Golden Gate Bridge in the south to Sonoma County in the north, an east-west bikeway along Sir Francis Drake Boulevard, and the potential use of abandoned railroad tunnels and rights-of-way for multi-use paths. Recommendations include locating vital infrastructure improvements near key destinations to promote and encourage increased bicycle and pedestrian activity and using best practice designs such as colored bike lanes to increase pedestrian and bicycle safety. As proposed in the 2001 Plan, the County has developed and is in the process of implementing a countywide bicycle route sign system. This system of bicycle route signs guides cyclists along the safest and most accessible routes between cities and towns throughout the County.

(5) San Quentin Bicycle and Pedestrian Access Study. The San Quentin study area was identified as one of the top priority projects in Marin County in the *Marin County Unincorporated Bicycle and Pedestrian Master Plan*.[9] The study area consisted of a 1.5 mile long study corridor along Sir Francis Drake Boulevard and I-580, connecting the Richmond-San Rafael Bridge to the east and the existing bicycle path at Remillard Park to the west. This study identified a series of key issues that bicyclists and pedestrians face along this corridor and provided recommendations along the entire corridor and for these specific locations. Recommendations for several alternatives include new bicycle lanes or a Class I multi-use path along Sir Francis Drake Boulevard and a new signal or undercrossing at Sir Francis Drake Boulevard/Andersen Drive.

(6) City of Larkspur Bicycle and Pedestrian Master Plan (2004). The *Larkspur Bicycle and Pedestrian Master Plan*[10] examines existing bicycle and pedestrian facilities within the City of Larkspur and lays the framework for development of future facilities and policies that will make bicycling and walking an integral part of daily life in Larkspur. Recommendations include improving the visibility of pedestrians around Sir Francis Drake Boulevard and local schools, providing secure bicycle parking at key destinations within the city, improving east-west connections across U.S. 101, and making bus facilities safer and more accessible to pedestrians.

[8] Marin County Board of Supervisors, 2008. *Marin County Unincorporated Bicycle and Pedestrian Master Plan.*

[9] Ibid.

[10] Larkspur, City of, 2004. *Larkspur Bicycle and Pedestrian Master Plan*. August.

(7) Corte Madera Bicycle Master Plan (2008). The *Corte Madera Bicycle Master Plan*[11] was adopted by the Town Council in September 2008 and proposes several improvements to the bicycle network within Corte Madera. These improvements include designating Class III bicycle routes on Lucky Drive from Doherty Drive to Fifer Avenue, Fifer Avenue from Lucky Drive to Tamal Vista Boulevard, and Tamal Vista Boulevard from Fifer Avenue to Madera Boulevard. These proposed bicycle routes will include bicycle signage indicating shared right-of-way and shared roadway bicycle stencils (sharrows) painted onto the roadway to improve the visibility and safety of bicyclists. The plan also proposed numerous bicycle parking facilities through the City at major destinations and transit stops to help encourage trips with multi-modal connections and commuter trips.

2. Impacts and Mitigation Measures

This section evaluates the transportation-related impacts related to implementation of the Station Area Plan and identifies appropriate mitigation measures where feasible. Traffic impacts are evaluated under existing and cumulative conditions.

a. Criteria of Significance. The significance criteria below are used to determine whether implementation of the Station Area Plan results in significant environmental impacts that require mitigation. These criteria were developed using the *CEQA Guidelines* (Appendix G, Environmental Checklist Form), and in consultation with the City of Larkspur staff.

Implementation of the Station Area Plan would have a significant impact if it were to result in:

- An increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections);
- Exceedance, either individually or cumulatively, of the level of service (LOS) standard established by the county Congestion Management Agency or City of Larkspur for designated roads or highways;
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- Substantially increase hazards due to a design feature (i.e., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
- Inadequate emergency access;
- Inadequate parking capacity; or
- A conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

The following criteria are derived from Appendix G of the State *CEQA Guidelines* and from General Plan Circulation Element Policy D that established LOS D as the minimum acceptable threshold for signalized intersections and LOS C as the threshold for unsignalized intersections. The minimum LOS D operating standard is also consistent with prior traffic analyses conducted within the City of

[11] Corte Madera, City of, 2008. *Corte Madera Bicycle Master Plan*.

Larkspur. The Transportation Authority of Marin (TAM) has developed LOS thresholds for freeway segments as part of their Congestion Management Program (CMP).

(1) Traffic Impact Criteria. A project will result in a significant traffic impact at intersections if:

- Except for singly-developed single-family homes and vacant properties, proposed changes in existing use shall not add traffic to Sir Francis Drake Boulevard.
- If a signalized intersection with baseline traffic volumes is operating at an acceptable LOS (LOS D for signalized intersections and LOS C for unsignalized intersections) deteriorates to an unacceptable operation with the addition of project traffic; or
- If a signalized intersection with baseline traffic volumes is at an unacceptable LOS and project traffic causes an increase in the delay of five seconds or more; or
- For side-street stop controlled intersections, the proposed project would cause an intersection with critical movements operating at acceptable LOS C or better under conditions without the project to deteriorate to unacceptable LOS F during the AM or PM peak hour; and the expected AM or PM peak hour traffic volumes at the intersection meet the peak hour volume traffic signal warrant criteria contained in the *Manual on Uniform Traffic Control Devices*, 2003 Edition; or exacerbate conditions at an intersection where critical movements are operating unacceptably under conditions without the project by causing the critical movement delay to increase by 5 or more seconds per vehicle during the AM or PM peak hour; and the expected AM or PM peak hour traffic volumes at the intersection meet the peak hour volume traffic signal warrant criteria contained in the *Manual on Uniform Traffic Control Devices*, 2003 Edition.

(2) Freeway Segment Impact Criteria. A project will result in a significant traffic impact on roadway segments:

- If operations on U.S. 101 deteriorate from LOS E or better under conditions without the project to LOS F during the AM or PM peak hour; or
- If operations on U.S. 101 operating at unacceptable LOS F under conditions without the project by causing the freeway volume over capacity ratio (v/c) to increase by 0.01 or more (i.e., 1 percent of the freeway segment capacity) during the AM or PM peak hour.

(3) Design Review Considerations. A roadway design impact is considered significant when the project introduces a design feature that presents safety concerns.

(4) Emergency Access Impact Criteria. An emergency vehicle access impact is considered to be significant if the proposed project would provide inadequate design features to accommodate emergency vehicle access and circulation.

(5) Pedestrian Impact Criteria. A pedestrian impact is considered significant if it would disrupt existing pedestrian facilities, interfere with planned pedestrian facilities, or create inconsistencies with adopted pedestrian system plans, guidelines, policies, or standards.

(6) Bicycle Impact Criteria. A bicycle impact is considered significant if it would disrupt existing bicycle facilities; interfere with planned bicycle facilities; conflict or create inconsistencies

with adopted bicycle system plans, guidelines, policies, or standards; or not provide secure and safe bicycle parking in adequate proportion to anticipated demand.

(7) Transit Impact Criteria. A transit impact is considered significant if it would result in a significant unanticipated increase in transit patronage or result in development that is inaccessible to transit riders.

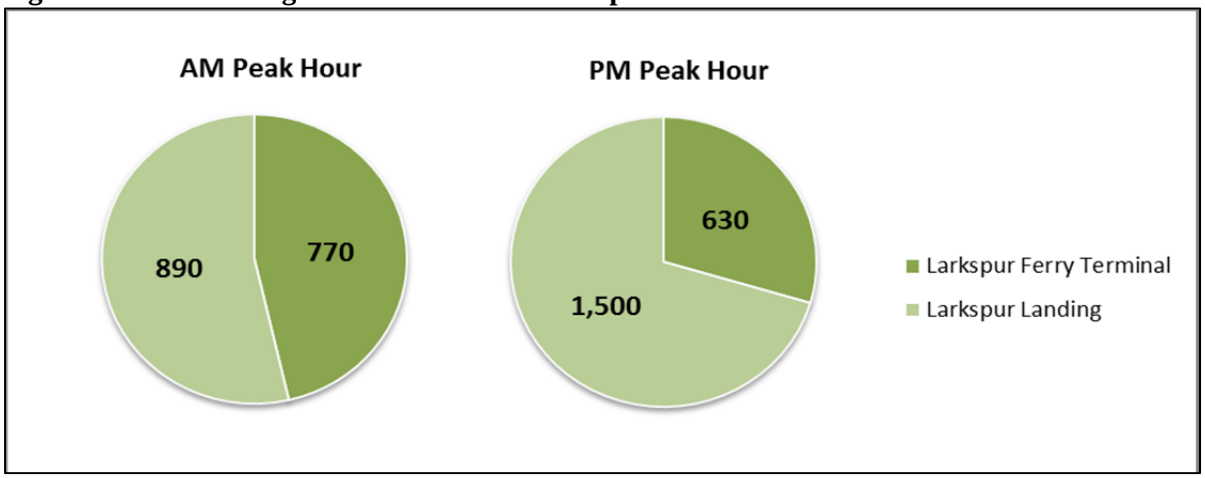
(8) Parking Impact Criteria. A parking impact is considered significant if it results in significant parking demand that would exceed the available supply of parking and result in off-site and indirect impacts such as noise and air quality impacts.

b. Impact Analysis. The following section summarizes the analysis of various Plan area transportation circulation factors. This section includes and analyzes existing conditions as well as cumulative (2035) conditions.

(1) Existing Conditions. Vehicle access to Sub-area 1A is provided through the two signalized intersections of Larkspur Landing Circle (East and West) and Sir Francis Drake Boulevard. Traffic counts at these intersections show that 1,660 and 2,130 vehicles are generated by the existing study area land uses during the AM and PM peak hours, respectively. As shown in Figure IV.B-6, nearly half (46 percent) of the AM peak hour trips and a third (30 percent) of PM peak hour trips are associated with the Larkspur Ferry Terminal. The remaining vehicle trips are associated with the residential and commercial land uses at Larkspur Landing.

Existing traffic counts also show that 85 to 90 percent of all vehicle trips generated from the Larkspur Landing area travel westbound on Sir Francis Drake Boulevard to U.S. 101 or destinations to the west. The remaining vehicles travel eastbound the two-lane segment of Sir Francis Drake Boulevard to the east.

Figure IV.B-6: Existing Sub-area 1A Vehicle Trip Generation



Source: Fehr & Peers, May 2013.

Traffic volumes traveling through Sub-area 1A along Sir Francis Drake Boulevard can be calculated from existing traffic counts at the intersections of Larkspur Landing Circle. Locally generated and through traffic volumes for the AM and PM peak hours are compared in Table IV.B-11. Key trends for existing traffic congestion on Sir Francis Drake Boulevard include the following:

- Through Traffic – Traffic between U.S. 101 and the Richmond-San Rafael Bridge is highest in the westbound direction during the morning and in the eastbound direction during the evening.
- Locally Generated (Sub-area 1A) Traffic – The existing land uses generate far more inbound traffic than outbound traffic in the AM peak hour, with the reverse true for the PM peak hour.

Table IV.B-11: Traffic Volumes on Sir Francis Drake Boulevard

	West of Site [a]				East of Site [b]			
	AM		PM		AM		PM	
	EB	WB	EB	WB	EB	WB	EB	WB
Trips Generated by Existing Sub-area 1A Land Uses	1,058	371	722	1,134	69	162	177	102
Through Trips	906	1,188	1,250	874	906	1,188	1,250	874
Total Trips on SFDB	1,964	1,559	1,972	2,008	975	1,350	1,427	976
Percent of Trips on SFDB Generated by Existing Uses	54%	24%	37%	56%	7%	12%	12%	10%

Notes: EB = Eastbound, WB = Westbound, SFDB = Sir Francis Drake Boulevard

[a] West of Site refers to traffic volumes on Sir Francis Drake Boulevard between the U.S. 101 northbound ramps and Larkspur Landing Circle (West)/Ferry Terminal Entrance.

[b] East of Site refers to traffic volumes to the east of Larkspur Landing Circle (East) on the two-lane segment of Sir Francis Drake Boulevard.

Sources: Fehr & Peers, May 2013.

These trends indicate that while the roadway may operate near capacity (i.e., within an acceptable LOS) in the peak direction in the AM and PM peak hours, some excess capacity is present in the non-peak direction. Traffic due to Larkspur Landing is typically spread out over the course of the peak hour and has less of an impact on peak congestion than the Ferry Terminal. These traffic patterns are important to consider when reviewing the traffic impacts for new development in Sub-area 1A.

(2) Vehicle Trip Generation Estimates. Vehicle trip estimates for implementation of the Station Area Plan were developed using the mixed-use trip generation methodology known as MXD+ described in Appendix B. The MXD+ method is based on site-specific reductions to trip generation rates presented in the Institute of Transportation Engineers (ITE) Trip Generation (8th Edition). The MXD+ method accounts for built environment factors such as the density and diversity of land uses, design of the pedestrian and bicycling environment, demographics of the site, and distance to transit to develop more realistic trip generation estimates for mixed-use and transit oriented developments than traditional traffic engineering methods. Calibration and validation of the trip generation model and the methodology used in the model is presented in Appendix B. Table IV.B-12 shows the existing/existing plus project, and net new trips that will be generated by the existing and proposed land uses at Sub-area 1A. The proposed land uses at Sub-area 1A are anticipated to generate approximately 7,500 daily trips, including 410 AM peak-hour trips, and 460 PM peak-hour trips.

Table IV.B-12: Vehicle Trip Generation Summary – Sub-area 1A: Larkspur Landing

Land Use	Quantity	Units[a]	ITE Code[b]	Daily Trips	AM Peak Hour Trips			PM Peak Hour Trips		
					In	Out	Total	In	Out	Total
Single Family Residential	120	DU	210	1,230	23	70	93	78	46	124
Multi-Family Residential	1,350	DU	220	8,305	133	532	665	494	266	760
General Retail	215	ksf	820	11,169	148	94	242	520	542	1,062
Bank	5	ksf	912	741	35	27	62	65	65	130
Health Club	20	ksf	492	659	13	15	28	40	31	71
Sit-Down Restaurant	10	ksf	932	1,272	60	55	115	66	46	112
General Office	354	ksf	710	3,527	453	62	515	81	394	475
Hotel	168	Rooms	310	1,373	57	37	94	52	47	99
Movie Theater	4	Screens	445	701	0	0	0	25	30	55
Sub-Total (ITE External Vehicle Estimate)				28,977	922	892	1,814	1,421	1,467	2,887
ITE Reductions [c]				19%	25%			29%		
Sub-Total after Reductions (Existing Plus Project trips)				23,471	692	669	1,361	1,009	1,042	2,050
Existing Trips [d]				-15,969	-563	-387	-950	-693	-898	-1,591
Net New Project Trips				7,502	129	282	411	316	144	459

[a] DU = dwelling units. KSF = 1,000 square feet.
[b] Trip generation rates from the Institute of Transportation Engineers (ITE) Trip Generation 8th Edition are presented in Appendix C.
[c] ITE reductions based on application of MXD model: Daily = 18%, AM Peak Hour = 23%, PM Peak Hour = 28%
[d] Based on traffic counts collected in 2006 for the Highway 101 Twin Cities/Greenbrae Corridor Improvement Project. Daily counts were not available and were estimated by applying the ratio of (ITE Daily/ITE PM) to the existing PM peak hour counts.

Source: Fehr & Peers, May 2013.

The Station Area Plan includes goals and recommendations to include senior housing in Sub-area 1A. Constructing senior housing in the Plan area would reduce the residential trip generation as seniors drive less than other residents. Trip generation studies completed for the Institute of Transportation Engineers Trip Generation (8th Edition) show that residents of Attached Senior Adult Housing typically generate half the peak hour trips per unit compared to non-age restricted condominiums or townhomes. For conservative purposes, non-age restricted housing was assumed for this analysis.

Table IV.B-13 shows the new trips that will be generated by the proposed land uses at Drakes Landing. No site-specific reductions were applied to the ITE trip generation rates at Drake's Landing due to the relatively low amount of development and mixed-use trip generation reduction potential at this site. The proposed land uses at Sub-area 1B are anticipated to generate 700 daily trips, including 70 AM peak-hour trips, and almost 80 PM peak-hour trips.

Table IV.B-13: Vehicle Trip Generation Summary – Sub-area 1B: Drake's Landing

Land Use	Quantity	Units[a]	ITE Code[b]	Daily Trips	AM Peak Hour Trips			PM Peak Hour Trips		
					In	Out	Total	In	Out	Total
Multi-Family Residential	70	DU	220	470	7	29	36	28	15	43
General Office	22	ksf	710	242	30	4	34	6	27	33
New Project Trips (ITE External Vehicle Estimate)				*712*	*37*	*33*	*70*	*34*	*42*	*76*

[a] DU = dwelling units. KSF = 1,000 square feet.
[b] Trip generation rates from the Institute of Transportation Engineers (ITE) Trip Generation 8th Edition are presented in Appendix C.

Source: Fehr & Peers, May 2013.

(3) Vehicle Trip Distribution. Trip distribution refers to the direction trips generated by the project would use to approach and depart the Plan area and the percentage of traffic using each direction. The traffic increase due to implementation of the Station Area Plan will be added to Sir Francis Drake Boulevard in a similar manner to the existing traffic generated by the site. Regional travel patterns to/from the site were identified using the Marin County Travel Demand model for each type of land use. Figure IV.B-7 shows the projected trip distribution patterns. Appendix B compares the trip distribution patterns for the proposed project to those prepared for the GCIP and to data from the 2000 Journey to Work Census. Trip distribution patterns will be similar for both Larkspur Landing and Drakes Landing.

(4) Vehicle Trip Assignment. Trips generated by the proposed project were assigned to the roadway system based on the trip distribution patterns shown on Figure IV.B-7. The trip assignments used in the evaluation of Existing Plus Project Conditions are presented on Figure IV.B-8.

(5) Existing Plus Project Conditions. This chapter presents the results of the intersection and freeway level of service analysis for Existing Plus Project Conditions. Existing conditions form the baseline against which project-related impacts are evaluated. For conservative purposes, the maximum density of proposed land uses, implemented over a 20-year period, was assumed for this analysis. Less intensive development within the Plan area or for specific housing types (i.e., senior or affordable housing) would result in fewer traffic effects than described in this section.

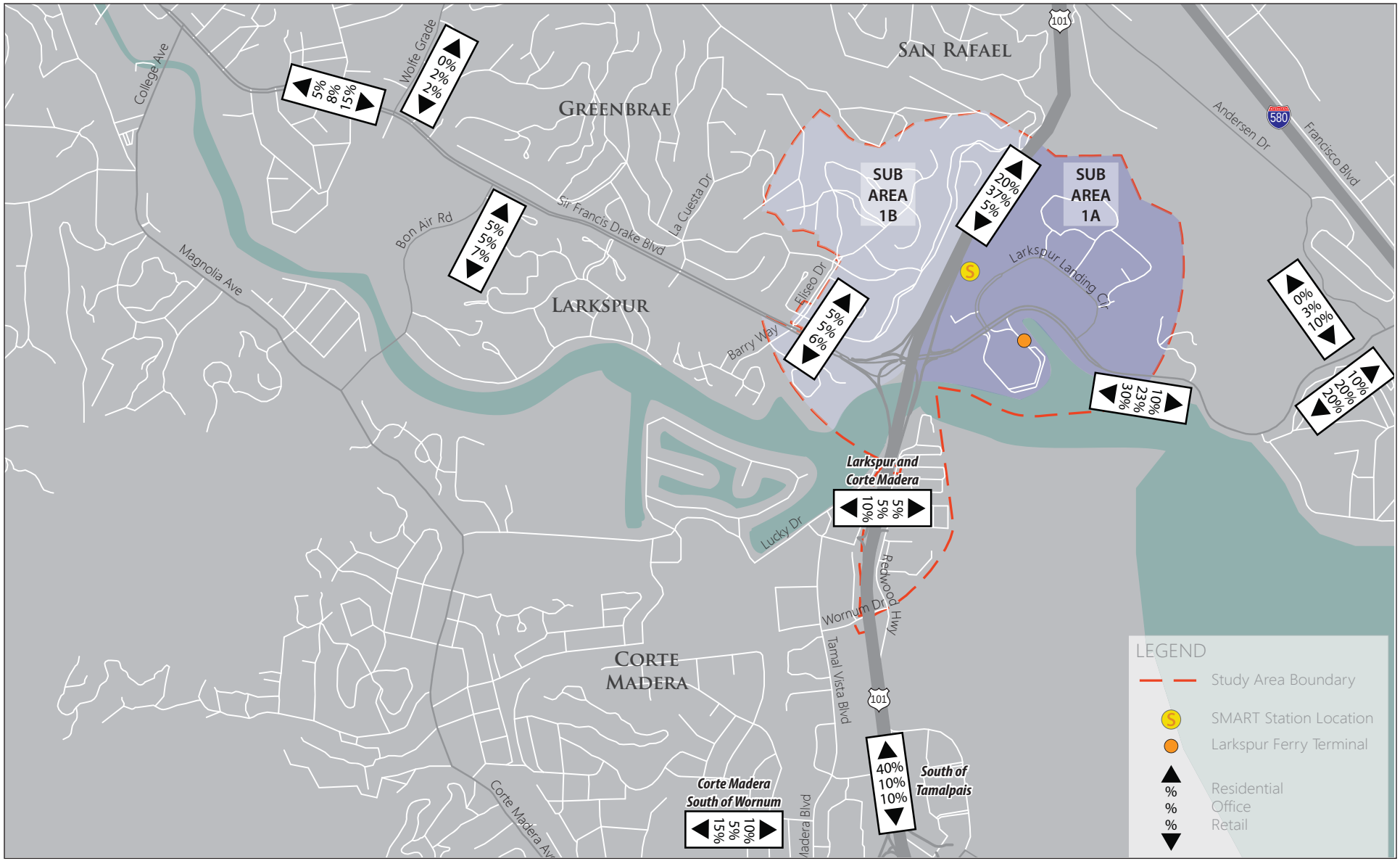


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FIGURE IV.B-7

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City of Larkspur SMART Station Area Plan EIR

Trip Distribution

SOURCE: FEHR & PEERS, MAY 2013.

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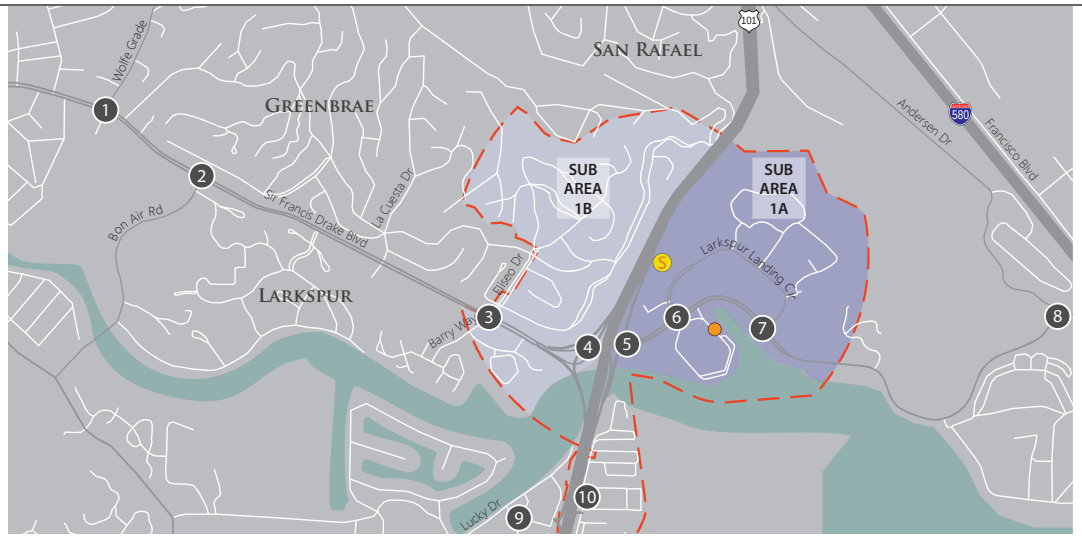

MAP KEY

- Study Area Boundary
- SMART Station Location
- Larkspur Ferry Terminal
- Study Intersection

VOLUMES KEY

- XX (YY) AM (PM) Peak Hour Traffic Volumes
- * Project Trips Added to on- or off-ramp

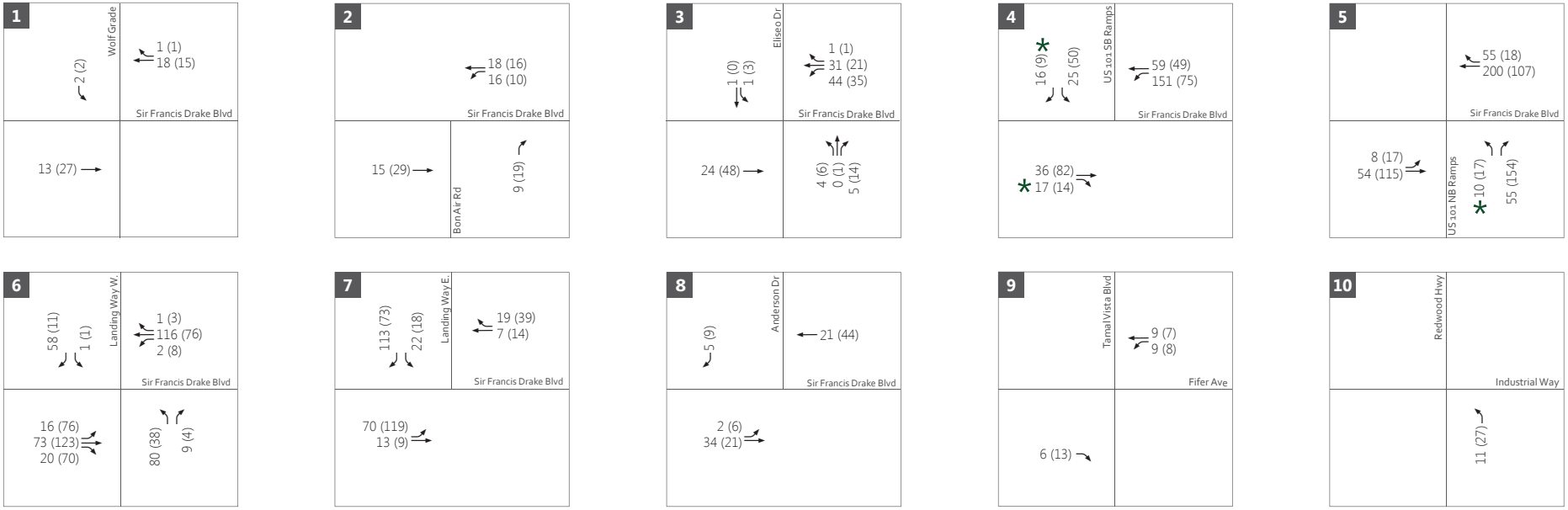

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FIGURE IV.B-8

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City of Larkspur SMART Station Area Plan EIR

Trip Assignment

SOURCE: FEHR & PEERS, MAY 2013.

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Intersection Operations. Existing intersection volumes plus new vehicle trips due to the proposed project are shown on Figure IV.B-9. Existing Plus Project intersection operations are shown in Table IV.B-14. The proposed project would add vehicle trips to Sir Francis Drake Boulevard. This is considered a significant project impact per Quality of Life Policy C of the City of Larkspur General Plan. New vehicle trips generated by the proposed project would add traffic to movements that currently operate at LOS E or F at Eliseo Drive, the U.S. 101 Northbound Off-Ramp, and Andersen Drive. These added project trips would cause the overall intersection LOS at several intersections along Sir Francis Drake Boulevard to significantly worsen compared to Existing Conditions. These are considered significant impacts as described below.

Impact TRANS-1: The addition of PM peak hour trips to Sir Francis Drake Boulevard would conflict with Circulation Element Policy C in the City of Larkspur General Plan. (S)

Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

> Mitigation Measure TRANS-1: The Draft Station Area Plan Implementation Chapter recommends a policy to amend the Larkspur General Plan to eliminate Circulation Element Policy C. Implementation of this policy would reduce this impact to less-than-significant levels. The City will be required to take this action prior to approval of individual projects within the Plan area. (LTS)

Impact TRANS-2: The addition of traffic associated with implementation of the Station Area Plan could increase the average delay during the AM and PM peak hours by more than 5 seconds at Intersection #3 Sir Francis Drake Boulevard/Eliseo Drive, which would operate at unacceptable LOS under Existing Plus Project Conditions. (S)

Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

> Mitigation Measure TRANS-2: Add a short auxiliary lane to serve as a third eastbound through lane on Sir Francis Drake Boulevard approaching Eliseo Drive through to the U.S. 101 southbound on-ramp. This improvement would be consistent with recommendations in the County of Marin General Plan and TAM Resolution 10 from the September 26, 2013 Transportation Authority of Marin Board Meeting.[12] However, Circulation Element Policy M of the Larkspur General Plan states that Intersection #3 currently operates at LOS E or F and that the City may have to accept this LOS as roadway expansion would be unacceptable to the community. This mitigation measure therefore conflicts with Larkspur General Plan Policy M. The Draft Station Area Plan Implementation Chapter recommends a policy to amend the Larkspur General Plan to eliminate Circulation Element Policy M. Implementing the short auxiliary lane on Sir Francis Drake Boulevard and amending the General Plan would reduce this impact to less-than-significant levels. The City will be required to take these actions prior to approval of individual projects within the Plan area. (LTS)

[12] Per September 26th, 2013 TAM Board Meeting. "Recommendation to Assign Excess Regional Measure 2 Funds (Action) Item 10" (TAM Board Memo, October 24th, 2013).

Table IV.B-14: Existing Plus Project Intersection LOS Results

Intersection	Control	Existing				Existing Plus Proposed Project			
		AM		PM		AM		PM	
		Delay [a]	LOS	Delay [a]	LOS	Delay [a]	LOS	Delay [a]	LOS
1. Sir Francis Drake Boulevard/Wolfe Grade	Signal	**>80** [d]	**F**	**>80**	**F**	**>80**	**F**	**>80**	**F**
2. Sir Francis Drake Boulevard/Bon Air Road	Signal	43	D	34	C	46	D	36	D
3. Sir Francis Drake Boulevard/Eliseo Drive [b]	Signal	**>80** [e]	**F**	**57**	**E**	**>80**	**F**	**68**	**E**
4. Sir Francis Drake Boulevard/U.S. 101 Southbound Ramps [b]	Signal	29	C	22	C	25	C	40	D
5. Sir Francis Drake Boulevard/U.S. 101 Northbound Ramps [b]	Signal	31	C	53	D	49	D	55	D
6. Sir Francis Drake Boulevard/Larkspur Landing Circle (West)/ Ferry Terminal Entrance [b]	Signal	44	D	35	C	**76**	**E**	47	D
7. Sir Francis Drake Boulevard/Larkspur Landing Circle (East) [b]	Signal	<10	A	28	C	29	C	37	D
8. Sir Francis Drake Boulevard/Andersen Drive	SSS [c]	**>50** [f]	**F**	**>50**	**F**	**>50**	**F**	**>50**	**F**
9. Tamal Vista Boulevard/Fifer Avenue [b]	Signal	17	B	20	B	17	B	20	B
10. U.S. 101 Northbound Ramps/Redwood Highway/Industrial Way [b]	Signal	<10	A	15	B	<10	A	15	B

Notes: **Bold** = unacceptable LOS. Shaded = Significant impact.

[a] For signalized and all-way stop controlled intersections, the delay shown is the weighted average for all movements in seconds per vehicle. For side-street stop controlled intersection, the delay shown is the worst-operating approach delay.

[b] Intersection analyzed using the VISSIM microsimulation model.

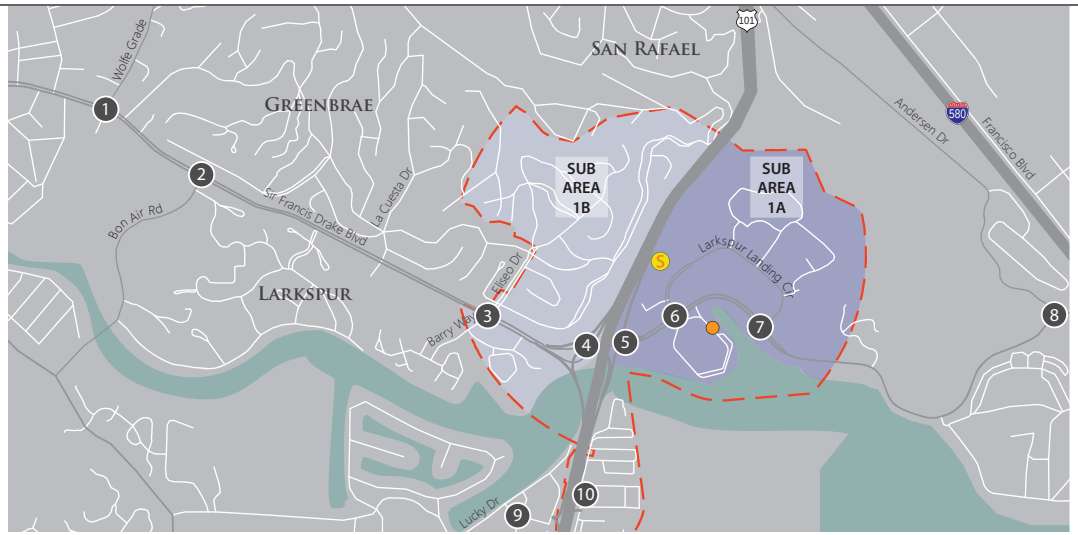
[c] SSS = Side-street stop.

[d] As shown in Appendix B of the transportation appendices, the project is expected to increase average delay at this study intersection by 1-2 seconds in the AM and PM peak hours.

[e] As shown in Appendix B of the transportation appendices, the proposed project is forecasted to increase average vehicle delay at this intersection by 32 seconds in the AM peak hour and 6 seconds in the PM peak hour.

[f] As shown in Appendix B of the transportation appendices, the proposed project is forecasted to increase average vehicle delay at this intersection by 33 seconds in the AM peak hour and 53 seconds in the PM peak hour.

Source: Fehr & Peers, May 2013.



MAP KEY

- Study Area Boundary
- SMART Station Location
- Larkspur Ferry Terminal
- Study Intersection

VOLUMES KEY

XX (YY) AM (PM) Peak Hour Traffic Volumes

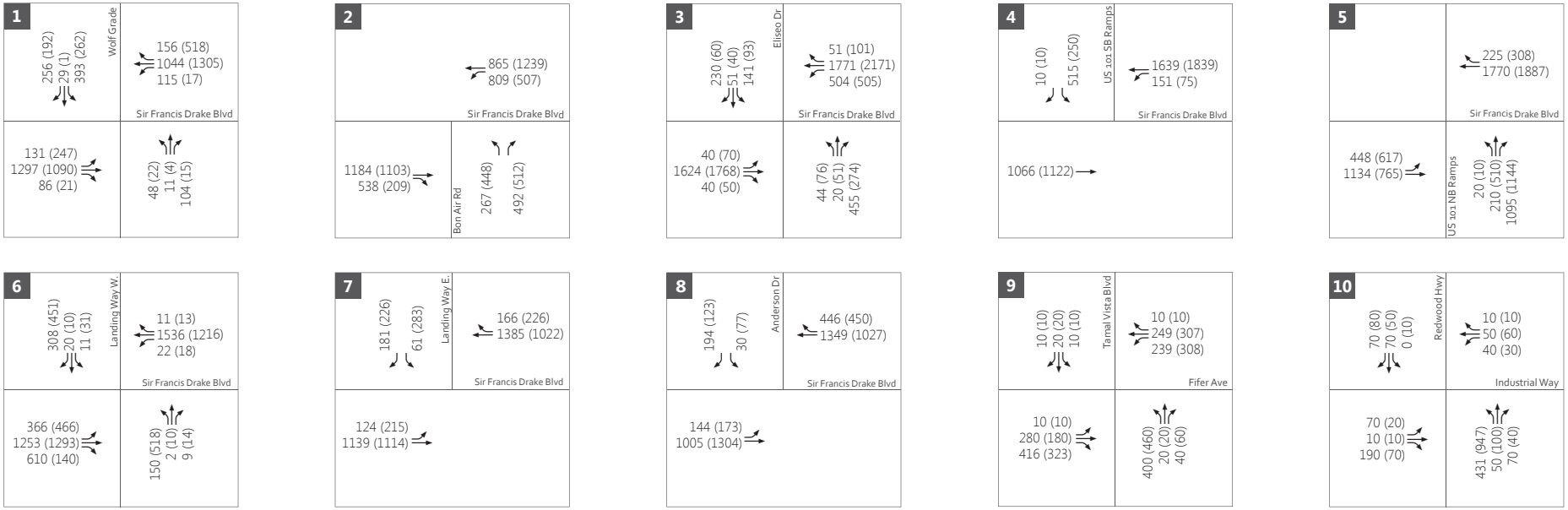


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FIGURE IV.B-9

NOT TO SCALE

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City of Larkspur SMART Station Area Plan EIR

Existing Plus Project Intersection Peak Hour Volumes

SOURCE: FEHR & PEERS, MAY 2013.

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Impact TRANS-3: Implementation of the Station Area Plan would result in the addition of project traffic to westbound Sir Francis Drake Boulevard and would cause Intersection #6 Sir Francis Drake Boulevard/Larkspur Landing Circle (West) to degrade from acceptable LOS D to unacceptable LOS E in the AM peak hour under Existing Plus Project Conditions. New project trips would worsen congestion on the westbound through movement at the U.S. 101 Northbound Ramps during the AM peak hour, which operates at LOS E under existing conditions, causing queues to back up to Larkspur Landing Circle (West) and increasing congestion at this intersection. (S)

Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

> Mitigation Measure TRANS-3: Based on a determination of costs by the City, applicants for individual projects shall pay their fair share towards the addition of a third westbound through lane on Sir Francis Drake Boulevard at Larkspur Landing Circle West and to retime and optimize the traffic signals on Sir Francis Drake Boulevard at the U.S. 101 interchange to provide additional green time to the westbound approach at the U.S. 101 Northbound Ramps during the AM peak period. The funding for these improvements shall be balanced with regional transportation funding as appropriate. The additional westbound through lane could be constructed by repurposing the parking lane or removing portions of the median to create room for a third lane that extends back approximately 350 feet to the GGBHTD bus stop and pedestrian bridge. This additional lane would provide vehicle storage capacity to the westbound approach at Larkspur Landing Circle (West) and allow vehicles to position themselves to turn right into Larkspur Landing or onto the U.S. 101 northbound on-ramp. Adding the additional green time and capacity to westbound Sir Francis Drake Boulevard would reduce queues at the U.S. 101 Northbound Ramps such that they no longer inhibit operations at Intersection #6 Sir Francis Drake Boulevard/Larkspur Landing Circle (West). These mitigation measures were recommended previously in the traffic study and Mitigated Negative Declaration for the 2000 Larkspur Landing Circle mixed-use project and approved by the Larkspur City Council in 2005.[13] These measures would improve intersection operations to an acceptable LOS D in the AM peak hour. The City will be required to take these actions prior to approval of individual projects within the Plan area. (LTS)

Impact TRANS-4: Implementation of the Station Area Plan would result in the addition of project traffic that would increase the average delay during the AM and PM peak hours by more than 5 seconds at Intersection #8 Sir Francis Drake Boulevard/Andersen Drive, which would operate at unacceptable LOS under Existing Plus Project Conditions. (S)

Implementation of the following mitigation measure would reduce this impact to a less-than-significant level. However, as this mitigation would need to be coordinated with the City of San Rafael and the City cannot guarantee that the mitigation measure would be implemented in time to mitigate the adverse impacts of the Station Area Plan, this impact is considered significant and unavoidable.

> Mitigation Measure TRANS-4: Applicants for individual projects shall pay their fair share in coordination with other stakeholders including the City of San Rafael, County of Marin, and Caltrans towards a traffic signal or other means of improving the LOS at Intersection #8 Sir Francis Drake Boulevard/Andersen Drive. The San Rafael General Plan recommends a traffic

[13] *2000 Larkspur Landing Circle Traffic Impact Assessment and Parking Report* (Dowling Associates, 2003); City of Larkspur Ordinance Number 948, adopted by the Larkspur City Council on September 21, 2005.

signal at this location. Internal and External Circulation Linkages Program 13 (CL[13]), of the 1990 Larkspur General Plan notes that the City should encourage and cooperate with the appropriate jurisdictions to signalize this intersection. The project sponsor shall contribute a pro rata share to the improvement described in this measure or other improvements after consultation and a record of agreement or other legal instrument with other jurisdictions. As the feasibility of this improvement will require further study and coordination with other agencies for approval and is not under the sole jurisdiction of the City of Larkspur, this impact is considered significant and unavoidable. (SU)

The proposed project would add traffic to intersection #1 Sir Francis Drake Boulevard/Wolfe Grade which currently operates at LOS F in the AM and PM peak hours; however, the average intersection delay would not increase by more than 5 seconds. The remaining intersections would continue to operate at an acceptable LOS D or better with the proposed project. Impacts to these intersections would be less-than-significant under Existing Plus Project Conditions.

Freeway Operations. Existing freeway volumes plus new vehicle trips due to the proposed project are shown in Table IV.B-15. The freeway operation LOS would vary depending on the peak hour, direction, and segment, ranging from LOS B to LOS E. No segments on U.S. 101 would exceed their CMP LOS threshold with the proposed project under Existing Plus Project conditions.

(1) Cumulative Conditions. Cumulative conditions for this analysis were developed as a part of the GCIP. The Marin County Travel Demand Model served as the travel demand forecasting (TDF) model for the GCIP. The base year model was calibrated and validated for 2005 conditions and the forecast year model represents 2035 conditions. The future year model includes recently completed infrastructure projects and accounts for the increase traffic demand served through the Plan area due to these improvements. This model utilizes the EMME/2 software platform along with recent land use and road network information to forecast the regional demand to 2035. While the model was developed by Marin County, it covers the entire nine-county San Francisco Bay Area and includes detailed zone and network systems within Marin, Sonoma, and San Francisco Counties. Through the sub-area model calibration and validation process, the model was deemed acceptable for use in the GCIP and this study.[14]

To determine the adequacy of the GCIP model for this study, the existing and future forecasted traffic volumes were compared to the proposed project's trip generation. As shown in Figure IV.B-10, the proposed project would generate a similar or lower amount of traffic than what was forecast in the GCIP model. Therefore, the GCIP model was deemed appropriate to develop traffic volumes for Cumulative Plus Project Conditions. Intersection turning movement volumes for Cumulative Plus Project Conditions are shown on Figure IV.B-11. Additional information on the land use and roadway assumptions included under Cumulative Conditions is presented below.

[14] Future year model calibration and validation process is described in the *Highway 101 Greenbrae/Twin Cities Corridor Improvements Project Approval/Environmental Document – Final Traffic Operations Report* (TAM, October 2012).

Table IV.B-15: Existing Plus Project Freeway Segment LOS Results

Direction	Freeway Segment	Theoretical Capacity [a]	Peak Hour	Existing			Existing Plus Project		
				Volume	V/C[b]	LOS	Volume	V/C[b]	LOS
Northbound U.S. 101	A. North of Sir Francis Drake Boulevard	9,900	PM	5,920	0.60	A	5,938	0.60	A
	B. North of Industrial Way	8,800	PM	7,910	0.90	D	8,064	0.92	E
	C. North of Tamalpais Drive, South of Industrial Way	7,700	PM	7,120	0.92	E	7,247	0.94	E
Southbound U.S. 101	A. North of Sir Francis Drake Boulevard	9,900	PM	5,370	0.54	A	5,420	0.55	A
	B. North of Fifer Avenue	8,800	PM	6,650	0.76	C	6,725	0.76	C
	C. South of Fifer Avenue, North of Madera Boulevard	8,800	PM	6,190	0.70	C	6,250	0.71	C

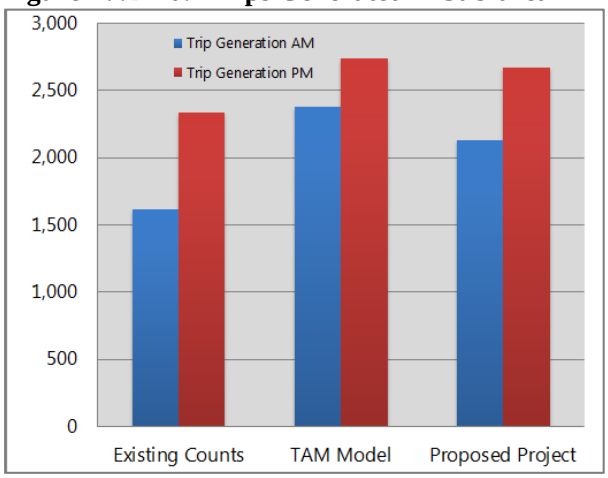
Notes:

[a] Assumes a mixed flow freeway capacity of 2,200 vehicles per hour per lane. HOV lane (peak direction only) capacity is 50 percent of a mixed flow freeway lane. Auxiliary lane capacity is 50 percent of a mixed flow lane.

[b] Freeway segment level of service based on volume to capacity ratio according to the Highway Capacity Manual. *Highway Capacity Manual, Transportation Research Board, 2000.*

Source: Fehr & Peers, May 2013.

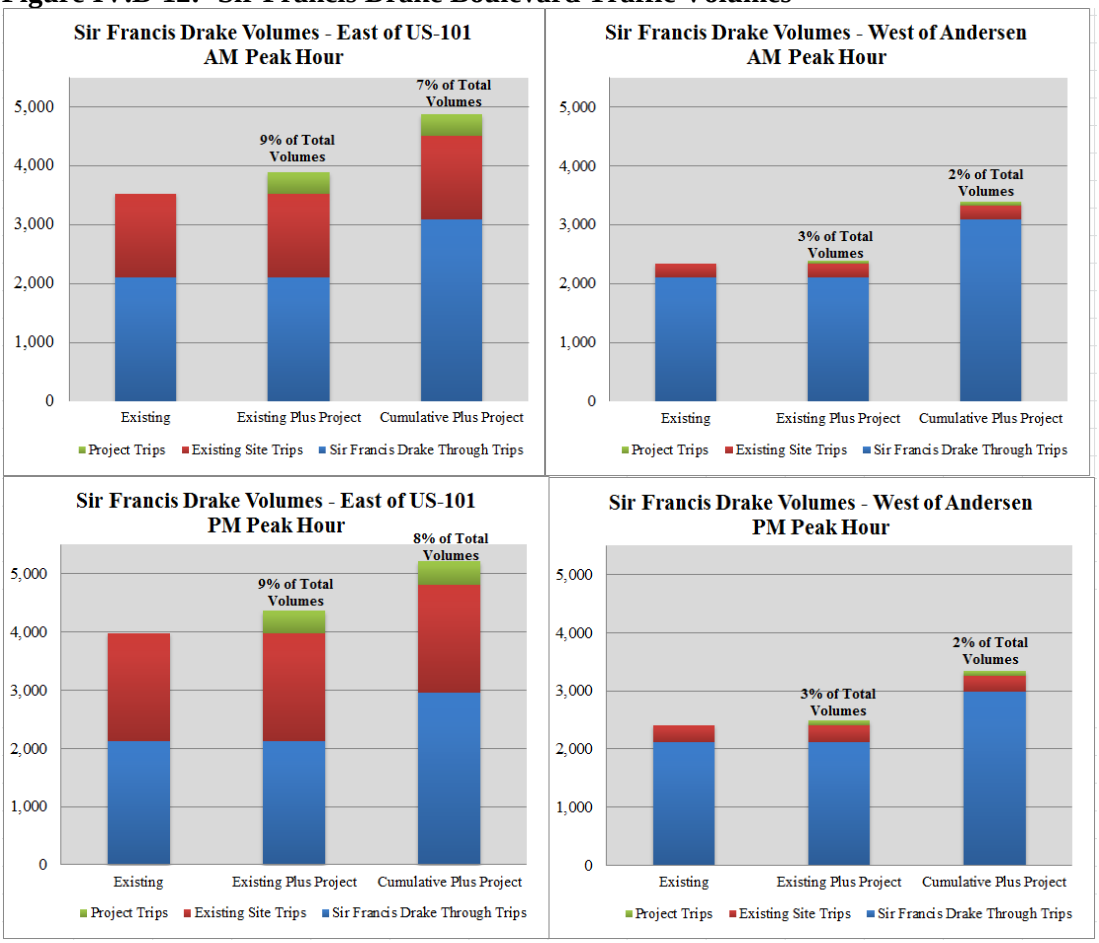
Figure IV.B-10: Trips Generated in Sub-area 1A



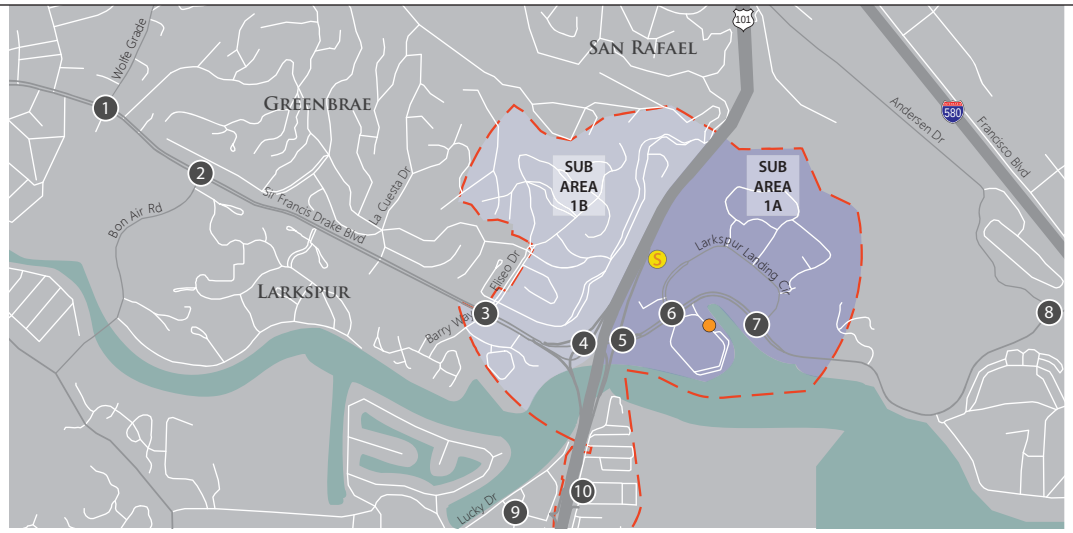
Source: Transportation Authority of Marin, 2012. *Highway 101 Greenbrae/Twin Cities Corridor Improvements Project Approval/ Environmental Document - Final Traffic Operations Report.* October.

Traffic volumes along Sir Francis Drake Boulevard at two locations were compared between Existing Conditions, Existing Plus Project Conditions, and Cumulative Plus Project conditions. As shown in Figure IV.B-12, the added trips due to implementation of the Station Area Plan would represent a 7 to 9 percent of the total traffic on Sir Francis Drake Boulevard between U.S. 101 and Larkspur Landing Circle (West). The added project trips would represent 2 to 3 percent of the total traffic on Sir Francis Drake Boulevard between Larkspur Landing Circle (East) and Andersen Drive.

Figure IV.B-12: Sir Francis Drake Boulevard Traffic Volumes



Source: Fehr & Peers, 2012. *Highway 101 Greenbrae/Twin Cities Corridor Improvements Project Approval/ Environmental Document - Final Traffic Operations Report.* October; Fehr & Peers, May 2013.



MAP KEY

- Study Area Boundary
- SMART Station Location
- Larkspur Ferry Terminal
- Study Intersection

VOLUMES KEY

XX (YY) AM (PM) Peak Hour Traffic Volumes

LSA

FIGURE IV.B-11

NOT TO SCALE

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City of Larkspur SMART Station Area Plan EIR

Cumulative Plus Project Conditions

Intersection Peak Hour Volumes

SOURCE: FEHR & PEERS, MAY 2013.

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Cumulative Land Use Assumptions. For purposes of the GCIP, it was necessary to produce forecasts for the Year 2035 (20 years after construction, scheduled to be completed by 2015) and to be consistent with the most recent set of regionally-adopted land use projections. At the time forecasts were completed, the Association of Bay Area Governments (ABAG) Projections 2005[15] were the most recent regionally adopted land use projections. With agreement from the Transportation Authority of Marin (TAM) and Caltrans, Design Year (2035) land use forecasts were extrapolated from the 2005 ABAG projection data.[16] Outside of Marin County, year 2030 projections contained in the Marin County Model were extrapolated linearly to Design Year (2035) conditions. Within Marin County, 2006 Countywide Plan land use projections including all cities within Marin County were modified to be consistent with the countywide Design Year (2035) extrapolated development totals. This approach allows for consistency with recent ABAG projections, while still reflecting the County's expectation of zonal distribution of new development consistent with their most recent long-range planning efforts. Table IV.B-16 shows representative local projects that were included in the GCIP model.

Table IV.B-16: Land Use Forecasts in Marin County Model

Project	Description	Year Approved
Larkspur Station Area Plan	Transit-oriented development plan	Planning underway
Drake's Cove	23 dwelling units	Construction underway
Rose Lane, Larkspur	91 dwelling units	2008
Drake's Way, Larkspur	24 dwelling units	Completed in 2010
Drake's Cove/Larkspur Landing Circle	126 dwelling units, plus hotel	Partially completed in 2010
Police Facility, Larkspur	New facility	Completed in 2012
MacFarlane Partners (WinCup Site), Corte Madera	180 dwelling units, plus 10,000 square feet of retail	Under construction
Marin General Hospital Expansion, Greenbrae	Hospital replacement project	Draft EIR released in August 2012
Village at Corte Madera Expansion	Addition to Nordstrom	Under construction
College of Marin	New Academic Center	Initial Study released in 2012
New school on San Clemente Drive, Corte Madera	350-450 students	Planning underway
Madera Vista Apartments	126 dwelling units	Renovation underway

Source: Fehr & Peers, December 2013.

The land use forecasts account for growth envisioned as part of the Marin County General Plan. For areas of potential future growth in Marin County such as San Quentin, where future development is uncertain, guidance from the Marin County General Plan was followed in developing the land use forecasts. The Marin County General Plan states in Policy PA-5.2: "San Quentin is expected to remain a state prison for the duration of this Countywide Plan and is therefore designated Public Facilities, reflecting its current use. No other designation or policy is established by this plan. However, should non-prison uses become feasible in the future, consideration could be given to development that is less than or equal to the energy and resource consumption and traffic generation of the current prison use." A comparison between the ABAG 2005 projections and the most recently completed ABAG 2009 projections was completed to determine what levels of growth are forecasted for the Plan area and Marin County. The 2005 ABAG growth projections were found to be 5 percent to 15 percent higher in the Plan area and Marin County than the most recent ABAG growth projections from 2009. Therefore, the cumulative forecasts prepared using the 2005 ABAG projections conservatively account for potential future growth in traffic through the Plan area.

[15] Association of Bay Area Governments, 2005. *Projections 2005*.

[16] Fehr & Peers, 2013. *Highway 101 Greenbrae/Twin Cities Corridor Improvements Project Approval/ Environmental Document - Final Traffic Operations Report*. October.

Cumulative Roadway Improvements. A number of roadway improvements are planned for construction in and around the Plan area prior to 2035. The Marin County Travel Demand Model was inspected and modified to ensure the 2035 roadway network included relevant improvements. Planned roadway improvements included in the model were reviewed and approved by TAM and Caltrans. Table IV.B-17 shows a list of transportation projects that were included in the GCIP model.

Table IV.B-17: Future Transportation Projects in Travel Demand Model

Project	Description	Year Approved	Assumed in Marin County Model Forecasts	Not Assumed in Marin County Model Forecasts
101 HOV Gap Closure Project	Completed in 2010	Early 2000s	X	
WB 580 to NB 101 Connector	Completed in 2011	2008/09	X	
Novato Narrows Widening	Widening of U.S. 101 to 3 lanes in each direction	Under construction	X	
SMART (to San Rafael)	New commuter rail service	2008		X
SMART (to Larkspur)	New commuter rail service	n/a		X
Richmond Bridge widening	Planned widening of Richmond Bridge to 3 lanes in each direction	n/a		X
Alto Tunnel Bikeway	Planned bikeway connection between Corte Madera and Mill Valley	n/a		X

Source: Fehr & Peers, May 2013.

Cumulative No Project Conditions. As discussed above, the proposed project was included in the GCIP model to represent Cumulative Plus Project conditions. Cumulative No Project conditions were developed by removing the new AM and PM peak-hour trips for the proposed project. These vehicle trips were removed from the freeway segments, roadway segments, and intersection turning movements based on the directions of approach and departure shown in Figure IV.B-7. Intersection turning movement volumes for Cumulative No Project Conditions are shown on Figure IV.B-13. For conservative purposes, the maximum density of land uses, implemented over a 20-year period, was assumed for this analysis. Less intensive development within the Plan area (i.e., senior or affordable housing) would result in fewer traffic effects than described in this section.

Cumulative No Project Intersection Operations. The cumulative intersection operations under no project and project conditions are presented below.

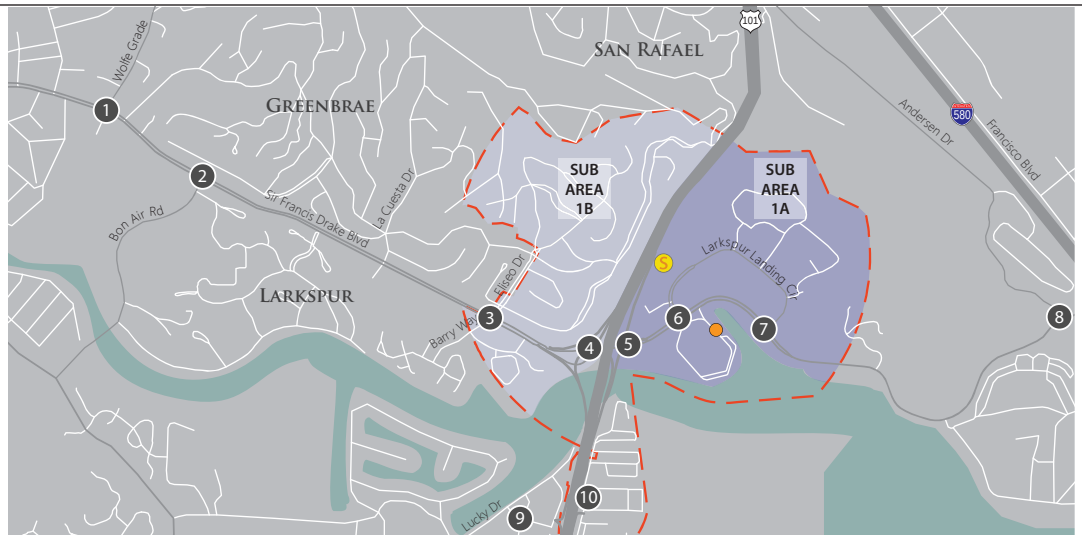
Cumulative No Project. The intersection LOS analysis results for Cumulative Conditions are presented in Table IV.B-18. The LOS results show that the following study intersections would degrade to unacceptable intersection operations due to the cumulative traffic growth without the project:

#2 Sir Francis Drake Boulevard/Bon Air Road – LOS F in the AM peak hour, LOS E in the PM peak hour.

#3 Sir Francis Drake Boulevard/Wolfe Grade – LOS F in the AM and PM peak hours.

#5 U.S. 101 Northbound Ramps/Sir Francis Drake Boulevard – LOS E in the PM peak hour.

#10 U.S. 101 Northbound Ramps/Redwood Highway/Industrial Way – LOS F in the PM peak hour.



MAP KEY

- Study Area Boundary
- SMART Station Location
- Larkspur Ferry Terminal
- Study Intersection

VOLUMES KEY

XX (YY) AM (PM) Peak Hour Traffic Volumes

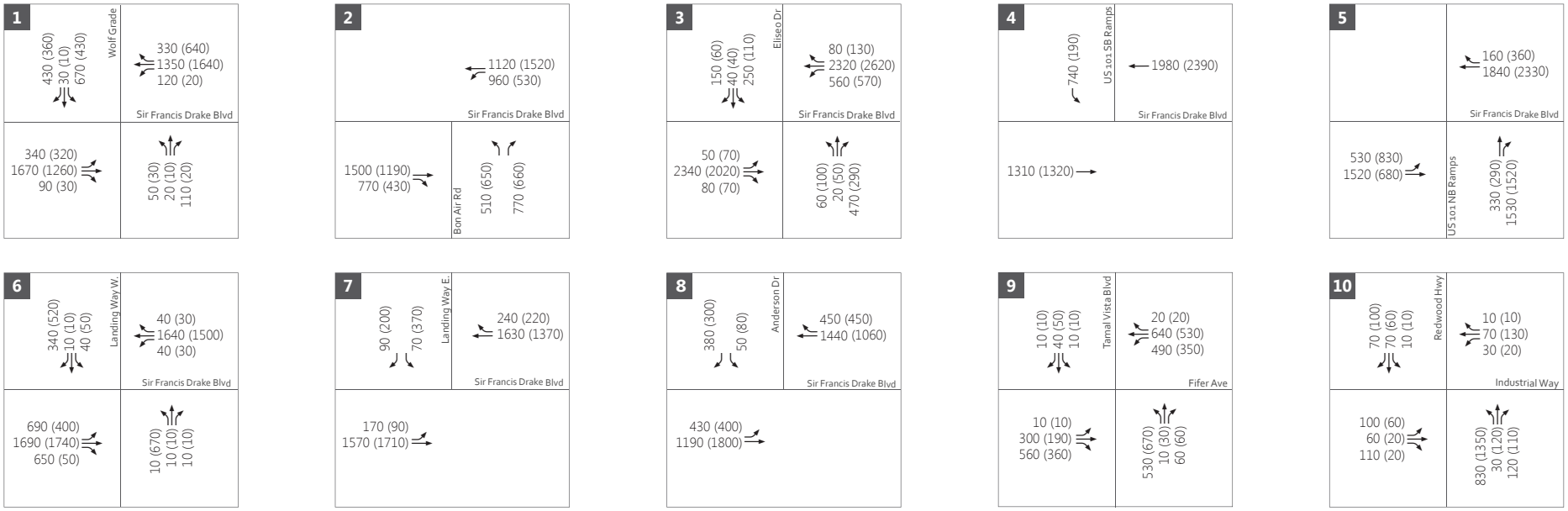


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FIGURE IV.B-13

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City of Larkspur SMART Station Area Plan EIR

Cumulative No Project Conditions

Intersection Peak Hour Volumes

SOURCE: FEHR & PEERS, MAY 2013.

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Table IV.B-18: Cumulative Plus Project Intersection LOS Results

Intersection	Control	Cumulative No Project				Cumulative Plus Project			
		AM		PM		AM		PM	
		Delay [a]	LOS	Delay [a]	LOS	Delay [a]	LOS	Delay [a]	LOS
1. Sir Francis Drake Boulevard/Wolfe Grade	Signal	**>80** [d]	**F**	**>80**	**F**	**>80**	**F**	**>80**	**F**
2. Sir Francis Drake Boulevard/Bon Air Road	Signal	**>80** [e]	**F**	**66**	**E**	**>80**	**F**	**69**	**E**
3. Sir Francis Drake Boulevard/Eliseo Drive [b]	Signal	**>80** [f]	**F**	**67**	**E**	**>80**	**F**	**72**	**E**
4. Sir Francis Drake Boulevard/U.S. 101 Southbound Ramps [b]	Signal	45	D	<10	A	46	D	12	B
5. Sir Francis Drake Boulevard/U.S. 101 Northbound Ramps [b]	Signal	31	C	**61**	**E**	38	D	**58**	**E** [i]
6. Sir Francis Drake Boulevard/Larkspur Landing Circle (West)/Ferry Terminal Entrance [b]	Signal	16	B	49	D	22	C	51	D
7. Sir Francis Drake Boulevard/Larkspur Landing Circle (East) [b]	Signal	25	C	37	D	28	C	46	D
8. Sir Francis Drake Boulevard/Andersen Drive	SSS [c]	**>50** [g]	**F**	**>50**	**F**	**>50**	**F**	**>50**	**F**
9. Tamal Vista Boulevard/Fifer Avenue [b]	Signal	55	D	44	D	53	D	48	D
10. U.S. 101 Northbound Ramps/Redwood Highway/Industrial Way [b]	Signal	< 10	A	**>80** [h]	**F**	<10	A	**>80**	**F**

Notes: **Bold** = unacceptable LOS. Shaded = significant impact.

[a] For signalized and all-way stop controlled intersections, the delay shown is the weighted average for all movements in seconds per vehicle. For side-street stop controlled intersection, the delay shown is the worst-operating approach delay.

[b] Intersection analyzed using the VISSIM microsimulation model.

[c] SSS = Side-street stop.

[d] As shown in Appendix B of the transportation appendices, the proposed project is forecast to increase average vehicle delay by 1 seconds in the AM and PM peak hours.

[e] As shown in Appendix B of the transportation appendices, the proposed project is forecast to increase average vehicle delay by 3-4 seconds in the AM and PM peak hours.

[f] As shown in Appendix B of the transportation appendices, the proposed project is forecast to increase average vehicle delay by 1-3 seconds in the AM and PM peak hours.

[g] As shown in Appendix B of the transportation appendices, the project would add traffic to the southbound approach which would not be able to enter Sir Francis Drake Boulevard during the AM and PM peak hours. In addition, the westbound left approach would operate at LOS F and the project would increase delay on this movement by 13 seconds in the PM peak hour.

[h] As shown in Appendix B of the transportation appendices, the proposed project is forecast to increase average vehicle delay by less than 5 seconds in the PM peak hour.

[i] Average intersection delay slightly improves at this location under cumulative conditions due to the increase in traffic on the eastbound through movement which has relatively less congestion than the remainder of the intersection.

Source: Fehr & Peers, May 2013.

The degradation of Sir Francis Drake Boulevard/Bon Air Road and Sir Francis Drake Boulevard/U.S. 101 Northbound Ramps is due to an increase in through traffic along Sir Francis Drake Boulevard. U.S. 101 Northbound Ramps/Redwood Highway/Industrial Way degrades to LOS F due to worsening mainline and Sir Francis Drake Boulevard off-ramp conditions that cause queues to spill back on Redwood Highway.

Cumulative Plus Project. The proposed project would contribute traffic and increase delay by more than 5 seconds at the intersections of Sir Francis Drake Boulevard/Andersen Drive, which are operating at unacceptable levels of service during the AM and PM peak hours. The proposed project would add in excess of 5 seconds of delay to this intersection during the AM peak hour. Therefore, the project's impact at this intersection is significant.

Impact TRANS-5: The addition of Station Area Plan traffic would increase the average delay during the AM and PM peak hours by more than 5 seconds at Intersection #8 Sir Francis Drake Boulevard/Andersen Drive, which contributes to unacceptable intersection operations under Cumulative Plus Project Conditions. (S)

Implementation of the following mitigation measure would reduce this impact to a less-than-significant level. However, as this mitigation would need to be coordinated with the City of San Rafael, this impact is considered significant and unavoidable.

> Mitigation Measure TRANS-5: Implementation of Mitigation Measure TRANS-4 would reduce vehicle delay at this intersection to less than without the project. As the feasibility of this improvement will require further study and coordination with other agencies for approval, this impact is considered significant and unavoidable. (SU)

The implementation of the Station Area Plan would add traffic to Intersection #1 Sir Francis Drake Boulevard/Wolfe Grade, Intersection #3 Sir Francis Drake Boulevard/Eliseo Drive, Intersection #5 Sir Francis Drake Boulevard/U.S. 101 Northbound Ramps, and Intersection #10 U.S. 101 Northbound Ramps/Redwood Highway/Industrial Way. These intersections would operate at unacceptable LOS E or F in the AM or PM peak hours under cumulative conditions; however, the average vehicle delay at these intersections would not increase by more than 5 seconds; primarily due to the fact that project trips would make up a smaller increase in traffic on Sir Francis Drake Boulevard when compared to the forecasted cumulative growth and that the signal timings would be optimized to meet the future traffic volumes. The remaining intersections would continue to operate at an acceptable LOS D or better with the proposed project. Therefore, impacts to these intersections would be less-than-significant under Cumulative Plus Project Conditions.

Freeway Operations. The cumulative freeway mainline operations under the Cumulative and Plus Project Conditions are presented below. The freeway traffic volumes and analysis results with the proposed project are presented in Table IV.B-19. The freeway operation LOS would vary depending on the peak hour, direction, and segment, ranging from LOS B to LOS F. The segments of northbound U.S. 101 North of Industrial Way and North of Tamalpais Drive, South of Industrial Way would exceed the CMP LOS threshold under Cumulative No Project and Plus Project Conditions. The proposed project would contribute traffic to these freeway segments greater than 1 percent of the freeway segment capacity, resulting in significant impacts to these freeway segments.

Table IV.B-19: Cumulative Plus Project Freeway Segment LOS Results

Direction	Freeway Segment	Theoretical Capacity[a]	Peak Hour	Cumulative			Cumulative Plus Project		
				Volume	V/C[b]	LOS	Volume	V/C[b]	LOS
Northbound U.S. 101	A. North of Sir Francis Drake Boulevard	9,900	PM	7,200	0.73	C	7,218	0.73	C
	B. North of Industrial Way	8,800	PM	9,440	**1.07**	**F**	9,594	**1.09**	**F**
	C. North of Tamalpais Drive, South of Industrial Way	7,700	PM	7,930	**1.03**	**F**	8,057	**1.05**	**F**
Southbound U.S. 101	A. North of Sir Francis Drake Boulevard	9,900	PM	6,850	0.69	B	6,900	0.70	B
	B. North of Fifer Avenue	8,800	PM	8,580	0.98	E	8,655	0.98	E
	C. South of Fifer Avenue, North of Madera Boulevard	8,800	PM	7,890	0.90	D	7,950	0.90	E

Notes: Bold = unacceptable **Bold** = unacceptable LOS. Shaded = significant impact.

[a] Assumes a mixed flow freeway capacity of 2,200 vehicles per hour per lane. HOV lane (peak direction only) capacity is 50 percent of a mixed flow freeway lane. Auxiliary lane capacity is 50 percent of a mixed flow lane.

[b] Freeway segment level of service based on volume to capacity ratio according to the Highway Capacity Manual. *Highway Capacity Manual, Transportation Research Board, 2000*.

Source: Fehr & Peers, May 2013.

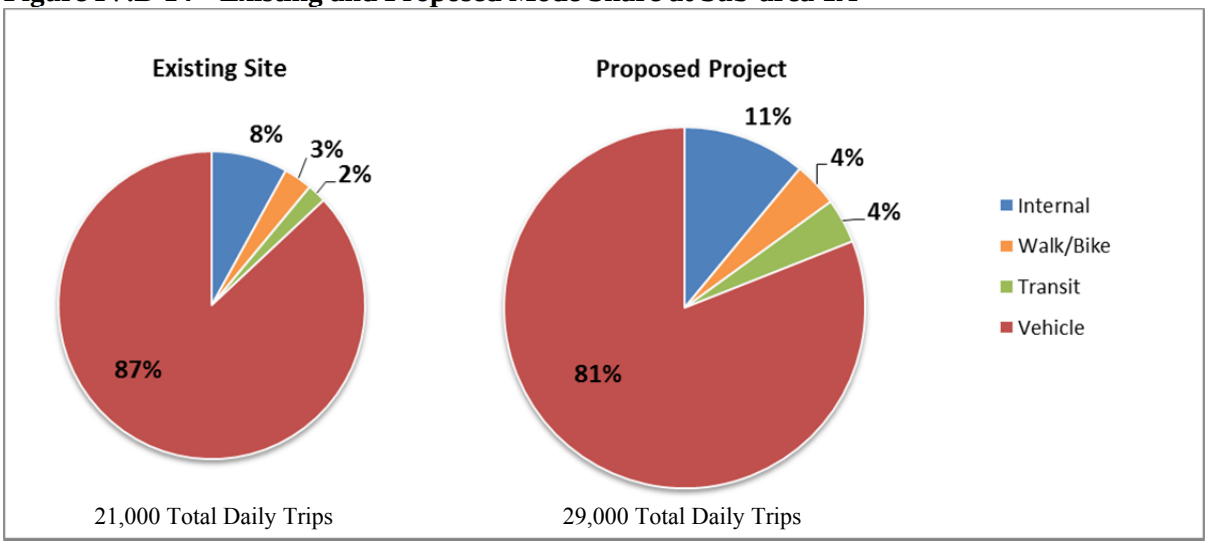
Impact TRANS-6: Implementation of the Station Area Plan would add traffic greater than 1 percent of the freeway segment capacity on the two segments of northbound U.S. 101 between Tamalpais Drive and Industrial Way, resulting in a significant project contribution under Cumulative Conditions. (S)

Mitigation Measure TRANS-6: Widening of northbound U.S. 101 to from three to four mixed-flow lanes (in addition to one HOV lane) from the Tamalpais Drive to Sir Francis Drake Boulevard interchanges would expand roadway capacity from 7,700 to 9,900 vehicles per hour between Tamalpais Drive and Industrial Way and from 8,800 to 11,000 vehicles per hour north of Industrial Way, thus providing acceptable operations. However, this roadway improvement is neither planned nor funded and is under the jurisdiction of Caltrans. Therefore, this impact is considered significant and unavoidable. (SU)

(2) Other Transportation Impacts and Mitigations. This section includes a discussion of the potential impacts of the project related to pedestrian, bike, and transit facilities; emergency access; air traffic; construction; transportation demand management; and parking.

Public Transit Facilities. As discussed previously, public transit service in the area is provided by GGT and Marin Transit. Key existing public transit services include the Larkspur Ferry Terminal and bus service operated by the GGT along Sir Francis Drake Boulevard. In addition to these services, the SMART train would provide service to the Plan area under project conditions. All three of these public transit services are within a quarter mile of the proposed land uses in Sub-area 1A. Public transit trips generated by the proposed project were determined based the existing transit mode split based on the 2000 Bay Area Travel Survey (BATS) data and the MXD+ trip generation forecasts. Figure IV.B-14 shows a comparison of forecasted transit mode share for Sub-area 1A under existing and project build out conditions.

Figure IV.B-14 Existing and Proposed Mode Share at Sub-area 1A



Source: Fehr & Peers, May 2013.

The MXD+ forecasts include transit ridership forecasts based on the project site characteristics and the accessibility of transit services at the site to employment. Table IV.B-20 shows the forecasted transit ridership for the proposed project based on the existing and future transit access at the site.

Table IV.B-20: Forecasted Public Transit Ridership Generated by the Proposed Project

Plan+ Tool Forecasts	Daily	AM Peak Hour	PM Peak Hour
Existing Sub-area 1A	430	50	70
Proposed Project	1,090	130	180
Net New Transit Riders	660	80	110

[a] Applying the projected transit mode share to Sub-area 1B would result in less than 10 transit trips in the AM and PM peak hours (mode share of 4 percent X 70/76 trips during the AM/PM peak hours).

Source: Fehr & Peers, May 2013.

To determine which public transit services these new transit riders would use, the existing daily Ferry ridership and bus ridership in the Plan area were compared to the forecasted daily ridership prepared for the SMART EIR. As shown in Table IV.B-21, these proportions were then applied to the ridership forecasts, resulting in approximately 520 new daily ferry riders, 30 new bus riders, and 110 SMART riders generated by the proposed project.

Table IV.B-21: Forecasted Public Transit Ridership Generated by the Proposed Project

	Daily	AM Peak Hour	PM Peak Hour
Forecasted New Ferry Riders	520	60	90
Forecasted New Bus Riders	30	0-10	0-10
Forecasted SMART Riders	110	20	20

Note: Appendix B shows transit calculations.

Source: Fehr & Peers, May 2013.

The SMART ridership would not exceed the forecasted ridership presented in the SMART EIR and Ferry Terminal ridership is currently planning for increased ridership in the future. The proposed project would be built out over 20 years, allowing the GGBHTD time to address potential increases in ridership associated with growth from the site and region. The City would continue to coordinate with the GGBHTD regarding development proposed in the vicinity of the ferry and potential effects on the ferry parking and ridership. Implementation of the Station Area Plan would not cause an unanticipated increase in public transit ridership beyond what is forecasted for the transit services in the Plan area. Therefore, impacts to public transit conditions would be less-than-significant.

Pedestrian and Bicycle Facilities. Implementation of the Station Area Plan would result in increased pedestrian and bicycle activity in and around the Plan area. In general, the Station Area Plan would enhance pedestrian and bicycle operations through new and improved crossings along Larkspur Landing Circle and at Sir Francis Drake Boulevard, additional sidewalks along Sir Francis Drake Boulevard and Larkspur Landing Circle, and a network of pedestrian and bicycle oriented streets throughout the site. Proposed on-site pedestrian improvements are shown in Figures IV.B-15a and IV.B-15b.

The site plan associated with Station Area Plan implementation has not been finalized. The final project designs will be reviewed to ensure consistency with design standards. Considering the improvements shown in Figures IV.B-15a and IV.B-15b, implementation of the Station Area Plan would improve existing pedestrian and bicycle facilities, minimize on-site potential conflicts between various modes, and provide safe and efficient pedestrian, bicycle, and vehicle connections between the Larkspur Ferry Terminal, Larkspur Landing, and the surrounding circulation systems.

Additionally, off-site pedestrian and bicycle improvements are proposed as a part of the following plans:

- Transportation Authority of Marin Proposed Studies
- Central Marin Ferry Connector
- San Quentin Access Study

A summary of applicable policies and plans was provided previously. The Station Area Plan is designed to be consistent with these policies, plans, and programs and would not preclude the development of bicycle and pedestrian facilities described in these plans. In addition, the proposed project would not cause a significant impact to existing pedestrian or bicycle facilities or substantially increasing traffic hazards to motor vehicles, bicycles, or pedestrians due to a design feature. Therefore, impacts to bicycle and pedestrian conditions would be less-than-significant.

Emergency Access. Emergency vehicles would be able to use the roadways surrounding the project site and through the project site, maintaining existing emergency access. Therefore, the proposed project would not result in emergency vehicle access impacts.

Air Traffic. Additional residents and employment associated with implementation of the Station Area Plan would not contribute substantially to demand for commercial flights. Therefore, the proposed project would not substantially increase flight operations. In addition, no buildings or features would be constructed on-site that would interfere with flight operations at local airports.

Construction. Project construction associated with implementation of the Station Area Plan would affect off-site circulation due to increased truck traffic to and from the development sites. Construction would also disrupt on-site travel due to the potential closure of sidewalks and blockage of bicycle facilities and transit routes during construction.

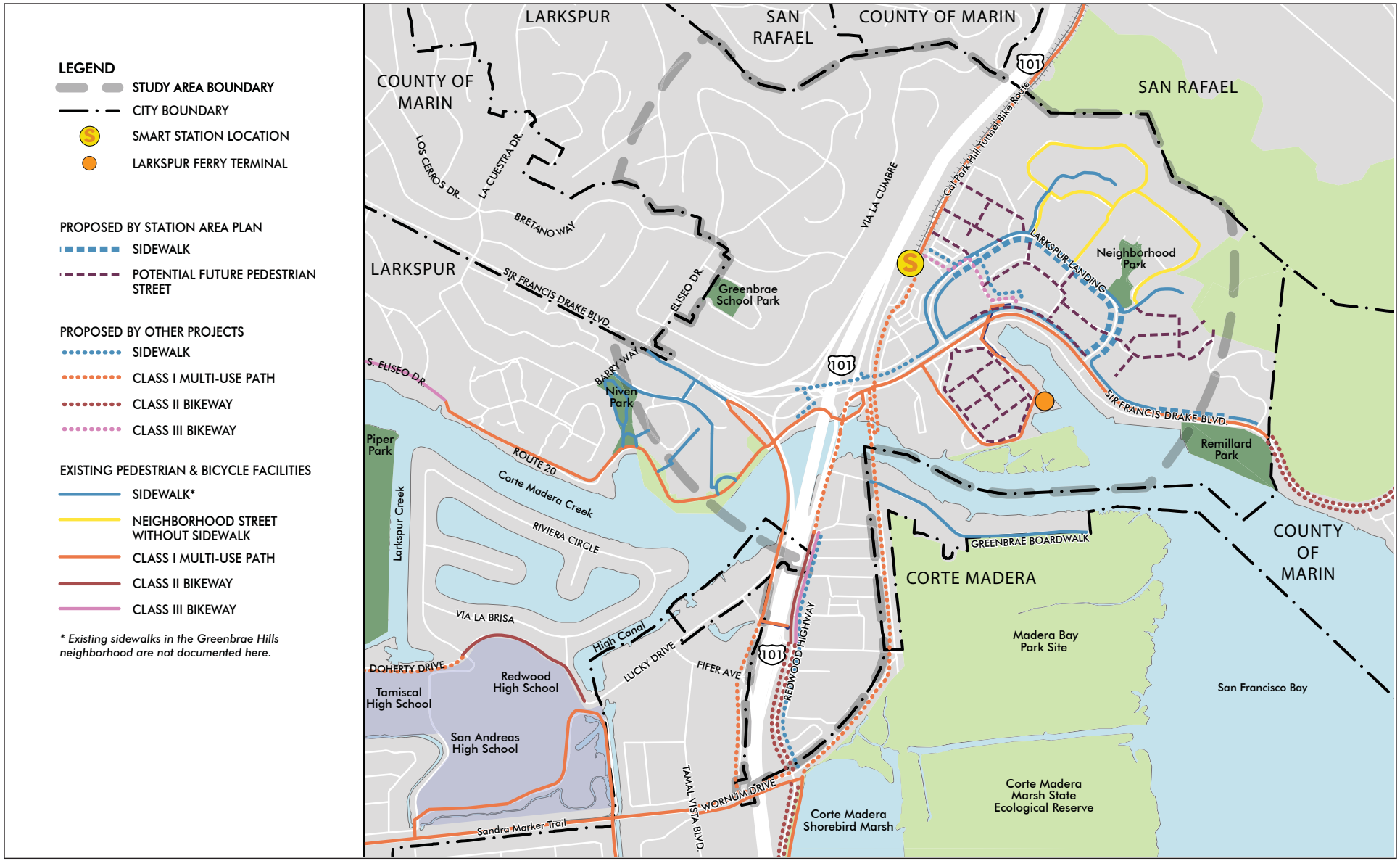


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FIGURE IV.B-15a

City of Larkspur SMART Station Area Plan EIR

Bicycle and Pedestrian Circulation Improvements

SOURCE: CITY OF LARKSPUR, DECEMBER 2013.

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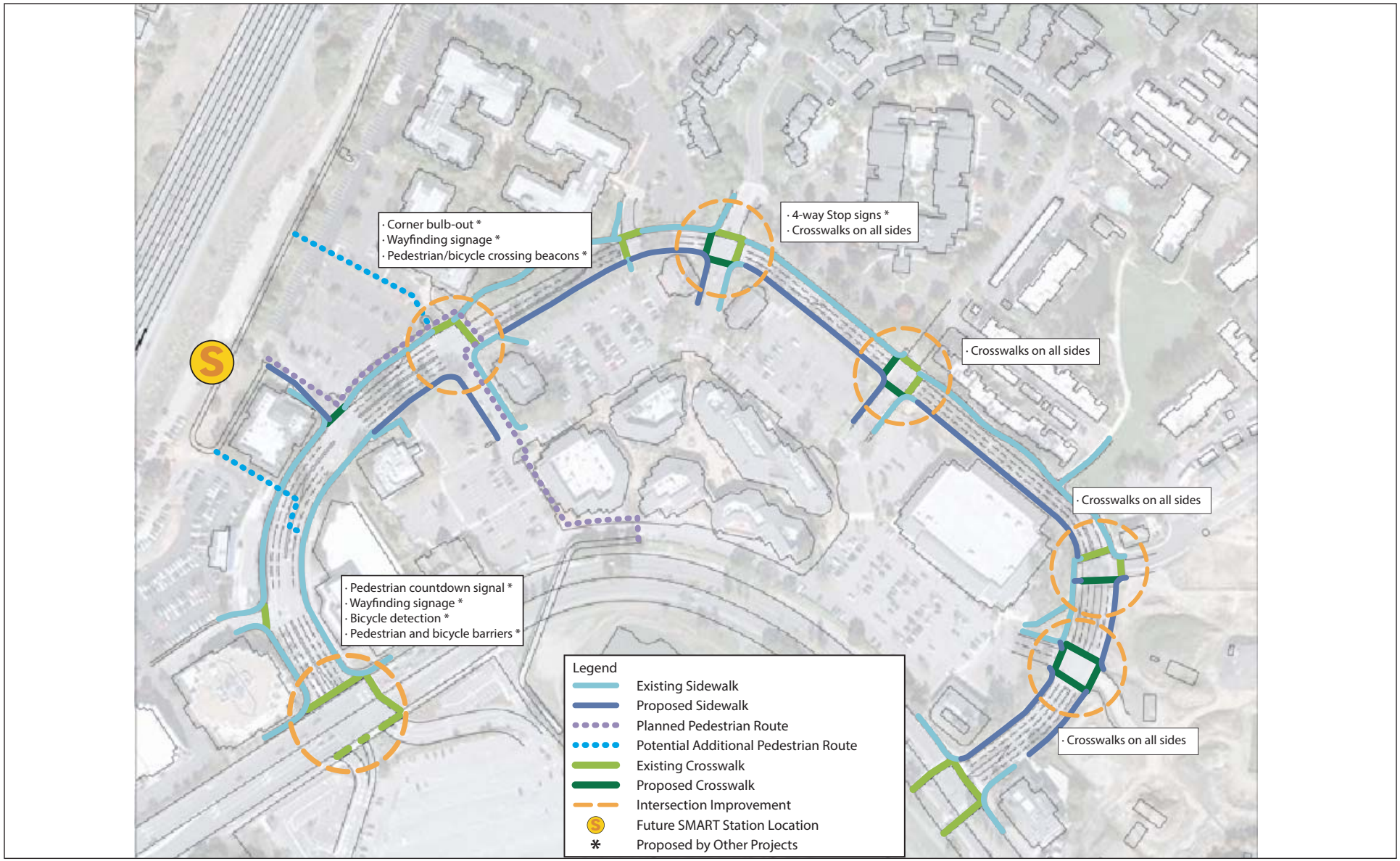

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FIGURE IV.B-15b

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City of Larkspur SMART Station Area Plan EIR

Bicycle and Pedestrian Circulation Improvements

SOURCE: CITY OF LARKSPUR, OCTOBER 2013.

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Impact TRANS-7: Project construction activities could interfere with circulation patterns. (S)

Implementation of the following mitigation measure would reduce this impact to a less-than-significant level:

Mitigation Measure TRANS-7: The City will require as a Condition of Approval that project applicants develop and submit construction management plans for City approval that specify measures that would reduce impacts to motor vehicle, bicycle, pedestrian, and transit circulation. Construction management plans shall include the following:

- Location of construction staging areas for materials, equipment, and vehicles;
- Notification procedures for adjacent property owners and public safety personnel regarding when major deliveries, detours, and lane closures will occur;
- Identification of haul routes for movement of construction vehicles that would minimize impacts on vehicular and pedestrian traffic, circulation, and safety; and provision for monitoring surface streets used for haul routes so that any damage and debris attributable to the haul trucks can be identified and corrected by the project sponsors;
- Provisions for removal of trash generated by project construction activity;
- A process for responding to, and tracking, complaints pertaining to construction activity, including identification of an on-site complaint manager; and
- Provisions for pedestrian and bicycle circulation through the congestion zone.

Project applicants shall implement construction management plans. (LTS)

Parking. The development associated with implementation of the Station Area Plan project in Sub-area 1A would include a total of 4,990 parking spaces in parking garages and on-street parking. This would represent an increase of approximately 1,410 parking spaces, or a 39 percent increase over the existing site. Parking would be shared among most uses to minimize the total amount of parking required at the site. The required parking code for the site and parking demand calculations are presented below. *Larkspur SMART Station Area Plan: Parking Demand Analysis Memorandum*[17] in Appendix B documents the proposed parking demand and supply.

The Larkspur Municipal Code defines off-street parking requirements in Chapter 18.56. Table IV.B-23 shows the required amount of parking for each land use in the Station Area Plan. Minimum parking requirements for multi-family housing range from 1.25 to 3 spaces per unit depending on the number of bedrooms in the unit. Minimum parking requirements for commercial uses range from four parking spaces per 1,000 square feet of office space to five parking spaces per 1,000 square feet of retail space.

[17] Fehr & Peers, 2012. *Larkspur SMART Station Area Plan: Parking Demand Analysis Memorandum.* November 30.

Table IV.B-22: Sub-area 1A Proposed Parking Supply

Opportunity Site	Existing	Proposed				
		Residential	Office	Retail	Other	Total
1. Ferry Terminal	1,800	330	0	0	1,800	2,130 (+380)
2. Marin Airporter	340	0	0	0	340	340[a] (0)
3. Larkspur Landing Offices/Cinema	630	0	640	160	20	820 (+190)
4. Marin Country Mart	810	330	0	950	0	1,280 (+470)
5. Sanitary District	0	400	0	0	20	420 (+420)
Total Sub-area 1A	**3,580**	**1,060**	**640**	**1,110**	**2,180**	**4,990 (+1,410)**

[a] Golden Gate Transit District is currently studying options to provide additional overflow parking at this location. These plans do not preclude additional parking at this site.

Source: Fehr & Peers, May 2013.

Table IV.B-23: Larkspur Off-Street Parking Requirements

Land Use	Unit Type	Rental	Condo	Guest Parking[a]	Range of Parking Ratios
(A) Multi-Family Residential (for large complexes in Station Area)	Studio + 1-Bedroom	1/unit	1/unit	0.25 to 0.5/unit	1.25 to 3/unit
	2-Bedroom	1.5/unit	2/unit		
	3-Bedroom	2/unit	2.5/unit		
	4-Bedroom	2/unit	2.5/unit		
Commercial Uses	**Use Type**	**Parking Ratio**			
	(C) General Retail	5/1,000 SF			
	(F) Office	4/1,000 SF			

Notes:
SF = square feet
[a] Guest parking is allowed to include on-street parking if it is available adjacent to the building which it serves. However, there is limited on-street parking in the Plan area.
Source: Fehr & Peers, May 2013.

Parking Demand and Supply. Parking occupancy surveys throughout the Plan area were conducted to estimate existing on- and off-street parking supply and demand within the area. Parking surveys were completed for both weekdays and weekends and shortfalls or surpluses during the peak parking periods were determined for each potential opportunity site (see Figure III-3). The proposed parking ratios and supply are based on the existing parking demand as well as parking ratios for existing transit oriented development (TOD's) throughout the San Francisco Bay Area.

The Urban Land Institute's (ULI) Shared Parking Model was used to determine the future parking demand for each development site within Sub-area 1A. Different land uses have peak parking demand at different times of the day. For example, commercial land uses (retail and office) have the peak parking demand during the middle of the day on weekdays, while residential land uses have their peak parking demand overnight. The ULI Shared Parking Model determines the maximum shared

parking demand on a weekday or weekend for a mix of land uses. Table IV.B-24 shows the forecasted increased parking demand at each of the sites.

Table IV.B-24: Sub-area 1A Projected Parking Demand

Opportunity Site	Existing Demand	Additional ULI Shared Parking Demand[a]				Peak Parking Demand[b]	Parking Supply
		Residential	Office	Retail	Other		
1. Ferry Terminal	1,800[c]	330	0	0	0	2,130	2,130
2. Marin Airporter	260[d]	0	0	0	0	260	340
3. Larkspur Landing Offices/Cinema	610	30	230	160	20	820	820
4. Marin Country Mart	640	330	0	310	0	1,280	1,280
5. Sanitary District	0	400			20	420	420
Total	**3,110**	**1,060**	**230**	**470**	**40**	**4,910**	**4,990**

Notes:
[a] ULI shared parking model assumes an optimum efficiency of 85-95 percent occupancy depending on the type of land use to account for the fact that a parking facilities will be perceived as full at somewhat less than its actual capacity. Residential demand parking rates are based on the ULI recommended rates, which are consistent with vehicle ownership levels in Marin County. Commercial parking demand rates are based on the survey of existing parking demand at the site.
[b] Peak parking demand at the site occurs during the weekday mid-day.
[c] Existing Ferry Terminal parking demand is assumed to be accommodated through a parking garage at the Ferry Terminal and a potential overflow parking garage at the Marin Airporter site. Excess demand beyond the current parking lot capacity is assumed to be accommodated at the Marin Airporter site.
[d] Includes existing overflow parking demand from the Ferry Terminal and Marin Airporter parking demand.

Source: Fehr & Peers, May 2013.

Parking Supply. The proposed parking supply of 4,990 spaces would adequately accommodate the forecasted maximum parking demand of 4,910 at the site during the mid-day weekday peak. This maximum parking demand includes an optimum efficiency of 85-95 percent occupancy depending on the type of land use per the ULI Shared Parking model. Existing and future parking demand at the Ferry Terminal would be accommodated at the Ferry Terminal site and in an overflow parking garage at the Marin Airporter site. Other times of the day or week would have less parking demand, resulting in additional available parking.

Sub-area 1B would have limited opportunities for shared parking due to the relatively small mix of land uses at the site. Therefore, parking provided at the land uses in Sub-area 1B would be required to meet the requirements set forth in the City of Larkspur Parking Code. The Parking Code requires four spaces per 1,000 square feet for office land uses and 1.25 to 3 spaces per unit for residential land uses.

With implementation of the parking policies identified below, the projected parking supply for the Station Area Plan would adequately accommodate the maximum parking demand. Therefore, impacts to parking demand would be less-than-significant.

The future parking demand at the Ferry Terminal is unknown at this time. GGBHTD is continuing to study options that include additional parking structures or reducing Ferry Terminal parking demand through the addition of SMART service to the Ferry Terminal and feeder shuttle services. These measures could also be coordinated with parking pricing and demand management strategies to provide incentive and funding to support these measures. These strategies should be coordinated with

those presented below for the proposed TOD. As the feasibility of these measures are not clear at this time, no adjustment in Ferry Terminal parking demand was made to account for these measures. Future parking supplies should be designed to accommodate the existing parking demand at the Ferry Terminal unless future studies show these measures could substantially reduce parking demand.

Parking Policies. Parking policies are one of the cornerstones of a successful Transit Oriented Development (TOD). Traveler behavior, urban design, and financial feasibility of the development can be directly affected, both positively and negatively, by the placement, price, and supply of parking. Based on the unique needs and characteristics of Larkspur, the proposed project includes the following parking policies. Many of these practices are adapted from MTC's *Reforming Parking Policies to Support Smart Growth Toolbox/Handbook* (June 2007).[18] Proposed bicycle parking strategies are also discussed at the end of this section.

Successful implementation of these policies will require the support of more general parking strategies that focus on incentivizing transit and non-motorized modes through transportation demand management. The City may consider adoption of these or other policies into the updated General Plan, Zoning Ordinance, and/or a Bicycle and Pedestrian Master Plan.

Parking Supply

1. Reduce off-street parking requirements:
   - Take advantage of shared-parking opportunities generated by mixed use development and the Ferry Terminal.
   - Set off-street parking maximums.
   - Allow developers to pay in-lieu fees to reduce parking provisions where appropriate.
2. Develop a parking management strategy:
   - Designate areas for short- and long-term parking
   - Employ innovative payment, information and monitoring technologies:
     - Offer "parking debit cards" or cell phone payment options at metered parking.
     - Coordinate off- and on-street parking availability via real-time message boards and mobile applications.
3. Where feasible, construct parking garages instead of parking lots. Avoid surrounding the transit station with surface parking:
   - Give developers flexibility to create space-efficient parking through the use of tandem, valet, and stacked mechanical parking.
   - Include ground floor retail to integrate parking structures into the neighborhood design and pedestrian realm.

[18] Metropolitan Transportation Commission, 2007. *Reforming Parking Policies to Support Smart Growth Toolbox/ Handbook.* June.

4. Market the parking supply strategy by providing a brochure with parking locations and information on alternative transportation options.
5. Provide on-street parking where possible (Note: this is often a product of reduced block sizes and enhanced pedestrian connections). Consider back-in or regular angled parking where feasible to maximize on-street parking opportunities.

Parking Demand

1. Encourage Alternative Modes (Transportation Demand Management or TDM):
   - Provide a transit subsidy ("commuter check" or "EcoPass") to all residents and employees.
   - Recruit and make provisions for Car-Share programs and neighborhood electric vehicle programs to reduce the need to have a car on site for occasional use.
   - Hire an on-site TDM Coordinator to manage and promote TDM programs and oversee monitoring to determine program effectiveness.
   - Integrate bicycle parking and support facilities, including signage and wayfinding, primarily to reduce trips within Larkspur and neighboring communities.
   - Provide a guaranteed ride home program.
   - Create incentives to tenants who use less than their share of the parking supply, work on-site, and for carpool and vanpool users.
   - Develop marketing and information programs to encourage alternative transportation modes.
2. Unbundle parking (separating the cost of parking in lease agreements with tenants) for offices and housing units to create more affordable live and work spaces, encourage developers to build less parking, and make the price of parking more transparent.
3. If feasible, charge for parking based on real-time demand:
   - Charge for all on-street parking within Sub-area 1A.
   - Coordinate off- and on-street parking prices.
   - Set a variable market price for parking to ensure 15 percent vacancy at all times, thereby reducing cruising for parking and air pollution, and encouraging visitors to local businesses. This includes varying parking by time of day and proximity to destination.
   - Implement companion parking technologies (pay by cell phone, etc.) and parking informational brochure, website, and wayfinding signs.
4. Implement parking pricing at the Larkspur Ferry Terminal through coordination with the Golden Gate Transit District:
   - Institute minimal parking fees thereafter in the range of $1 to $3/day in line with BART station parking fees.
   - Charge a premium for parking located closest to the Ferry Terminal.

- Use changeable message signs to direct Ferry Terminal patrons to available parking.
- Provide reserved carpool and vanpool spaces conveniently located near the Ferry Terminal.
- Work with Golden Gate Transit District to study the feasibility for shuttles or improved transit service to the Ferry Terminal to improve alternative mode access to the Ferry Terminal.

5. When charging for parking, employ these complementary measures:
    - Create residential parking permit zones on residential-only streets to prevent parking spillover into residential neighborhoods.
    - Return the parking revenue to the district by establishing Parking Benefit Districts.
    - Enforce parking cash-out programs if employers offer subsidized parking to employees.

Bicycle Parking. Bicycle parking strategies for convenient and secure on-street and off-street parking can make bicycling to Sub-area 1A more appealing. When bicycling works for both short- and long-term visitors riding to employment, retail and entertainment destination, the total number of car trips is reduced. Because bicycling is much faster than walking, bicycle trips expand the area accessible without a car. Three main strategies support this:

- Provide bicycle parking and supporting facility requirements such as showers and lockers for new developments.
- Consider in-street bicycle corrals to reduce sidewalk clutter, especially at high demand locations.
- Consider expanding MTC's bike share program to Larkspur.

Recommended Bicycle Parking Requirements

1. Bicycle parking requirements for all land uses creates designated places to safely store bicycles. Short-term bicycle parking is currently required at a rate of 10 percent of the number of required automobile parking spaces, and long-term requirements vary according to land uses. In some locations where parking reductions apply, more than 10 percent of automobile parking spaces may be beneficial, and short- and long-term bicycle parking could be substituted for automobile parking requirements. Table IV.B-25 illustrates the parking requirements for bicycles for different land uses within the Plan area.
2. To enhance the viability of bicycle travel within the Plan area, it is vital to provide sufficient bicycle parking opportunities. Bicycle parking ranges from short-term parking amenities, such as bicycle racks in highly visible and secure locations near building entrances, to long-term parking facilities, such as lockers or cages where bicycles are either locked individually (lockers) or with limited access (cages). As land uses develop and bicycle routes expand, it will be essential to provide safe and convenient places to store bicycles.
    - <u>In-Street Bicycle Corrals</u>: In-street bicycle corrals can be installed in any on-street parking space. Two vehicle parking spaces can accommodate a corral with 10-12 racks for 20-24 bikes. These are especially appropriate where bicycle parking is constrained

at high-use areas that cater to bicyclist (such as bike shops) or are popular bicycle trip destinations (such as restaurants and entertainment venues). Bicycle corrals can also be used to buffer pedestrians and sidewalk seating from car activity.

- Bicycle Share: Bicycle sharing programs are currently being studied by the MTC as a last-mile trip amenity for Caltrain riders in San Mateo County. The City of Larkspur should work with MTC and local employers at Larkspur Landing to determine if a similar program could be implemented at the Ferry Terminal and SMART station to create a local bike share system.

Table IV.B-25: Bicycle Parking Requirements for the Larkspur Station Area

Type of Activity	Long-Term Parking Requirement	Short-Term Parking Requirement
Residential		
Multifamily Dwelling		
a) With private garage for each unit (A private locked storage unit may be considered as a private garage if a bicycle can fit into it)	No spaces required	0.10 spaces for each bedroom. Minimum is 2 spaces.
b) Without private garage for each unit	0.5 spaces for each bedroom. Minimum is 2 spaces.	0.10 spaces for each bedroom. Minimum is 2 spaces.
c) Senior Housing	0.5 spaces for each bedroom. Minimum is 2 spaces.	0.10 spaces for each bedroom. Minimum is 2 spaces.
Public Transportation		
Rail/bus terminals and stations/ airports	Spaces for 7 percent of projected AM peak period daily ridership	Spaces for 2 percent of projected AM peak period daily ridership
Commercial		
General retail	1 space for each 10,000 sf of floor area. Minimum requirement is 2 spaces.	1 space for each 2,000 sf of floor area. Minimum requirement is 2 spaces.
Office	1 space for each 10,000 sf of floor area. Minimum requirement is 2 spaces.	1 space for each 20,000 sf of floor area. Minimum requirement is 2 spaces.
Off-street parking lots and garages available to the general public either without charge or on a fee basis	1 space for each 20 automobile spaces. Minimum requirement is 2 spaces. Unattended surface parking lots excepted.	Minimum of 6 spaces or 1 per 10 auto spaces. Unattended surface parking lots excepted.

Notes: sf = square feet

Sources: Based on the *Bicycle Parking Guidelines, 2nd Edition*, Association of Pedestrian and Bicycle Professionals (APBP/www.apbp.org) 2010; Fehr & Peers, May 2013.

Transportation Demand Management and Trip Cap. The Station Area Plan includes a suite of Transportation Demand Management (TDM) strategies to reduce peak single-occupancy vehicle trips and encourage use of transit, walking, and biking as transportation modes. These strategies can significantly enhance mobility for people accessing the Plan area and will require close coordination among multiple agencies, including the GGTBHD, Transportation Authority of Marin, County of Marin, and Caltrans. These TDM strategies will be most effective when they are provided for all user groups in the Plan area, including residents, employees, shoppers, and transit riders. In addition, the

Station Area Plan also includes a vehicle trip cap will monitor effectiveness of the TDM program and the traffic generated from the Plan area. For the purpose of conducting a conservative traffic analysis, the TDM program and trip cap are not included in the travel demand calculations for the EIR traffic analysis. The TDM program has the potential to reduce traffic to the Plan area and the Larkspur Ferry Terminal. However, the feasibility, funding sources, and effectiveness for these mode shift strategies are unknown at this time. The proposed TDM program includes the following components:

- **Vehicle Trip Cap**: Mixed-use, transit-oriented development such as that proposed by the project generates less traffic than traditional, suburban-type development. The Station Area Plan includes a vehicle trip cap that will limit the increase in vehicle trips from the Plan area to approximately 10 percent above the existing traffic generated in the Plan area. A monitoring program will be put in place by the City to periodically measure this traffic to ensure that traffic conditions are not worsened by development in the Plan area.
- **TDM Coordinator and Transportation Management Strategies**: A TDM Coordinator provides information via flyers, posters, e-mail, and educational programs regarding non-auto access and circulation options. The TDM Coordinator's role may also include actively marketing alternative mode use, administering a neighborhood ride-matching program, and overseeing a Guaranteed Ride Home program (working with a local taxi service or rental car agency). A TDM Coordinator could also help implement or support the transportation management strategies listed below.
- **Guaranteed Ride Home Program/Taxi Service**: One of the reasons many commuters choose to drive to work and/or transit stations, rather than being dropped off or taking transit, is their inability to go home unexpectedly or the fear of being stranded if returning late without a car at the station. Guaranteed Ride Home programs are designed to allay these fears. With this program, transit riders are able to use a complimentary or reduced price taxi service to get home. Adequate taxi service is necessary for the Guaranteed Ride Home program to be successfully implemented.
- **Neighborhood Ride-Matching and Ridesharing**: Carpools consist of two or more people riding in one vehicle for commute purposes. A vanpool consists of seven to 15 passengers, including the driver, and the vehicle is either owned by one of the vanpoolers or their employer or leased by a vanpool rental company. Carpools and vanpool formations often require ride-matching assistance. Neighborhood carpooling could be incentivized through priority parking at the Larkspur SMART Station and Larkspur Ferry Terminal, and through transit fare reductions. Additionally, the Guaranteed Ride Home program would provide an insurance plan to those hesitant to join carpools for concerns of being unable to respond to an emergency, sick child, or other issue. To facilitate the formation of carpools, a TDM coordinator will administer an on-site carpool and vanpool matching service for commuters and maintain a list of available vanpools that provide service between the Plan area and various residential neighborhoods. The coordinator could also direct patrons to the 511.org Rideshare website to access additional ride-matching services.
- **Attended Parking**: Attended parking employs the service of a parking attendant who organizes efficient parking based on arrival and departure times. This strategy is well-suited for the Larkspur Ferry Terminal, Larkspur SMART Station, and Larkspur Landing offices, where arrivals and departures come in "waves" with ample time during the day to re-arrange vehicles for efficient storage and exiting. Unlike valet parking, where a valet parks a vehicle on arrival and retrieves the vehicle on departure, attended parking relies on

organized parking queues and is not intended as a luxury service. Drivers typically park and retrieve their own vehicles. A significant benefit of attended parking is the ability to utilize more capacity in a parking area.

- **Preferential Parking for Vanpool or Carpool**: Reserve convenient parking spaces for high-occupancy vehicles (HOVs) to encourage ridesharing. Preferential spaces could be striped and signed at a low cost. By implementing this strategy with attended parking, there would be minimal enforcement costs. Complementary strategies such as a Guaranteed Ride Home program and a ride-matching program would further encourage ridesharing.
- **Transit Discounts for Carpools or Vanpools**: In addition to preferential parking for carpools and vanpools, SMART or Larkspur Ferry Terminal patrons commuting via carpool or vanpool may receive subsidized transit travel as an additional incentive. HOV discounts for ferry or SMART fares would require significant monitoring and enforcement to prevent abuse of the system. This could be a responsibility of a TDM Coordinator who could issue the discounted fares.
- **Unbundled, Shared Parking**: The cost of parking is often "hidden" within the rent or purchase price of a residential or commercial unit. When parking is unbundled, parking spaces may be rented or sold separately rather than automatically included with the building space. Unbundling parking can also make housing more affordable for lower income households by providing the option of paying for housing without also paying for parking (if the household chooses not to or does not have a vehicle). Companion strategies of prohibiting street parking overnight, charging market rates for on street parking, and selling limited residential parking permits are often necessary to prevent spillover effects. Unbundled parking can also complement car-sharing programs. Unbundling parking is more equitable and efficient and it has been shown to reduce the total amount of parking required for a building when alternatives to driving are available in the area. Where parking provisions are not reduced, excess parking may be used as shared parking in mixed-use developments. Shared parking maximizes the use of parking facilities by making parking available for several land uses, especially those that have different time-of-day parking requirements. A potential shared parking scheme could include the following:
    - Parking spaces are sold separately from units, with the total parking supply equal to the amount described in the Parking Management section;
    - Surplus residential or employee parking is leased to SMART or Ferry Terminal patrons at market rates (on a monthly basis to control the population of users with access to the residential parking area); this program could be managed by a TDM Coordinator or by SMART and GGT; and
    - Available spaces are provided to residents first upon turnover should their parking needs change.
- **Bicycle Parking**: Bicycle parking strategies for convenient and secure on-street and off-street parking can make bicycling to the Plan area more appealing. When bicycling works for both short- and long-term visitors riding to employment, retail and entertainment destination, the total number of vehicle trips is reduced. Because bicycling is much faster than walking, bicycle trips expand the area accessible without a car. Three main strategies support this:

  - Provide bicycle parking and supporting facility requirements such as showers and lockers for new developments;
  - Consider in-street bicycle corrals to reduce sidewalk clutter, especially at high demand locations; and
  - Consider expanding MTC's bike share program to Larkspur
- **Carsharing**: With carsharing, a fleet of vehicles is available to members of a carsharing group. Membership fees typically include insurance, fuel, and maintenance costs and may be paid on a per-hour or mile basis. Carsharing can be an alternative to car ownership or may encourage households within the Plan area to "shed" an extra car, or employees to take transit to the site knowing that they will have vehicles available if needed. Carsharing could complement other strategies such as unbundled parking or parking permits for residents and discounted transit passes and parking cash-out for employees.
- **Additional Strategies**:
  - Improved wayfinding and signage;
  - Station branding and visibility;
  - Station Area maps;
  - Variable real-time message signs (e.g., for parking);
  - Information kiosks and booths; and
  - Neighborhood ecopass.

C. AIR QUALITY

This section describes the air quality issues and provides an overview of existing air quality conditions in and around the vicinity of the Larkspur SMART Station Area Plan (Plan) area and the San Francisco Bay Area. The section summarizes the ambient air quality standards and the regulatory framework related to air quality. Project-related air quality impacts are then analyzed, and mitigation measures are recommended, if necessary, to reduce potentially significant air quality impacts.

1. Setting

The following discussion provides an overview of existing air quality conditions in and around the San Francisco Bay and the Plan area. Ambient air quality standards and the regulatory framework related to air quality are summarized. Climate, air quality conditions, and typical air pollutant types and sources are described.

a. Background. Air quality standards, the regulatory framework, and State and federal attainment status are discussed below.

(1) Ambient Air Quality Standards. Pursuant to the federal Clean Air Act (CAA) of 1970, the U.S. Environmental Protection Agency (EPA) established national ambient air quality standards (NAAQS). The NAAQS were established for major pollutants, termed "criteria" pollutants. Criteria pollutants are defined as those pollutants for which the federal and State governments have established ambient air quality standards, or criteria, for outdoor concentrations in order to protect public health.

Both the EPA and the California Air Resources Board (CARB) have established ambient air quality standards for common pollutants: carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (Pb), and suspended particulate matter (PM). In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. These standards are designed to protect the health and welfare of the public with a reasonable margin of safety. These ambient air quality standards are levels of contaminants which represent safe levels that avoid specific adverse health effects associated with each criteria pollutant.

Federal standards include both primary and secondary standards. Primary standards set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.[1]

Health effects of criteria pollutants and their potential sources are described below and summarized in Table IV.C-1. The standards would have to be exceeded by a large margin, or for a prolonged period of time, for the health effects to occur. Table IV.C-2 shows both the State and federal standards for these criteria pollutants; the California Ambient Air Quality Standards (CAAQS) are more stringent than the NAAQS.

[1] U.S. Environmental Protection Agency, 2012. Website: www.epa.gov/air/criteria.html. May.

Table IV.C-1: Health Effects of Air Pollutants

Pollutants	Sources	Primary Effects
Carbon Monoxide (CO)	• Incomplete combustion of fuels and other carbon-containing substances, such as motor exhaust • Natural events, such as decomposition of organic matter	• Reduced tolerance for exercise • Impairment of mental function • Impairment of fetal development • Death at high levels of exposure • Aggravation of some heart diseases (angina)
Nitrogen Dioxide (NO_2)	• Motor vehicle exhaust • High temperature stationary combustion • Atmospheric reactions	• Aggravation of respiratory illness • Reduced visibility • Reduced plant growth • Formation of acid rain
Ozone (O_3)	• Atmospheric reaction of organic gases with nitrogen oxides in sunlight	• Aggravation of respiratory and cardiovascular diseases • Irritation of eyes • Impairment of cardiopulmonary function • Plant leaf injury
Lead (Pb)	• Contaminated soil	• Impairment of blood functions and nerve construction • Behavioral and hearing problems in children
Suspended Particulate Matter ($PM_{2.5}$ and PM_{10})	• Stationary combustion of solid fuel • Construction activities • Industrial processes • Atmospheric chemical reactions	• Reduced lung function • Aggravation of the effects of gaseous pollutants • Aggravation of respiratory and cardiorespiratory diseases • Increased cough and chest discomfort • Soiling • Reduced visibility
Sulfur Dioxide (SO_2)	• Combustion of sulfur-containing fossil fuels • Smelting of sulfur-bearing metal ores • Industrial processes	• Aggravation of respiratory diseases (asthma, emphysema) • Reduced lung function • Irritation of eyes • Reduced visibility • Plant injury • Deterioration of metals, textiles, leather, finishes, coatings, etc.

Source: California Air Resources Board (ARB), 2012.

Ozone. Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving ROG and NO_x. The main sources of ROG and NO_x, often referred to as ozone precursors, are combustion processes (including combustion in motor vehicle engines) and the evaporation of solvents, paints, and fuels. In the Bay Area, automobiles are the single largest source of ozone precursors. Ozone is referred to as a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production through the photochemical reaction process. Ozone causes eye irritation, airway constriction, and shortness of breath and can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.

Carbon Monoxide. Carbon monoxide (CO) is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuels. The single largest source of CO is motor vehicles. While CO transport is limited, it disperses with distance from the source under normal meteorological conditions. However, under certain extreme meteorological conditions, CO concentrations near congested roadways or intersections may reach unhealthful levels that adversely affect local sensitive receptors (e.g., residents, school children, the elderly, hospital patients, etc.). Typically, high CO concentrations are associated with roadways or intersections operating at unacceptable levels of service (LOS) or with extremely high traffic volumes. Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause headaches, nausea, dizziness, and fatigue, impair central nervous system function, and induce angina (chest pain) in persons with serious heart disease. Very high levels of CO can be fatal.

Nitrogen Dioxide. NO_2 is a reddish brown gas that is a byproduct of combustion processes. Automobiles and industrial operations are the main sources of NO_2. Aside from its contribution to ozone formation, NO_2 also contribute to other pollution problems, including a high concentration of fine particulate matter, poor visibility, and acid deposition. NO_2 may be visible as a coloring component on high pollution days, especially in conjunction with high ozone levels. NO_2 decreases lung function and may reduce resistance to infection. On January 22, 2010, the EPA strengthened the health-based NAAQS for NO_2.

Sulfur Dioxide. Sulfur dioxide (SO_2) is a colorless, irritating gas formed primarily from incomplete combustion of fuels containing sulfur. Industrial facilities also contribute to gaseous SO_2 levels in the region. SO_2 irritates the respiratory tract, can injure lung tissue when combined with fine particulate matter, and reduces visibility and the level of sunlight.

Particulate Matter. Particulate matter is the term used for a mixture of solid particles and liquid droplets found in the air. Coarse particles are those that are larger than 2.5 microns but smaller than 10 microns, or PM_{10}. $PM_{2.5}$ refers to fine suspended particulate matter with an aerodynamic diameter of 2.5 microns or less that is not readily filtered out by the lungs. Nitrates, sulfates, dust, and combustion particulates are major components of PM_{10} and $PM_{2.5}$. These small particles can be directly emitted into the atmosphere as by-products of fuel combustion, through abrasion, such as tire or brake lining wear, or through fugitive dust (wind or mechanical erosion of soil). They can also be formed in the atmosphere through chemical reactions. Particulates may transport carcinogens and other toxic compounds that adhere to the particle surfaces, and can enter the human body through the lungs.

Table IV.C-2: Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]		Federal Standards[b]		
		Concentration[c]	Method[d]	Primary[c,e]	Secondary[c,f]	Method[g]
Ozone (O_3)	1-Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	–	Same as Primary Standard	Ultraviolet Photometry
	8-Hour	0.07 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM_{10})	24-Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		–		
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	–		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15 µg/m^3		
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	–	Non-Dispersive Infrared Photometry (NDIR)
	1-Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		–	–	
Nitrogen Dioxide (NO_2)[h]	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	Gas Phase Chemi-luminescence	0.053 ppb (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemi-luminescence
	1-Hour	0.18 ppm (339 µg/m^3)		100 ppb (188 µg/m^3)	–	
Lead (Pb)[j,k]	30-day average	1.5 µg/m^3	Atomic Absorption	–	–	High-Volume Sampler and Atomic Absorption
	Calendar Quarter	–		1.5 µg/m^3 (for certain areas)[k]	Same as Primary Standard	
	Rolling 3-month average[i]	–		0.15 µg/m^3		
Sulfur Dioxide (SO_2)[i]	24-Hour	0.04 ppm (105 µg/m^3)	Ultraviolet Fluorescence	0.14 ppm (for certain areas)[i]	–	Ultraviolet Fluorescence; Spectro-photometry (Pararosaniline Method)
	3-Hour	–		–	0.5 ppm (1300 µg/m^3)	
	1-Hour	0.25 ppm (655 µg/m^3)		75 ppb (196 µg/m^3)	–	
	Annual Arithmetic Mean	–		0.030 ppm (for certain areas)[i]	–	
Visibility-Reducing Particles[l]	8-Hour	Extinction coefficient of 0.23 per kilometer - visibility of 10 miles or more (0.07–30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards		
Sulfates	24-Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[j]	24-Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

Table notes included on next page.

[a] California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, suspended particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.

[c] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

[e] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[f] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[g] Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.

[h] To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national standards are in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb are identical to 0.100 ppm.

[i] On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved. Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standards to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

[j] The ARB has identified lead and vinyl chloride as "toxic air contaminants" with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[k] The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

[l] In 1989, the ARB converted both the general Statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the Statewide and Lake Tahoe Air Basin standards, respectively.

°C = degrees Celsius
ARB = California Air Resources Board
U.S. EPA = United States Environmental Protection Agency
$\mu g/m^3$ = micrograms per cubic meter
mg/m^3 = milligrams per cubic meter
ppm = parts per million
ppb = parts per billion

Source: ARB, June 7, 2012.

Lead. Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result of the phase-out of leaded gasoline, metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufactures.

Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, the EPA established national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. The EPA banned the use of leaded gasoline in highway vehicles in December 1995. As a result of the EPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector and levels of lead in the air decreased dramatically

Toxic Air Contaminants. In addition to the criteria pollutants discussed above, Toxic Air Contaminants (TACs) are another group of pollutants of concern. TACs are injurious in small quantities and are regulated by the EPA and the CARB. Some examples of TACs include: benzene, butadiene, formaldehyde, and hydrogen sulfide. The identification, regulation and monitoring of TACs is relatively recent compared to that for criteria pollutants.

High volume freeways, stationary diesel engines, and facilities attracting heavy and constant diesel vehicle traffic (distribution centers, truck stops) were identified as having posing the highest risk to adjacent receptors. Other facilities associated with increased risk include warehouse distribution centers, large retail or industrial facilities, high volume transit centers or schools with a high volume of bus traffic. Health risks from TACs are a function of both concentration and duration of exposure.

b. Regulatory Framework. The Bay Area Air Quality Management District (BAAQMD) is primarily responsible for regulating air pollution emissions from stationary sources (e.g., factories) and indirect sources (e.g., traffic associated with new development), as well as for monitoring ambient pollutant concentrations. The District's jurisdiction encompasses seven counties—Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara and Napa—and portions of Solano and Sonoma counties. The CARB and EPA regulate direct emissions from motor vehicles.

(1) Federal Air Quality Regulations. At the federal level, the EPA has been charged with implementing national air quality programs. EPA's air quality mandates are drawn primarily from the Federal Clean Air Act (FCAA), which was enacted in 1963. The FCAA was amended in 1970, 1977, and 1990.

The FCAA required EPA to establish primary and secondary NAAQS and required each state to prepare an air quality control plan referred to as a State Implement Plan (SIP). The Federal Clean Air Act Amendments of 1990 (FCAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA has responsibility to review all state SIPs to determine conformity with the mandates of the FCAAA and determine if implementation will achieve air quality goals. If the EPA determines a SIP to be inadequate, a Federal Implementation Plan (FIP) may be prepared for the nonattainment area which imposes additional control measures. Failure to submit an approvable SIP or to implement the plan within the mandated timeframe may

result in the application of sanctions on transportation funding and stationary air pollution sources in the air basin.

The 1970 FCAA authorized the establishment of national health-based air quality standards and also set deadlines for their attainment. The FCAA Amendments of 1990 changed deadlines for attaining NAAQS as well as the remedial actions required of areas of the nation that exceed the standards. Under the FCAA, State and local agencies in areas that exceed the NAAQS are required to develop SIPs to show how they will achieve the NAAQS by specific dates. The FCAA requires that projects receiving federal funds demonstrate conformity to the approved SIP and local air quality attainment plan for the region. Conformity with the SIP requirements would satisfy the FCAA requirements.

(2) State Air Quality Regulations. The CARB is the agency responsible for the coordination and oversight of State and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA), adopted in 1988. The CCAA requires that all air districts in the State achieve and maintain the California Ambient Air Quality Standards (CAAQS) by the earliest practical date. The CCAA specifies that districts should focus on reducing the emissions from transportation and air-wide emission sources, and provides districts with the authority to regulate indirect sources.

CARB is also responsible for developing and implementing air pollution control plans to achieve and maintain the NAAQS. CARB is primarily responsible for Statewide pollution sources and produces a major part of the SIP. Local air districts provide additional strategies for sources under their jurisdiction. CARB combines this data and submits the completed SIP to the EPA.

Other CARB duties include monitoring air quality (in conjunction with air monitoring networks maintained by air pollution control and air quality management districts), establishing CAAQS (which in many cases are more stringent than the NAAQS), determining and updating area designations and maps, and setting emissions standards for new mobile sources, consumer products, small utility engines, and off-road vehicles.

(3) Bay Area Air Quality Management District. The BAAQMD seeks to attain and maintain air quality conditions in the San Francisco Bay Area Air Basin through a comprehensive program of planning, regulation, enforcement, technical innovation, and education. The clean air strategy includes the preparation of plans for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations, and issuance of permits for stationary sources. The BAAQMD also inspects stationary sources and responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements programs and regulations required by law.

Clean Air Plan. The BAAQMD is responsible for developing a Clean Air Plan which guides the region's air quality planning efforts to attain the CAAQS. The BAAQMD's 2010 Clean Air Plan is the latest Clean Air Plan which contains district-wide control measures to reduce ozone precursor emissions (i.e., ROG and NO_x), particulate matter and greenhouse gas emissions.

The Bay Area 2010 Clean Air Plan, which was adopted on September 15, 2010 by the BAAQMD's board of directors:

- Updates the Bay Area 2005 Ozone Strategy in accordance with the requirements of the California Clean Air Act to implement "all feasible measures" to reduce ozone;

- Provides a control strategy to reduce ozone, particulate matter (PM), air toxics, and greenhouse gases in a single, integrated plan;
- Reviews progress in improving air quality in recent years; and
- Establishes emission control measures to be adopted or implemented in the 2010 to 2012 timeframe.

BAAQMD CARE Program. The Community Air Risk Evaluation (CARE) program was initiated in 2004 to evaluate and reduce health risks associated with exposures to outdoor TACs in the Bay Area. The program examines TAC emissions from point sources, area sources and on-road and off-road mobile sources with an emphasis on diesel exhaust, which is a major contributor to airborne health risk in California. The CARE program is an on-going program that encourages community involvement and input. The technical analysis portion of the CARE program is being implemented in three phases that includes an assessment of the sources of TAC emissions, modeling and measurement programs to estimate concentrations of TAC, and an assessment of exposures and health risks. Throughout the program, information derived from the technical analyses will be used to focus emission reduction measures in areas with high TAC exposures and high density of sensitive populations. Risk reduction activities associated with the CARE program are focused on the most at-risk communities in the Bay Area. The BAAQMD has identified six communities as impacted: Concord, Richmond/San Pablo, Western Alameda County, San Jose, Redwood City/East Palo Alto and Eastern San Francisco. The City of Larkspur has not been included as an impacted community, and no other communities within Marin County have been identified as in need of immediate emission reduction measures.

BAAQMD CEQA Air Quality Guidelines. The BAAQMD *CEQA Air Quality Guidelines*[2] were prepared to assist in the evaluation of air quality impacts of projects and plans proposed within the Bay Area. The guidelines provide recommended procedures for evaluating potential air impacts during the environmental review process consistent with CEQA requirements including thresholds of significance, mitigation measures and background air quality information. They also include assessment methodologies for air toxics, odors and greenhouse gas emissions. In June 2010, the BAAQMD's Board of Directors adopted CEQA thresholds of significance and an update of their *CEQA Guidelines*. In May 2011, the updated BAAQMD *CEQA Air Quality Guidelines* were amended to include a risk and hazards threshold for new receptors and modify procedures for assessing impacts related to risk and hazard impacts.

On March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the thresholds of significance in the 2011 BAAQMD *CEQA Air Quality Guidelines*. The court issued a writ of mandate ordering the BAAQMD to set aside the thresholds and cease dissemination of them until the BAAQMD complied with CEQA. In view of the court's order, the BAAQMD is no longer recommending that the thresholds of significance be used as a generally applicable measure of a project's significant air quality impacts. On May 4, 2012, BAAQMD commenced an appeal in the First District of the California Court of Appeal seeking to overturn the Alameda County Superior Court decision. In August 2013, the First District Court of Appeal overturned the trial court and held that the thresholds of significance were not subject to CEQA

[2] Bay Area Air Quality Management District, 2011. *CEQA Air Quality Guidelines*. May.

review. The BAAQMD has not reinstated the 2011 Guidelines; however, Alameda County Superior Court, in ordering BAAQMD to set aside the thresholds, did not address the merits of the science or evidence supporting the thresholds. The City finds that, despite the court ruling, the science and reasoning contained in the BAAQMD 2011 *CEQA Air Quality Guidelines* provide the latest state-of-the-art guidance available. For that reason, substantial evidence supports continued use of the BAAQMD 2011 *CEQA Air Quality Guidelines*

(4) Attainment Status Designations. The CARB is required to designate areas of the State as attainment, nonattainment or unclassified for all State standards. An "attainment" designation for an area signifies that pollutant concentrations did not violate the standard for that pollutant in that area. A "nonattainment" designation indicates that a pollutant concentration violated the standard at least once, excluding those occasions when a violation was caused by an exceptional event, as defined in the criteria. An "unclassified" designation signifies that data does not support either an attainment or nonattainment status. The CCAA divides districts into moderate, serious, and severe air pollution categories, with increasingly stringent control requirements mandated for each category.

The EPA designates areas for O_3, CO, and NO_2 as either "does not meet the primary standards," or "cannot be classified" or "better than national standards." For SO_2, areas are designated as "does not meet the primary standards," "does not meet the secondary standards," "cannot be classified" or "better than national standards."

Table IV.C-3 provides a summary of the attainment status for the San Francisco Bay Area with respect to national and State ambient air quality standards.

Table IV.C-3: San Francisco Bay Area Attainment Status

Pollutant	Averaging Time	California Standards [a]		National Standards [b]	
		Concentration	Attainment Status	Concentration[c]	Attainment Status
Carbon Monoxide (CO)	8-Hour	9 ppm (10 mg/m^3)	Attainment	9 ppm (10 mg/m^3)	Attainment [f]
	1-Hour	20 ppm (23 mg/m^3)	Attainment	35 ppm (40 mg/m^3)	Attainment
Nitrogen Dioxide (NO_2)	Annual Mean	0.030 ppm (57 mg/m^3)	Attainment	0.053 ppm (100 µg/m^3)	Attainment
	1-Hour	0.18 ppm (338 µg/m^3)	Attainment	0.100 ppm [j]	Unclassified
Ozone (O_3)	8-Hour	0.07 ppm (137 µg/m^3)	Nonattainment [h]	0.075 ppm	Nonattainment [d]
	1-Hour	0.09 ppm (180 µg/m^3)	Nonattainment	Not Applicable	Not Applicable [e]
Suspended Particulate Matter (PM_{10})	Annual Mean	20 µg/m^3	Nonattainment [g]	Not Applicable	Not Applicable
	24-Hour	50 µg/m^3	Nonattainment	150 µg/m^3	Unclassified
Suspended Particulate Matter ($PM_{2.5}$)	Annual Mean	12 µg/m^3	Nonattainment[g]	15 µg/m^3	Attainment
	24-Hour	Not Applicable	Not Applicable	35 µg/m^3 See footnote [i]	Nonattainment
Sulfur Dioxide (SO_2) [k]	Annual Mean	Not Applicable	Not Applicable	80 µg/m^3 (0.03 ppm)	Attainment
	24-Hour	0.04 ppm (105 µg/m^3)	Attainment	365 µg/m^3 (0.14 ppm)	Attainment
	1-Hour	0.25 ppm (655 µg/m^3)	Attainment	0.075 ppm (196 µg/m^3)	Attainment

Table notes included on next page.

[a] California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter - PM_{10}, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, Lake Tahoe carbon monoxide, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour or 24-hour average (i.e., all standards except for lead and the PM_{10} annual standard), then some measurements may be excluded. In particular, measurements are excluded that CARB determines would occur less than once per year on the average. The Lake Tahoe CO standard is 6.0 ppm, a level one-half the national standard and two-thirds the State standard.

[b] National standards shown are the "primary standards" designed to protect public health. National standards other than for ozone, particulates and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the 3-year average of the 4th highest daily concentrations is 0.075 ppm (75 ppb) or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 $\mu g/m^3$. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of 98th percentiles is less than 35 $\mu g/m^3$.
Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM_{10} is met if the 3-year average falls below the standard at every site. The annual $PM_{2.5}$ standard is met if the 3-year average of annual averages spatially-averaged across officially designed clusters of sites falls below the standard.

[c] National air quality standards are set by EPA at levels determined to be protective of public health with an adequate margin of safety.

[d] On September 22, 2011, the EPA announced it will implement the current 8-hour ozone standard of 75 ppb. The EPA expects to finalize initial area designations for the 2008 8-hour ozone standard by mid-2012.

[e] The national 1-hour ozone standard was revoked by EPA on June 15, 2005.

[f] In April 1998, the Bay Area was redesignated to attainment for the national 8-hour carbon monoxide standard.

[g] In June 2002, CARB established new annual standards for $PM_{2.5}$ and PM_{10}. Statewide VRP Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

[h] The 8-hour CA ozone standard was approved by the CARB on April 28, 2005 and became effective on May 17, 2006.

[i] 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 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 EPA by December 14, 2012.

[j] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100ppm (effective January 22, 2010).

[k] On June 2, 2010, the EPA established a new 1-hour SO_2 standard, effective August 23, 2010, which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations. The existing 0.030 ppm annual and 0.14 ppm 24-hour SO_2 NAAQS however must continue to be used until one year following EPA initial designations of the new 1-hour SO_2 NAAQS. EPA expects to designate areas by June 2012.

Lead (Pb) is not listed in the above table because it has been in attainment since the 1980s.
ppm = parts per million
mg/m^3 = milligrams per cubic meter
$\mu g/m^3$ = micrograms per cubic meter

Source: Bay Area Air Quality Management District, 2012.

c. Existing Climate and Air Quality. Regional air quality, local climate, air quality, and air pollution climatology within the Marin County region is described below.

The City of Larkspur is located in the San Francisco Bay Area, a large shallow air basin ringed by hills that taper into a number of sheltered valleys around the perimeter. Two primary atmospheric outlets exist. One is through the strait known as the Golden Gate, a direct outlet to the Pacific Ocean. The second extends to the northeast, along the west delta region of the Sacramento and San Joaquin Rivers.

The City of Larkspur is within the jurisdiction of the BAAQMD. Air quality conditions in the San Francisco Bay Area have improved significantly since the BAAQMD was created in 1955. Ambient concentrations of air pollutants, and the number of days during which the region exceeds air quality standards, have fallen dramatically. Exceedances of air quality standards occur primarily during meteorological conditions conducive to high pollution levels, such as cold, windless winter nights or hot, sunny summer afternoons.

Ozone levels, measured by peak concentrations and the number of days over the State 1-hour standard, have declined substantially in the San Francisco Bay Area as a result of aggressive programs by the BAAQMD and other regional, State and federal agencies. The reduction of peak concentrations represents progress in improving public health; however, the Bay Area still exceeds the State standard for 1-hour ozone.

Levels of PM_{10} have exceeded State standards two of the last three years, and the area is considered a nonattainment area for this pollutant relative to the State standards. The Bay Area is an unclassified area for the federal PM_{10} standard.

No exceedances of the State or federal CO standards have been recorded at any of the region's monitoring stations since 1991. The Bay Area is currently considered a maintenance area for State and federal CO standards.

Air quality is a function of both local climate and local sources of air pollution. Air quality is the balance of the natural dispersal capacity of the atmosphere and emissions of air pollutants from human uses of the environment. Climate and topography are major influences on air quality in the project area. Marin County benefits from constant winds, a marine layer of fog which lifts in the morning hours during the summer, and heavy winter precipitation compared to other parts of the Bay Area. Wind direction is east-west, in alignment with the ridges (Corte Madera Ridge and Southern Heights Ridge in Larkspur). The combination of wind direction and topography allows for constant scouring of the ambient air, resulting in good air quality most of the time. It also means that air pollution generated in Marin County is dispersed to other parts of the Bay Area.

The CARB monitors air pollution at various sites within California. The closest monitoring site to the Plan area in Marin County is located in the City of San Rafael. Pollutant monitoring results for the years 2009 to 2012 at the San Rafael ambient air quality monitoring station, shown in Table IV.C-4, indicate that air quality in the Plan area has generally been good. There were six exceedances of the State PM_{10} standard recorded in 2010 and 2011 and no exceedances of the federal PM_{10} standard during the four-year recording period. There were four exceedances recorded in 2010 and one exceedance recorded in 2011 of the federal $PM_{2.5}$ standard. Additionally, there was an exceedance of the State annual arithmetic standard for $PM_{2.5}$ in 2009. The State 1-hour ozone standard was not exceeded during the four-year period at this monitoring station. State and federal 8-hour ozone standards were also not exceeded during the four-year period at this monitoring station. In addition, CO, SO_2, and NO_2 standards were not exceeded in this area during the four-year period.

Table IV.C-4: Ambient Air Quality at the San Rafael Monitoring Station

Pollutant	Standard	2009	2010	2011	2012[a]
Carbon Monoxide (CO)					
Maximum 1-hour concentration (ppm)		2.2	1.7	1.9	2.3
Number of days exceeded:	State: > 20 ppm	0	0	0	0
	Federal: > 35 ppm	0	0	0	0
Maximum 8-hour concentration (ppm)		1.24	1.13	1.21	1.1
Number of days exceeded:	State: > 9 ppm	0	0	0	0
	Federal: > 9 ppm	0	0	0	0
Ozone (O_3)					
Maximum 1-hour concentration (ppm)		0.075	0.083	0.092	0.076
Number of days exceeded:	State: > 0.09 ppm	0	0	0	0
Maximum 8-hour concentration (ppm)		0.059	0.070	0.070	0.057
Number of days exceeded:	State: > 0.07 ppm	0	0	0	0
	Federal: > 0.08 ppm	0	0	0	0
Coarse Particulates (PM_{10})					
Maximum 24-hour concentration ($\mu g/m^3$)		38.4	51.3	54.1	36.0
Number of days exceeded:	State: > 50 $\mu g/m^3$	0	6	6	0
	Federal: > 150 $\mu g/m^3$	0	0	0	0
Annual arithmetic average concentration ($\mu g/m^3$)		16.2	16.7	16.5	ND
Exceeded for the year:	State: > 20 $\mu g/m^3$	No	No	No	ND
	Federal: > 50 $\mu g/m^3$	No	No	No	ND
Fine Particulates ($PM_{2.5}$)					
Maximum 24-hour concentration ($\mu g/m^3$)		34.2	46.5	42.2	26.5
Number of days exceeded:	Federal: > 35 $\mu g/m^3$	0	4	1	0
Annual arithmetic average concentration ($\mu g/m^3$)		12.8	10.7	9.8	8.0
Exceeded for the year:	State: > 12 $\mu g/m^3$	Yes	No	No	No
	Federal: > 15 $\mu g/m^3$	No	No	No	No
Nitrogen Dioxide (NO_2)					
Maximum 1 hour concentration (ppm)		0.052	0.057	0.053	0.052
Number of days exceeded:	State: > 0.25 ppm	0	0	0	0
Annual arithmetic average concentration (ppm)		0.012	0.012	0.012	ND
Exceeded for the year:	Federal: > 0.053 ppm	No	No	No	ND
Sulfur Dioxide (SO_2)[a]					
Maximum 1-hour concentration (ppm)		24	11	19	68
Number of days exceeded:	State: > 0.25 ppm	0	0	0	0
Maximum 3-hour concentration (ppm)		ND	ND	ND	ND
Number of days exceeded:	Federal: > 0.5 ppm	ND	ND	ND	ND
Maximum 24-hour concentration (ppm)		0.005	0.004	0.003	0.008
Number of days exceeded:	State: > 0.04 ppm	0	0	0	0
	Federal: > 0.14 ppm	0	0	0	0
Annual arithmetic average concentration (ppm)		0.000	0.000	0.001	ND
Exceeded for the year:	Federal: > 0.030 ppm	No	No	No	ND

[a] Oakland-21st Street was the closest monitoring station for results.
ppm = parts per million
$\mu g/m^3$ = micrograms per cubic meter
ND = No data. There was insufficient (or no) data to determine the value.

Source: CARB and EPA, 2013.

d. Larkspur General Plan Policies. The Health and Safety Chapter[3] of the City of Larkspur's 1990 General Plan includes the following goals, policies, and programs related to Air Quality:

Health and Safety Element

Goal 10: Ensure that air pollution levels do not threaten public health and safety.

- Policy r: Seek to comply with State and federal standards for air quality.
- Policy s: Seek to reduce auto travel and, thereby, the pollutants from auto emissions.
- Policy t: Ensure that traffic generated from new development is not the cause of State and federal air quality standards being exceeded in Marin County.
    - Action Program [37]: Require new development to mitigate impacts if the project causes a change in the level of air pollutants by a specified amount.

2. Impacts and Mitigation Measures

This section provides an assessment of the potential adverse impacts related to air quality within the City of Larkspur. It begins with the criteria of significance, which establishes the thresholds for determining whether an impact is significant. The latter part of this section identifies potential impacts associated with implementation of the Station Area Plan. Where potentially significant impacts are identified, mitigation measures are recommended.

a. Criteria of Significance. Implementation of the Station Area Plan would have a significant effect on the environment if it would:

- Conflict with or obstruct implementation of the current Air Quality Plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors or the general public to substantial pollutant concentrations as defined by federal or State air quality standards; or
- Create objectionable odors affecting a substantial number of people.

b. Impacts Analysis. The following section provides an evaluation and analysis for the potential impacts associated with implementation of the Station Area Plan for each of the criteria of significance listed above.

(1) Conflict With Current Air Quality Plan. The applicable air quality plan is the Bay Area 2010 Clean Air Plan, which was adopted on September 15, 2010. The Clean Air Plan is a comprehensive plan to improve Bay Area air quality and protect public health. The Clean Air Plan

[3] Larkspur, City of, 1990. *Larkspur General Plan*.

defines a control strategy to reduce emissions and ambient concentrations of air pollutants; safeguard public health by reducing exposure to air pollutants that pose the greatest health risk, with an emphasis on protecting the communities most heavily affected by air pollution; and reduce greenhouse gas emissions to protect the climate. Consistency with the Clean Air Plan can be determined if the project does the following: 1) supports the goals of the Clean Air Plan; 2) includes applicable control measures from the Clean Air Plan; and 3) would not disrupt or hinder implementation of any control measures from the Clean Air Plan. The project's consistency with these objectives is described below.

1) Does the project support the goals of the Clean Air Plan?

The primary goals of the Bay Area 2010 Clean Air Plan are to: attain air quality standards; reduce population exposure to air pollutants and protect public health in the Bay Area; and reduce greenhouse gas emissions and protect the climate.

The Station Area Plan would promote transit oriented development, promote alternative modes of transportation and would generally support the goals of the Clean Air Plan by supporting a reduction in Vehicle Miles Traveled (VMT) within the Bay Area.

2) Does the project include applicable control measures from the Clean Air Plan?

The control strategies of the Bay Area 2010 Clean Air Plan include stationary source measures, mobile source measures, and transportation control measures. This latest Clean Air Plan also identifies land use and local impact measures and energy and climate measures. Stationary source measures are not specifically applicable to the Station Area Plan and, therefore, are not evaluated further in this EIR. The project's consistency with other measures in the Bay Area 2010 Clean Air Plan is discussed below.

Transportation and Mobile Source Control Measures. The transportation control measures in the Bay Area 2010 Clean Air Plan are designed to reduce emissions from motor vehicles by reducing vehicle trips and VMT in addition to reducing vehicle idling and traffic congestion. The measures also support alternate modes of transportation.

The Urban Design Guidelines[4] for the Station Area Plan provide guidelines for new development focusing on improving pedestrian and bicycle circulation throughout the Plan area to reduce vehicle miles traveled. The guidelines state that new development should maximize public access, via pedestrian-scaled streets and pathways, to provide multiple routes for walking to services, the SMART train, or Ferry Terminal sites. They also state that, where possible, parking should be located away from the street frontage so that retail or other uses will line the pedestrian way for a more pedestrian-friendly environment. In addition, proximity of parcels in the Plan area to transit, bike routes, pathways, and trails, and to a wide range of uses and activities, make this area particularly suitable to walking and bicycling. Therefore, in general, development associated with implementation of the Station Area Plan would include the applicable transportation demand and control measures from the BAAQMD's Clean Air Plan.

[4] Larkspur, City of, 2014. *Larkspur SMART Station Area Plan, Public Review Draft*. February.

Land Use and Local Impact Measures. The Bay Area 2010 Clean Air Plan includes Land Use and Local Impacts Measures (LUMs) to achieve the following: promote mixed-use, compact development to reduce motor vehicle travel and emissions; and ensure that planned growth is focused in a way that protects people from exposure to air pollution associated with stationary and mobile sources of emissions. The LUMs identified by the BAAQMD are not specifically applicable to the Station Area Plan as they primarily relate to actions the BAAQMD will take to reduce impacts from goods movement and health risks in affected communities. The measures also detail new regulatory actions the BAAQMD will undertake related to land use, including the updated *CEQA Air Quality Guidelines*, and indirect source review, which is still under development by the BAAQMD. One of the purposes of the Station Area Plan is to promote mixed-use, compact development so as to reduce vehicle miles traveled. The Urban Design Guidelines for the Station Area Plan encourage new development in the Plan area to complement Larkspur's existing mix of retail, office, and residential uses. The Guidelines promote transit-oriented development and dense, more compact growth patterns with a mix of uses in the Plan area. Therefore, implementation of the Station Area Plan would not conflict with any of the Land Use and Local Impact Measures of the Bay Area 2010 Clean Air Plan.

Energy Measures. The Bay Area 2010 Clean Air Plan also includes Energy and Climate Control Measures (ECM), which are designed to reduce ambient concentrations of criteria pollutants and reduce emissions of CO_2. Implementation of these measures is intended to promote energy conservation and efficiency in buildings throughout the community, promote renewable forms of energy production, reduce the "urban heat island" effect by increasing reflectivity of roofs and parking lots, and promote the planting of (low-VOC-emitting) trees to reduce biogenic emissions, lower air temperatures, provide shade, and absorb air pollutants. The energy measures are not specifically applicable to the Station Area Plan at this time as they relate to future building codes and other actions that regulatory agencies may adopt; however, the Station Area Plan would meet the requirements for specific energy and climate control measures as they are adopted by the BAAQMD and the City of Larkspur in the future. Further, included in the Urban Design Guidelines for the Station Plan Area is the City of Larkspur's commitment to incorporating sustainability into its operations and practices. The Guidelines include a measure requiring the provision of trees and landscaped areas along pedestrian walkways, in parking lots, and in public spaces. The Station Area Plan also specifies installation of low maintenance, non-invasive plantings. The Station Area Plan also recommends utilizing recycled and recyclable materials, and prioritizing pedestrians and cyclists in streetscape treatments.

3) Would the project disrupt or hinder implementation of any control measures from the Clean Air Plan?

As discussed above, implementation of the Station Area Plan would not conflict with the measures outlined in the Clean Air Plan, including transportation control measures and energy measures. The project would not disrupt or hinder implementation of any control measures from the Clean Air Plan.

(2) Violate Any Air Quality Standards. According to the BAAQMD CEQA Air Quality Guidelines, to meet air quality standards for operational-related criteria air pollutant and air precursor impacts, the project must not:

- Contribute to CO concentrations exceeding the State ambient air quality standards;
- Generate construction emissions of ROG, NO_x or $PM_{2.5}$ (exhaust) greater than 54 pounds per day or PM_{10} exhaust emissions greater than 82 pounds per day; or

- Generate operation emissions of ROG, NO_x or $PM_{2.5}$ greater than 10 tons per year or 54 pounds per day or PM_{10} emissions greater than 15 tons per year or 82 pounds per day.

The following section describes the project's CO impacts and construction- and operation-related air quality impacts.

Localized CO Impacts. The BAAQMD has established a screening methodology that provides a conservative indication of whether the implementation of a proposed project would result in significant CO emissions. According to the BAAQMD's CEQA Air Quality Guidelines, a proposed project would result in a less-than-significant impact to localized CO concentrations if the following screening criteria are met:

- The project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, and the regional transportation plan and local congestion management agency plans.
- Project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
- The project would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, or below-grade roadway).

The Station Area Plan is consistent with the Congestion Management Program for Marin County and would not conflict with the Transportation Authority of Marin's Congestion Management Program[5] for designated roads or highways, a regional transportation plan, or other agency plans.

Implementation of the Station Area Plan would not be located in an area where vertical or horizontal mixing is substantially limited (as the area is exposed to breezes from San Francisco Bay) and traffic volumes on roadways in the vicinity of the Plan area are less than 44,000 vehicles per hour. As shown in Table IV.C-4, background CO concentrations in the area are substantially below State and federal standards. Implementation of the Station Area Plan would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour and would not result in localized CO concentrations that exceed State or federal standards. Localized CO impacts would therefore be less-than-significant.

Construction Period Impacts. During construction, short-term degradation of air quality may occur due to the release of particulate emissions generated by excavation, grading, hauling, and other activities. Emissions from construction equipment are also anticipated and would include CO, NO_x, ROG, directly-emitted particulate matter ($PM_{2.5}$ and PM_{10}), and TACs such as diesel exhaust particulate matter.

<u>Impact AIR-1</u>: Construction of development associated with implementation of the Station Area Plan could generate air pollutant emissions that could violate air quality standards. (S)

[5] Transportation Authority of Marin, 2011. *Congestion Management Program.* November.

Construction projects associated with implementation of the Station Area Plan could involve demolition of existing structures, site preparation, cut-and-fill activities, grading, and building activities. Construction-related effects on air quality would be greatest during the site preparation phase because most engine emissions are associated with the excavation, handling, and transport of soils on the site. If not properly controlled, these activities would temporarily generate PM_{10}, $PM_{2.5}$, and to a lesser extent CO, SO_2, NO_x, and VOCs. Sources of fugitive dust would include disturbed soils at the construction sites and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit dirt and mud on local streets, which could be an additional source of airborne dust. PM_{10} emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM_{10} emissions would depend on soil moisture, the silt content of soil, wind speed, and the amount of operating equipment. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site. These emissions would be temporary and limited to the immediate area surrounding the construction sites.

Water or other soil stabilizers can be used to control dust, resulting in emission reductions of 50 percent or more. The BAAQMD has established standard measures for reducing fugitive dust emissions ($PM_{2.5}$ and PM_{10}). With the implementation of standard construction measures such as frequent watering (e.g., two times per day at a minimum), fugitive dust emissions from construction activities would not result in adverse air quality impacts.

Implementation of the Station Area Plan would occur over a 15- to 20-year period. Construction emissions were estimated for the project using the California Emissions Estimator Model (CalEEMod v.1.1). Total construction emissions were estimated using default assumptions in CalEEMod. Total estimated emissions were averaged over a 15-year construction period to estimate the average daily emission rate. Construction-related emissions are presented in Table IV.C-5. As shown in Table IV.C-5, construction emissions of ozone precursors (ROG and NO_x) would not exceed the BAAQMD's threshold for average daily construction emissions.

Table IV.C-5: Project Construction Emissions in Pounds Per Day

Project Construction	ROG	NO_x	Exhaust $PM_{2.5}$	Fugitive Dust $PM_{2.5}$	Total $PM_{2.5}$	Exhaust PM_{10}	Fugitive Dust PM_{10}	Total PM_{10}
Maximum Daily Emissions	16.58	25.56	1.19	0.37	1.55	1.23	0.85	2.08
BAAQMD Thresholds	54.00	54.00	54.00	BMP	NA	82.00	BMP	NA
Exceed Threshold?	**No**	**No**	**No**	**BMP**	**NA**	**No**	**BMP**	**NA**

NA = Not Applicable, the BAAQMD does not have threshold.
BMP = Best Management Practices

Source: LSA Associates, 2013.

The BAAQMD recommends the implementation of Best Management Practices to reduce fugitive dust emissions from construction activities to a less-than-significant level. Implementation of Mitigation Measure AIR-1 would require implementation of the BAAQMD's Best Management Practices and additional measures to reduce diesel PM exhaust emissions and other fugitive dust impacts. Implementation of this mitigation measure would reduce PM emissions to a less-than-significant level.

Mitigation Measure AIR-1: Consistent with guidance from the BAAQMD, the City shall ensure that the following language is included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:

- 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 tracked-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.
- A publicly visible sign shall be posted with the telephone number and person to contact at the City of Larkspur regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

The above measures would reduce construction-period air pollutant emissions to a less-than-significant level. (LTS)

Operational Emissions – Regional Emissions Analysis. Implementation of the Station Area Plan would generate long-term air emissions associated with changes in the permanent use of the Plan area. These long-term emissions are primarily mobile source emissions that would result from vehicle trips associated with Station Area Plan development. Area sources, such as natural gas heaters, landscape equipment, and use of consumer products such as pressurized air canisters would also result in pollutant emissions.

The emissions estimator model CalEEMod, which the BAAQMD approves for use in estimating emissions associated with land use development projects, was used to calculate long-term mobile and area source emissions.

Long-term air emission impacts are those associated with area sources and mobile sources involving any change related to implementation of the Station Area Plan. The project would generate two types of emissions: short-term construction emissions and long-term air emissions, such as those associated with changes in permanent use of the Plan area. These long-term emissions are primarily mobile source emissions that would result from vehicle trips associated with Station Area Plan development. The proposed project is expected to generate approximately 8,214 trips per day (see Section IV.B, Transportation and Circulation). Area sources, such as natural gas heaters, landscape equipment, and use of consumer products, would also result in pollutant emissions. The daily emissions associated with project operational trip generation and area sources are identified in Table IV.C-6 for ROG, NO_x, PM_{10}, and $PM_{2.5}$.

Table IV.C-6: Project Regional Emissions

Emissions in Pounds Per Day [a]				
	Reactive Organic Gases	**Nitrogen Oxides**	**PM_{10}**	**$PM_{2.5}$**
Area Source Emissions	864.67	25.15	263.51	263.51
Energy Emissions	1.23	10.83	0.85	0.85
Mobile Source Emissions	18.10	29.12	54.69	2.47
Total Emissions	883.94	65.10	319.05	266.83
BAAQMD Significance Threshold	**54.0**	**54.0**	**82.0**	**54.0**
Exceed?	**Yes**	**Yes**	**Yes**	**Yes**
Emissions in Tons Per Year				
Area Source Emissions	35.42	0.47	4.26	4.26
Energy Emissions	0.22	1.98	0.15	0.15
Mobile Source Emissions	2.69	4.60	7.05	0.40
Total Emissions	38.33	7.05	11.46	4.81
BAAQMD Significance Threshold	**10.00**	**10.00**	**15.00**	**10.00**
Exceed?	**Yes**	**No**	**No**	**No**

[a] Summary reported for winter emissions.

Source: LSA Associates, Inc., 2013.

The ROG emissions from mobile sources include emissions from different automobile operating modes, including running emissions and evaporation from engine running and resting. These emissions also include those resulting from increased emission rates (due to incomplete combustion) that occur when a cold car is started. NO_x emissions comprise running exhaust and are increased during the initial engine running periods.

PM_{10} emissions result from running exhaust, tire and brake wear, and the entrainment of dust into the atmosphere from vehicles traveling on paved roadways. Entrainment of PM_{10} occurs when vehicle tires pulverize small rocks and pavement and the vehicle wakes generate airborne dust. The contribution of tire and brake wear is small compared to the other PM emission processes. Gasoline-powered engines have small rates of particulate matter emissions compared with diesel-powered vehicles. Since much of the project traffic fleet would be made up of light-duty gasoline-powered vehicles, a majority of the PM_{10} emissions would result from entrainment of roadway dust from vehicle travel.

Area source emissions associated with the project would include emissions from wood-burning devices, water heating and the use of landscaping equipment.

The primary emissions associated with the project are regional in nature, meaning that air pollutants are rapidly dispersed on emission or, in the case of vehicle emissions associated with the project, emissions are released in other areas of the air basin. Because the resulting emissions are dispersed rapidly and contribute only a small fraction of the region's air pollution, air quality in the immediate vicinity of the Plan area would not substantially change compared to existing conditions or the air quality monitoring data reported in Table IV.C-4.

The primary source of area emissions associated with the project is residential wood burning, while mobile source emissions would be generated by vehicles traveling to and from the Plan area.

The results shown in Table IV.C-6 indicate the project would exceed all the criteria pollutant emission thresholds for daily emissions and the annual ROG emission threshold; therefore, the proposed project could have a significant effect on regional air quality and mitigation would be required.

Impact AIR-2: Implementation of the Station Area Plan could generate air pollutant emissions that would exceed the BAAQMD criteria and could substantially contribute to a violation of air quality standards. (S)

When mitigating emissions from land use projects, the BAAQMD recommends incorporating transportation demand management measures to reduce mobile source emissions. One of the key principles to guide future development is to support TOD densities and multi-modal circulation to support transit ridership; this could, in turn, reduce regional VMT. Transportation modeling completed for the project indicates that average daily traffic would be reduced by 19 percent over typical trip generation rates. The Station Area Plan also incorporates recommended measures for reducing emissions including: mix of land uses, transit service, and bike and pedestrian infrastructure. Plan level land use measures that reduce vehicle miles traveled have been implemented to the extent feasible. The Plan incorporates all of the plan level transportation emission reduction measures recommended by the BAAQMD such as the mix of uses, locating residential uses near transit, and prioritizing alternate modes of transportation.

However, implementation of the Station Area Plan does not restrict the use of wood-burning fireplaces in new residential units, and as shown in Table IV.C-6, the project would generate significant area source emissions which primarily result from wood-burning. The City of Larkspur Municipal Code[6] regulates wood-burning appliances by requiring all wood-burning devices be EPA Phase II-Certified. However, implementation of the following measure would further reduce criteria pollutant emissions. However, ROG emissions would remain significant and unavoidable.

> Mitigation Measure AIR-2: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:
>
> - All wood-burning devices, such as woodstoves and open hearth fire places, shall be prohibited in all residential units. Only natural gas fireplaces shall be permitted.

With implementation of this mitigation measure, NO_x, PM_{10} and $PM_{2.5}$ emissions would be reduced to a less-than-significant level; ROG emissions would remain significant and unavoidable. Therefore, even with the prohibition of all wood burning in residential units, ROG emissions would exceed the BAAQMD's significance criterion, and this impact would remain significant and unavoidable. (SU)

[6] Larkspur, City of. City of Larkspur Municipal Code, Section 1, Section 15.52 Installation of Wood Burning Appliances and Removal of Noncertified Wood Burning Appliances.

(3) Result in a Cumulatively Considerable Net Increase of Any Criteria Pollutant. According to the BAAQMD, regional air pollution is largely a cumulative impact. No single project is sufficient in size to independently create regional nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. Therefore, if daily average or annual emissions of construction- or operational-related criteria air pollutants exceed any applicable threshold established by the BAAQMD, the proposed project would result in a cumulatively significant impact.

Table IV.C-7: Project Mitigated Emissions

Emissions in Pounds Per Day [a]				
	Reactive Organic Gases	**Nitrogen Oxides**	**PM_{10}**	**$PM_{2.5}$**
Area Source Emissions	79.37	1.47	2.14	2.13
Energy Emissions	1.12	9.91	0.78	0.78
Mobile Source Emissions	17.94	28.88	53.96	2.44
Total Emissions	98.43	40.26	56.88	5.35
BAAQMD Significance Threshold	**54.0**	**54.0**	**82.0**	**54.0**
Exceed?	**Yes**	**No**	**No**	**No**
Emissions in Tons Per Year				
Area Source Emissions	13.81	0.13	0.11	0.11
Energy Emissions	0.20	1.81	0.14	.14
Mobile Source Emissions	2.67	4.56	6.95	0.39
Total Emissions	16.68	6.50	7.20	0.64
BAAQMD Significance Threshold	**10.00**	**10.00**	**15.00**	**10.00**
Exceed?	**Yes**	**No**	**No**	**No**

[a] Summary reported for winter emissions.

Source: LSA Associates, Inc., 2013.

<u>Impact AIR-3</u>: Implementation of the Station Area Plan could result in a significant cumulative net increase in criteria pollutant emissions. (S)

As shown in Table IV.C-7, implementation of the Station Area Plan would exceed the threshold for operational impacts for criteria pollutants even with implementation of all feasible mitigation measures; therefore, the Station Area Plan would contribute to a cumulatively significant criteria air pollutant impact.

> <u>Mitigation Measure AIR-3</u>: Implement Mitigation Measures AIR-1 and AIR-2. While implementation of Mitigation Measure AIR-3 would reduce this impact, cumulative regional air quality impacts of the project would remain significant and unavoidable. (SU)

(4) Expose Sensitive Receptors to Substantial Pollutant Concentrations. According to the BAAQMD, a project would result in a significant impact if it would: individually expose sensitive receptors to TACs resulting in an increased cancer risk greater than 10.0 in one million, increased non-cancer risk of greater than 1.0 on the hazard index (chronic or acute), or an annual average ambient $PM_{2.5}$ increase greater than 0.3 $\mu g/m^3$. A significant cumulative impact would occur if the project in combination with other projects located within a 1,000-foot radius of the project site would expose sensitive receptors to TACs resulting in an increased cancer risk greater than 100.0 in one million, an increased non-cancer risk of greater than 10.0 on the non-hazard index (chronic), or an ambient $PM_{2.5}$ increase greater than 0.8 $\mu g/m^3$ on an annual average basis. Certain groups of people are more susceptible to health effects associated with air pollution than others. CARB has identified the following groups that are most likely to be affected by air pollution: children under 14 years, the elderly over 65 years, athletes, and people with cardiovascular and chronic respiratory diseases. These groups are classified as sensitive receptors. Locations that may contain a high concentration of these sensitive population groups include residential areas, hospitals, daycare facilities, elder care facilities, elementary schools, and open space.

Impact AIR-4: Construction of new projects associated with implementation of the Station Area Plan could result in exposure of sensitive receptors to substantial pollutant concentrations. (S)

The Station Area Plan would be constructed over a period of approximately 15 to 20 years. Construction would result in emissions of dust and diesel exhaust. Toxic construction-related health risks are dependent on the type of construction equipment used and duration of the construction period. Due to the lack of specific construction information, a precise estimate of project construction health risks cannot be determined. To ensure that construction impacts do not adversely affect sensitive receptors, the following mitigation measure shall be implemented:

> Mitigation Measure AIR-4: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:
>
> - For any development project that includes buildings within 1,000 feet of a residential dwelling unit, prior to issuing building permits, a construction health risk assessment shall be conducted to assess emissions from all construction equipment during that phase of construction. Equipment usage shall be modified as necessary to ensure that equipment use would not result in a carcinogenic health risk of more than 10 in 1 million, an increased non-cancer risk of greater than 1.0 on the hazard index (chronic or acute), or an annual average ambient $PM_{2.5}$ increase greater than 0.3 $\mu g/m^3$. (LTS)

According to the BAAQMD's database of permitted sources in the Plan area, permitted sources with TAC emissions are from gasoline stations, sanitation and water districts, and diesel generators associated with various businesses. Additional sources of TACs include dry cleaners which are a source of Perchloroethylene (Perc) a substance known to the State of California as a toxic air contaminant.[7]

Table IV.C-8 lists the permitted sources found in the Plan area or within 1,000 feet of the boundaries of the Plan area. Figure IV.C-1 graphically depicts the location of each source within the Plan area boundaries.

Additionally, high volume roadways within the Plan area, such as Highway 101 are significant sources of toxic air contaminants. Traffic on Highway 101 is one of the primary sources of toxic air contaminants from motor vehicles in the City of Larkspur. Sir Francis Drake Boulevard carries approximately 30,000 to 60,000 average daily vehicles within the Plan limits.

Another potential mobile source of toxic air contaminants would be train operations along the SMART rail line located within the Plan area. When considering the toxic risk from railroad lines, the primary risk from trains occurs when trains are left idling, for example at a rail yard. The SMART Project DEIR from November of 2005[8] evaluated the health risks associated with future SMART

[7] On July 1, 2010, the CARB required the elimination of Perc for use at co-residential dry cleaning facilities. Therefore, use of Perc at facilities that share a wall or are in the same building as a residence is no longer permitted. Additionally, the CARB requires that all use of Perc in dry cleaning be phased out by 2023. The regulations established by the CARB related to dry cleaning will reduce impacts related to Perc exposure to sensitive receptors in the City of Larkspur by 2030.

[8] Sonoma-Marin Area Rail Transit, 2005. *Draft Environmental Impact Report*. November.

Stations including the Larkspur station. The results indicated that the SMART project would not expose sensitive receptors to a significant amount of additional diesel PM emissions. Results of a screening health risk assessment indicate that the SMART project would cause less than two excess cancer cases out of a population of one million at any one location, well below the ten excess cancer cases considered significant by the BAAQMD. Therefore, the SMART project would not expose future sensitive receptors located within the Plan area to substantial pollutant concentrations.

Table IV.C-8: Permitted Sources Located in the Plan Area

Source Number	Stationary Source (address & name)	Distance (feet)	Risk (in a million)	$PM_{2.5}$ Concentration ($\mu g/m^3$)	Hazard Index
1	Sanitary District No 1 101 E. Sir Francis Drake Blvd., Larkspur	0 [a]	13.96	0.025	0.01
2	Maxwell The Cleaner 1401 Larkspur Landing Circle, Larkspur	0 [a]	30.00	0.000	0.08
3	Marin Sanitary Service 565 Jacoby Street, San Rafael	644	0.00	139.00	0.00
4	Ghilotti Bros 525 Jacoby Street, San Rafael	846	NA	NA	NA
5	Chevron Station 301 Sir Francis Drake, Greenbrae	0 [a]	73.15	NA	0.07
6	Drake Shell 295 Sir Francis Drake, Greenbrae	0 [a]	38.36	NA	0.04
7	Rich Readimix Concrete Inc. 101 Rich Street, Greenbrae	654	0.00	0.84	0.00
8	Emporio Rulli 26 Rich Street, Greenbrae	0 [a]	0.00	0.02	0.00
9	Econo Gas 2070 Redwood Highway, Larkspur	0 [a]	27.92	NA	0.03
10	Marin Municipal Water District 220 Nellen Avenue, Corte Madera	0 [a]	NA	NA	NA
11	New WinCup Holdings 195 Tamal Vista Blvd., Corte Madera	471	1.16	3.00	0.01

[a] Source is located within the Plan area.
NA = Not Applicable
Source: Bay Area Air Quality Management District, 2013

Proposed projects that would emit TACs would require review under the BAAQMD rules and regulations or review under CEQA, especially if near sensitive receptors. However, projects with sensitive receptors proposed near localized sources of TAC emissions (e.g., residences to be located near major roadways or stationary sources) could expose new sensitive populations to TACs and $PM_{2.5}$. According to the CARB and BAAQMD, exposure to elevated levels of TACs and $PM_{2.5}$ contributes to elevated health risks. BAAQMD recommends that buffers to avoid the exposure of sensitive receptors to TAC sources should be reflected in General Plan and Specific Plan land use maps, and implementing ordinances. The Station Area Plan does not include buffers between sources and sensitive land uses.

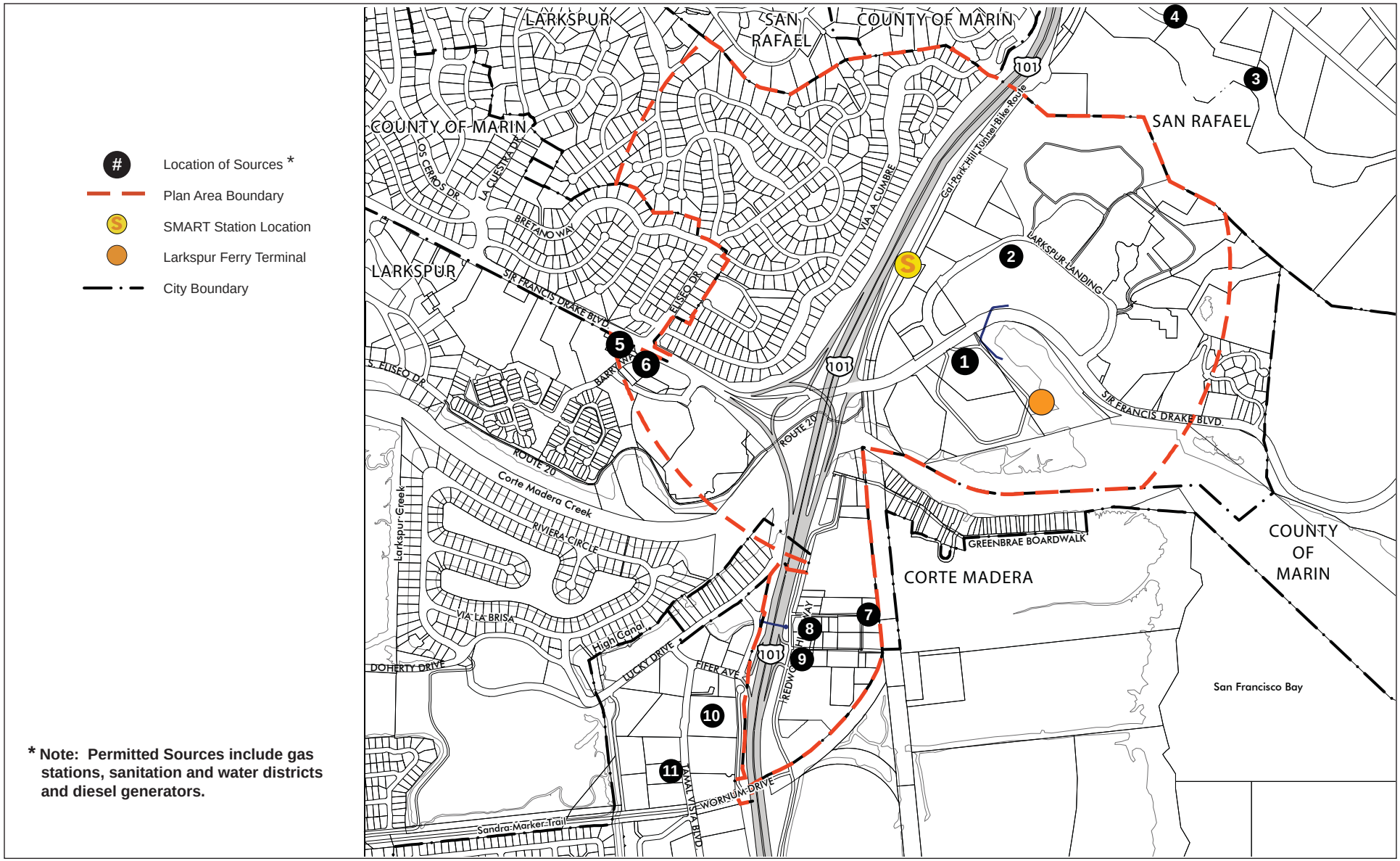
<u>Impact AIR-5</u>: Implementation of the Station Area Plan could result in exposure of sensitive receptors to substantial pollutant concentrations. (S)

As shown in Table IV.C-7 and Figure IV.C-1, there are several sources of air toxic contaminants within the Plan area. Risk levels and $PM_{2.5}$ concentrations drop dramatically beyond 500 feet from a source due to dispersion of emissions with distance. For area plans, the BAAQMD recommends the use of overlay zones around sources of TACs. The Community Risk and Hazard Zones associated with the Station Area Plan are shown in Figure IV.C-2. The precise location of future residential units within the Plan area is unknown at this time. Therefore, to reduce impacts from toxic air contaminants and the individual and cumulative level for future sensitive receptors in the Plan area, the following measure shall be implemented.

> Mitigation Measure AIR-5: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:
>
> - As shown in Figure IV.C-2, residential units proposed within 500 feet of Highway 101, Sir Francis Drake Boulevard and/or any of the stationary sources identified in Table IV.C-7 shall be evaluated for potential health risk exposure. The applicant for a residential project within the Plan area shall prepare a report using the latest BAAQMD permit data and roadway risk estimates to determine impacts to future residents. The report shall outline any measures that would be incorporated into the project necessary to reduce carcinogenic health risk of to less than 10 in 1 million, reduce the non-cancer risk of to less than 1.0 on the hazard index (chronic or acute), and ensure the annual average ambient $PM_{2.5}$ increase is less than 0.3 $\mu g/m^3$. Measures to reduce impacts could include upgrading air filtration systems of fresh air supply, tiered plantings of trees, and site design to increase distance from source to the receptor. (LTS)

(5) Create objectionable odors. The proposed SMART Station within the Plan area would result in a temporary increase in diesel fuel odors during the period of time that a train passes by. This increase would not be considered significant because the emission source is mobile. The diesel odor emitted would quickly dissipate and would not be a constant source of odor. In addition, the BAAQMD has developed a list of the types of facilities known to emit objectionable odors. A passenger rail facility like the proposed SMART Station is not on the list. Therefore, odors associated with the station are not anticipated.

The BAAQMD has only received one unconfirmed odor complaint in the City of Larkspur within the last three years. This complaint is located more than 1,000 feet outside of the SMART Station Area Plan boundaries. Therefore, new residences would not be located in an area that could expose sensitive receptors to odors. Additionally, the new land uses planned under the SMART Station Area Plan are not expected to create objectionable odors. Therefore, the proposed project would not have a substantial impact related to odors.



LSA

FIGURE IV.C-1

0 600 1200
FEET

N

SOURCES: CALIF. GOVERNOR'S OES; CITY OF LARKSPUR, 2011; BMS DESIGN GROUP; LSA ASSOCIATES, INC., 2013.

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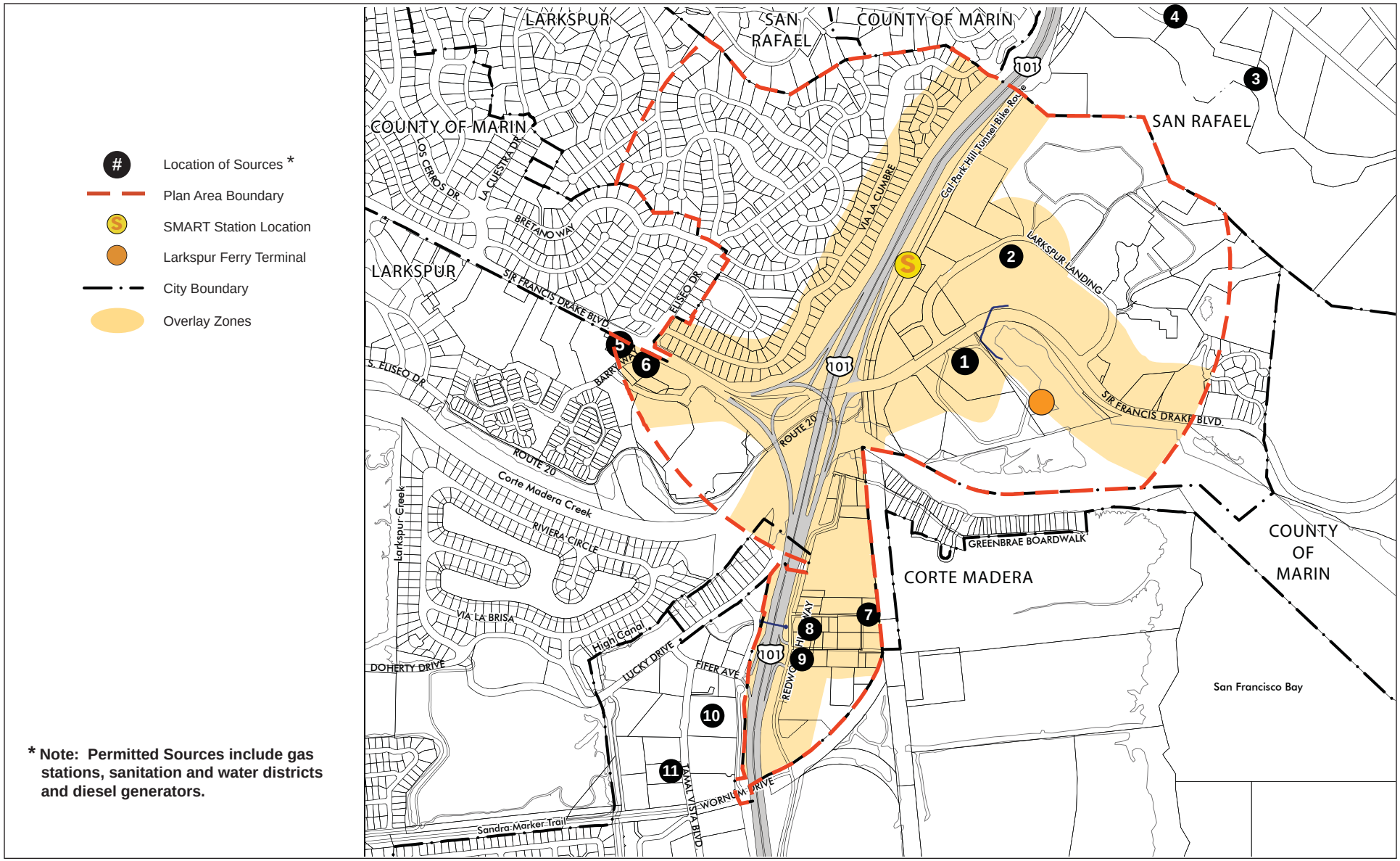
City of Larkspur SMART Station Area Plan EIR

Permitted Toxic Air Contaminant Sources



LSA

FIGURE IV.C-2

0 600 1200
FEET

N

SOURCES: CALIF. GOVERNOR'S OES; CITY OF LARKSPUR, 2011; BMS DESIGN GROUP; LSA ASSOCIATES, INC., 2013.

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City of Larkspur SMART Station Area Plan EIR

Community Risk and Hazard Overlay Zones

D. GLOBAL CLIMATE CHANGE

This chapter presents general background information on global climate change, meteorology, the regulatory framework for global climate change, and provides data on the existing global climate setting and greenhouse gas (GHG) emissions in the vicinity of the City of Larkspur and the SMART Station Area Plan (Plan) area.

1. Setting

The following section provides background information on GHG emissions and global climate change.

a. Greenhouse Gases. Global climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans in recent decades. Global surface temperatures have risen by 1.1 ± 0.4° Fahrenheit (°F) over the last 100 years (1906 to 2005). The rate of warming over the last 50 years is almost double that over the last 100 years.[1] The prevailing scientific opinion on climate change is that most of the warming observed over the last 50 years is attributable to human activities. The increased amounts of carbon dioxide (CO_2) and other GHGs are the primary causes of the human-induced component of warming. GHGs are released by the burning of fossil fuels, land clearing, agriculture, and other activities, and lead to an increase in the greenhouse effect.[2]

GHGs are present in the atmosphere naturally, are released by natural sources, or are formed from secondary reactions taking place in the atmosphere. The gases that are widely seen as the principal contributors to human-induced global climate change are:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur Hexafluoride (SF_6)

Over the last 200 years, humans have caused substantial quantities of GHGs to be released into the atmosphere. These extra emissions are increasing GHG concentrations in the atmosphere, and enhancing the natural greenhouse effect, which is believed to be causing global warming. While manmade GHGs include naturally-occurring GHGs such as CO_2, methane, and N_2O, some gases, like HFCs, PFCs, and SF_6 are completely new to the atmosphere.

[1] Intergovernmental Panel on Climate Change (IPCC), 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.

[2] The temperature on Earth is regulated by a system commonly known as the "greenhouse effect." Just as the glass in a greenhouse lets heat from sunlight in and reduces the heat escaping, GHGs like carbon dioxide, methane, and nitrous oxide in the atmosphere keep the Earth at a relatively even temperature. Without the greenhouse effect, the Earth would be a frozen globe; thus, although an excess of GHG results in global warming, the naturally occurring greenhouse effect is necessary to keep our planet at a comfortable temperature.

Certain gases, such as water vapor, are short-lived in the atmosphere. Others remain in the atmosphere for significant periods of time, contributing to climate change in the long term. Water vapor is excluded from the list of GHGs above because it is short-lived in the atmosphere and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation.

Gases vary considerably in terms of Global Warming Potential (GWP), which is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The global warming potential is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and length of time that the gas remains in the atmosphere ("atmospheric lifetime"). The GWP of each gas is measured relative to carbon dioxide, the most abundant GHG; the definition of GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to the ratio of heat trapped by one unit mass of CO_2 over a specified time period. Greenhouse gas emissions are typically measured in terms of pounds or tons of "CO_2 equivalents" (CO_2e). Table IV. D-1 shows the GWPs for each type of GHG. For example, sulfur hexafluoride is 22,800 times more potent at contributing to global warming than carbon dioxide.

The following discussion summarizes the characteristics of the six GHGs.

Table IV.D-1: Global Warming Potential of Greenhouse Gases

Gas	Atmospheric Lifetime (Years)	Global Warming Potential (100-year Time Horizon)
Carbon Dioxide	50-200	1
Methane	12	25
Nitrous Oxide	114	298
HFC-23	270	14,800
HFC-134a	14	1,430
HFC-152a	1.4	124
PFC: Tetrafluoromethane (CF_4)	50,000	7,390
PFC: Hexafluoromethane (C_2F_6)	10,000	12,200
Sulfur Hexafluoride (SF_6)	3,200	22,800

Source: IPCC, 2007. *Climate Change 2007: The Physical Science Basis.* Contribution of Working Group I to the Fourth Assessment Report of the IPCC.

(1) Carbon Dioxide (CO_2). In the atmosphere, carbon generally exists in its oxidized form, as CO_2. Natural sources of CO_2 include the respiration (breathing) of humans, animals and plants, volcanic outgassing, decomposition of organic matter and evaporation from the oceans. Human caused sources of CO_2 include the combustion of fossil fuels and wood, waste incineration, mineral production, and deforestation. Natural sources release approximately 150 billion tons of CO_2 each year, far outweighing the 7 billion tons of man-made emissions of CO_2 each year. Nevertheless, natural removal processes, such as photosynthesis by land- and ocean-dwelling plant species, cannot keep pace with this extra input of man-made CO_2, and consequently, the gas is building up in the atmosphere.

In 2002, CO_2 emissions from fossil fuel combustion accounted for approximately 98 percent of man-made CO_2 emissions and approximately 84 percent of California's overall GHG emissions (CO_2e). The transportation sector accounted for California's largest portion of CO_2 emissions, with gasoline consumption making up the greatest portion of these emissions. Electricity generation was California's second largest category of GHG emissions.

(2) Methane (CH_4). Methane is produced when organic matter decomposes in environments lacking sufficient oxygen. Natural sources include wetlands, termites, and oceans. Decomposition occurring in landfills accounts for the majority of human-generated CH_4 emissions in California and in the United States as a whole. Agricultural processes such as intestinal fermentation, manure management, and rice cultivation are also significant sources of CH_4 in California. Methane accounted for approximately 6 percent of gross climate change emissions (CO_2e) in California in 2002.

Total annual emissions of methane are approximately 500 million tons, with manmade emissions accounting for the majority. As with CO_2, the major removal process of atmospheric methane – a chemical breakdown in the atmosphere – cannot keep pace with source emissions, and methane concentrations in the atmosphere are increasing.

(3) Nitrous Oxide (N_2O). Nitrous oxide is produced naturally by a wide variety of biological sources, particularly microbial action in soils and water. Tropical soils and oceans account for the majority of natural source emissions. Nitrous oxide is a product of the reaction that occurs between nitrogen and oxygen during fuel combustion. Both mobile and stationary combustion emit N_2O, and the quantity emitted varies according to the type of fuel, technology, and pollution control device used, as well as maintenance and operating practices. Agricultural soil management and fossil fuel combustion are the primary sources of human-generated N_2O emissions in California. Nitrous oxide emissions accounted for nearly 7 percent of man-made GHG emissions (CO_2e) in California in 2002.

(4) Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulfur Hexafluoride (SF_6). HFCs are primarily used as substitutes for ozone-depleting substances regulated under the Montreal Protocol.[3] PFCs and SF_6 are emitted from various industrial processes, including aluminum smelting, semiconductor manufacturing, electric power transmission and distribution, and magnesium casting. There is no aluminum or magnesium production in California; however, the rapid growth in the semiconductor industry leads to greater use of PFCs. HFCs, PFCs, and SF_6 accounted for about 3.5 percent of man-made GHG emissions (CO_2e) in California in 2002.

b. Impacts of Climate Change. The potential impacts of global climate change are described in the following section.

(1) Temperature Increase. The latest projections, based on state-of-the art climate models, indicate that temperatures in California are expected to rise 3 to 10.5°F by the end of the century.[4] Because GHGs persist for a long time in the atmosphere, accumulate over time, and are generally well-mixed, their impact on the atmosphere cannot be tied to a specific point of emission.

Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from:

[3] The Montreal Protocol is an international treaty that was approved on January 1, 1989, and was designated to protect the ozone layer by phasing out the production of several groups of halogenated hydrocarbons believed to be responsible for ozone depletion.

[4] California Climate Change Center, 2006. *Our Changing Climate. Assessing the Risks to California*. July.

- Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;
- Natural processes within the climate system (e.g., changes in ocean circulation and reduction in sunlight from the addition of GHGs and other gases to the atmosphere from volcanic eruptions); or
- Human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., from deforestation, reforestation, urbanization, and desertification).

The primary effect of global climate change has been a rise in the average global temperature. The impact of human activities on global climate change is readily apparent in the observational record. For example, surface temperature data show that 11 of the 12 years from 1995 to 2006 rank among the 12 warmest since 1850, the beginning of the instrumental record for global surface temperature.[5] Climate change modeling shows that further warming could occur, which would induce additional changes in the global climate system during the current century. Changes to the global climate system, ecosystems, and the environment of California could include, but are not limited to:

- The loss of sea ice and mountain snow pack, resulting in higher sea levels and higher sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures;
- Rise in global average sea level primarily due to thermal expansion and melting of glaciers and ice caps in the Greenland and Antarctic ice sheets;
- Changes in weather that include widespread changes in precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather, including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones;
- Decline of the Sierra snowpack, which accounts for a significant amount of the surface water storage in California, by 70 percent to as much as 90 percent over the next 100 years;
- Increase in the number of days conducive to ozone formation by 25 to 85 percent (depending on the future temperature scenario) in high ozone areas of Los Angeles and the San Joaquin Valley by the end of the 21st century; and
- High potential for erosion of California's coastlines and seawater intrusion into the Delta and levee systems due to the rise in sea level.

(2) Precipitation and Water Supply. Global average precipitation is expected to increase overall during the 21st century as the result of climate change, but will vary in different parts of the world. However, global climate models are generally not well suited for predicting regional changes in precipitation because of the scale of regionally important factors, such as the proximity of mountain ranges that affect precipitation.[6]

[5] California, State of, 2008. California Energy Commission's Public Interest Energy Research Program. *The Future is Now: An Update on Climate Change Science, Impacts, and Response Options for California*. September.

[6] Intergovernmental Panel on Climate Change, 2007. *Climate Change 2007: The Physical Science Basis.* Contribution of Working Group I to the Fourth Assessment Report of the IPCC.

Most of California's precipitation falls in the northern part of the State during the winter. A vast network of man-made reservoirs and aqueducts capture and transport water throughout the State from northern California rivers, as the greatest demand for water comes from users in the southern part of the State during the spring and summer.[7] The current distribution system relies on Sierra Nevada mountain snowpack to supply water during the dry spring and summer months. Rising temperatures, potentially compounded by decreases in precipitation, could severely reduce spring snowpack, increasing the risk of summer water shortages.

Some models predict drier conditions and decreased water flows, while others predict wetter conditions in various parts of the world. If heat-trapping emissions continue unabated, more precipitation will fall as rain instead of snow, and the snow that does fall will melt earlier, reducing the Sierra Nevada spring snowpack by as much as 70 to 90 percent over the next 100 years.

The extent to which various meteorological conditions will impact groundwater supply is unknown. Warmer temperatures could increase the period when water is on the ground by reducing soil freeze. However, warmer temperatures could also lead to higher evaporation or shorter rainfall seasons, shortening the recharge season. Warmer winters could increase the amount of runoff available for groundwater recharge. However, the additional runoff would occur at a time when some basins, particularly in Northern California, are being recharged at their maximum capacity.

Where precipitation is projected to increase in California, the increases are focused in Northern California. However, various California climate models provide mixed results regarding changes in total annual precipitation in the State through the end of this century; therefore, no conclusion on an increase or decrease can be made. Considerable uncertainties about the precise effects of climate change on California hydrology and water resources will remain until there is more precise and consistent information about how precipitation patterns, timing, and intensity will change.[8]

The City of Larkspur receives its water supply from the Marin Municipal Water District (MMWD) which serves central and southern Marin County. The residents of southern and central Marin are served by a unique water supply system. MMWD obtains 75 percent of the water consumed annually from rainfall collected in seven reservoirs in Marin. Five of the reservoirs are on the Mount Tamalpais Watershed and the other two are located in West Marin. The remaining 25 percent of their water comes from the Russian River in Sonoma County under a contract with the Sonoma County Water Agency.[9]

(3) Sea Level Rise. Rising sea level is one of the major areas of concern related to global climate change. Two of the primary causes for a sea level rise are the thermal expansion of ocean waters (water expanding as it heats up) and the addition of water to ocean basins by the melting of land-based ice. From 1961 to 2003, global average sea level rose at an average rate of 0.07 inches per year, and at an accelerated average rate of about 0.12 inches per year during the last decade of this

[7] California Climate Change Center, 2006, op. cit.

[8] California, State of, 2006. Department of Water Resources, *Progress on Incorporating Climate Change into Management of California's Water Resources*. July.

[9] Marin Municipal Water District, 2012. Current Sources. Website: marinwater.org/controller?action=menuclick&id=221.

period (1993 to 2003).[10] Over the past 100 years, sea levels along California's coasts and estuaries have risen about 7 inches.[11] An additional discussion of sea level rise is provided in Section IV.H, Hydrology and Water Quality.

(4) Water Quality. Water quality depends on a wide range of variables such as water temperature, flow, runoff rates and timing, waste discharge loads, and the ability of watersheds to assimilate wastes and pollutants. Climate change could alter water quality in a variety of ways, including higher winter flows that reduce pollutant concentrations (through dilution) or increase erosion of land surfaces and stream channels, leading to higher sediment, chemical, and nutrient loads in rivers. Water temperature increases and decreased water flows can result in increasing concentrations of pollutants and salinity. Increases in water temperature alone can likely to lead to adverse changes in water quality, even in the absence of changes in precipitation.

Land and resource use changes can have impacts on water quality comparable to or even greater than those from global climate change. The net effect on water quality for rivers, lakes, and groundwater in the future is dependent not just on climate conditions, but also on a wide range of other human actions and management decisions.

Fortunately, there are a number of stewardship actions that cities and counties can take that reduce costs and improve the reliability and quality of water resources. The City of Larkspur's Climate Action Plan (CAP) has identified several programs to improve water quality, which the City is working to implement through the City's CAP.[12]

(5) Public Health. Global climate change is anticipated to result in not only changes to average temperature, but also to more extreme heat events.[13] These extreme heat events increase the risk of death from dehydration, heart attack, stroke, and respiratory distress, especially with people who are ill, children, the elderly, and the poor, who may lack access to air conditioning and medical assistance. According to the California Climate Change Center, more research is needed to understand the effects of higher temperatures and how adapting to these temperatures can minimize health effects.[14]

c. Emissions Sources and Inventories. An emissions inventory that identifies and quantifies the primary human-generated sources and sinks of GHGs is a well-recognized and useful tool for addressing climate change. This section summarizes the latest information on global, United States, California, local GHG emission inventories, and the GGRP inventory.

(1) Global Emissions. Worldwide emissions of GHGs in 2004 were 30 billion tons of CO_2e per year (including both ongoing emissions from industrial and agricultural sources, but excluding

[10] California, State of, 2008. California Energy Commission's Public Interest Energy Research Program. *The Future is Now: An Update on Climate Change Science, Impacts, and Response Options for California*. September.

[11] Ibid.

[12] Larkspur, City of, 2010. *Climate Action Plan.* June.

[13] California Climate Change Center, 2006, op. cit.

[14] Ibid.

emissions from land-use changes).[15] Global estimates are based on country inventories developed as part of programs of the United Nations Framework Convention on Climate Change (UNFCCC).

(2) U.S. Emissions. In 2010, the United States emitted about 1,633.2 million metric tons of CO_2e with each individual at home releasing approximately 4 metric tons per year. Of the four major sectors nationwide – residential, commercial, industrial and transportation – transportation accounts for the highest amount of GHG emissions (approximately 35 to 40 percent); these emissions are entirely generated from direct fossil fuel combustion. Between 1990 and 2009, total U.S. GHG emissions rose by 7.3 percent, but from emissions decreased from 2008 to 2009 by 6.1 percent. This decrease was primarily due to (1) a decrease in economic output resulting in a decrease in energy consumption across all sectors; and (2) a decrease in the carbon intensity of fuels used to generate electricity due to fuel switching as the price of coal increased, and the price of natural gas decreased significantly. Since 1990, U.S. emissions have increased at an average annual rate of 0.4 percent.[16]

(3) State of California Emissions. According to the California Air Resources Board (CARB) emission inventory estimates, California's gross GHG emissions decreased 1.5 percent, from 463.6 MMT[17] of CO_2e emissions in 2000 to 456.8 million in 2009, with a maximum of 488.8 million in 2007.[18] During the same period, California's population grew by 9.1 percent, from 33.9 to 37.2 million people and GHG emissions per person decreased from 13.7 to 12.4 metric tons of CO_2e per person. The year 2009 saw a 5.8 percent decrease in Statewide GHG emissions, driven by a noticeable drop in on-road transportation, cement production, and electricity. The year 2009 also reflects the full effects of the economic recession and higher fuel prices. As the economy recovers, GHG emissions are likely to rise again without other mitigation actions.

The California EPA Climate Action Team stated in its March 2006 report[19] that the composition of gross climate change pollutant emissions in California in 2002 (expressed in terms of CO_2e) was as follows:

- Carbon dioxide (CO_2) accounted for 83.3 percent;
- Methane (CH_4) accounted for 6.4 percent;
- Nitrous oxide (N_2O) accounted for 6.8 percent; and
- Fluorinated gases (HFCs, PFC, and SF_6) accounted for 3.5 percent.[20]

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[15] United Nations Framework Convention on Climate Change, 2007. *Sum of Annex I and Non-Annex I Countries Without Counting Land-Use, Land-Use Change and Forestry (LULUCF).* Website: unfccc.int/ghg_emissions_data/predefined_queries/items/3814.php

[16] U.S. Environmental Protection Agency, 2011. *The U.S. Greenhouse Gas Emissions and Sinks: Fast Facts*. Website: www.epa.gov/climatechange/emissions/usinventoryreport.html.

[17] A metric ton is equivalent to approximately 1.1 tons.

[18] California Air Resources Board, 2011. *Trends in California GHG Emissions for 2000 to 2009 by Category as Defined in the Scoping Plan*. Website: www.arb.ca.gov/cc/inventory/pubs/reports/ghg_inventory_00-09_trends.pdf (accessed June 2012). December.

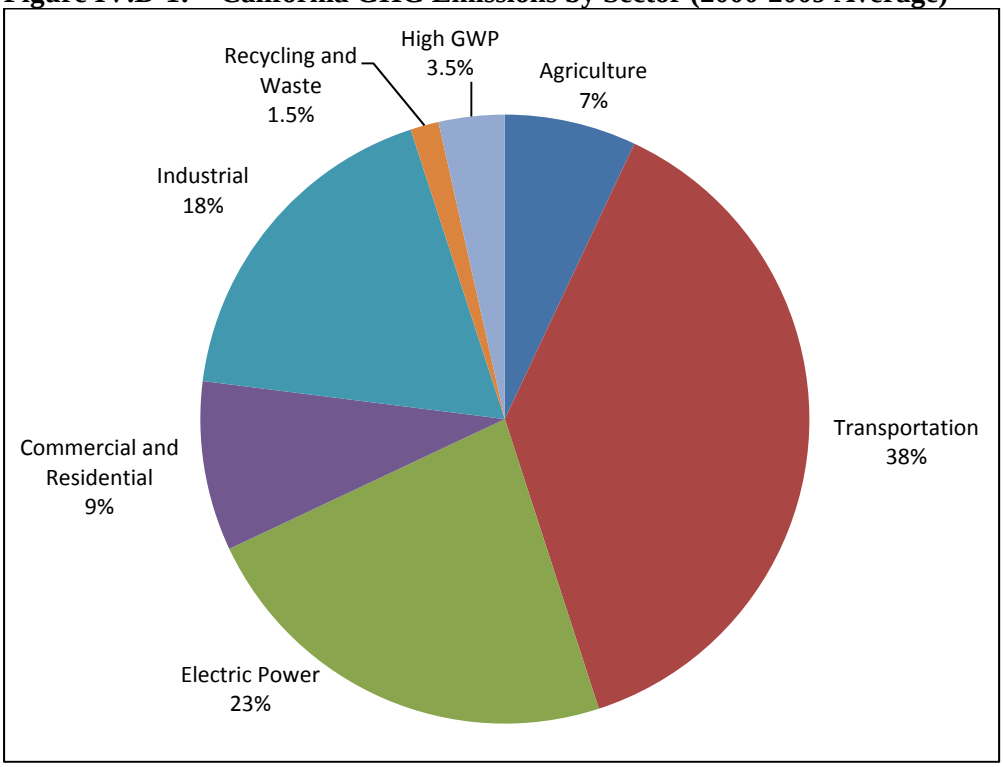
[19] California Environmental Protection Agency, 2006. *Climate Action Team Report to Governor Schwarzenegger and the Legislature*. Website: www.climatechange.ca.gov/climate_action_team/reports/#2006 (accessed July 2012). March.

[20] Ibid.

California has the fourth lowest per-capita CO_2 emission rate from fossil fuel combustion in the country, due to the success of its energy efficiency and renewable energy programs and commitments that have lowered the State's GHG emissions rate of growth by more than half of what it would have been otherwise.[21]

CARB is responsible for developing the California Greenhouse Gas Emission Inventory. This inventory estimates the amount of GHGs emitted to and removed from the atmosphere by human activities within the State of California and supports the AB 32 Climate Change Program, discussed below. CARB's current GHG emission inventory for the years 2000 to 2009 are shown in Figure IV.D-1 according to categories as defined by CARB. The emission inventory estimates are based on the actual amount of all fuels combusted in the State, which accounts for over 85 percent of the GHG emissions within California.

Figure IV.D-1: California GHG Emissions by Sector (2000-2009 Average)



Note: The High GWP sector encompasses miscellaneous sources.

Source: CARB, 2011. *Trends in California GHG Emissions for 2000 to 2009 – by Category as Defined in the Scoping Plan*. Website: www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_scopingplan_00-08_2010-05-12.pdf. December.

[21] California Energy Commission, 2007. *Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004 – Final Staff Report, publication # CEC-600-2006-013-SF*, Sacramento, CA. December 22, 2006, and January 23, 2007, update to that report.

CARB staff has projected 2020 unregulated GHG emissions, which represent the emissions that would be expected to occur in the absence of any GHG reduction actions. CARB staff estimates the State-wide 2020 unregulated GHG emissions will be 596 million metric tons (MMT) of CO_2e. GHG emissions in 2020 from the transportation and electricity sectors as a whole are not expected to increase, but remain at approximately 38 percent and 23 percent of total CO_2e emissions, respectively. The industrial sector consists of large stationary sources of GHG emissions and the percentage of the total 2020 emissions is projected to be 17 percent of total CO_2e emissions. The remaining sources of GHG emissions in 2020 are high global warming potential gases at 8 percent, residential and commercial activities at 8 percent, agriculture at 5 percent, and recycling and waste at 1 percent.[22]

(4) Bay Area Emissions Inventory. The BAAQMD established a climate protection program in 2005 to acknowledge the link between climate change and air quality. The BAAQMD regularly prepares inventories of criteria and toxic air pollutants to support planning, regulatory and other programs. The most recent emissions inventory estimates GHG emissions produced in the San Francisco Bay Area in 2007.[23] The inventory, which was published February 2010, updates the BAAQMD's previous GHG emission inventory for base year 2002.

According to the BAAQMD, in 2007, 95.8 million metric tons of CO_2e of GHGs were emitted by the nine-county San Francisco Bay Area. The transportation sector, including on-road motor vehicles, locomotives, ships and boats, and aircraft, and the industrial/commercial sector (excluding electricity and agriculture) are the largest sources of GHG emissions, each contributing about 36 percent of the region's total CO_2e emissions in the Bay Area. Energy production activities such as electricity generation and co-generation were the third largest contributor with 16 percent of the total GHG emissions. Off-road equipment such as construction, industrial, commercial, and lawn and garden equipment contributed 3 percent of GHG emissions. The contribution from residential fuel usage, primarily from space heating, cooking and water heating, contributed 7 percent of the total GHG emissions. Agriculture and farming activities was the smallest sector with 1 percent of the total GHG emissions in the Bay Area. The Bay Area GHG emissions by sector for the year 2007 are shown in Figure IV.D-2.

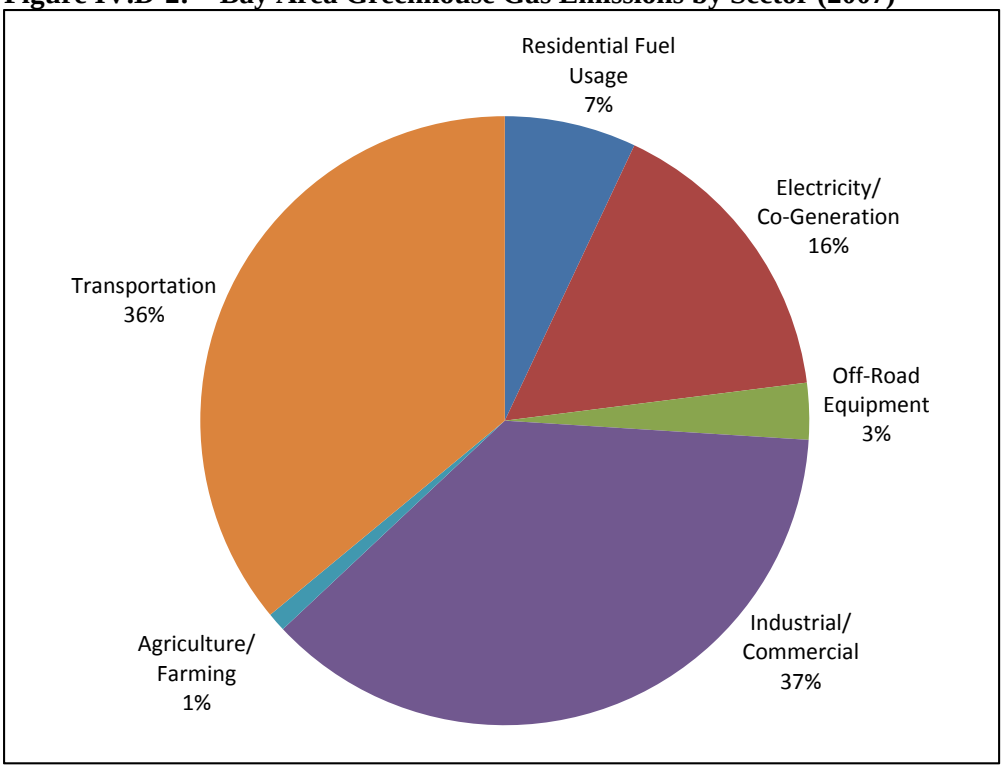
(5) City of Larkspur Emissions. The City of Larkspur recognizes that local governments play a strong role in reducing GHG emissions and mitigating the potential impacts of climate change. In June of 2010, the City of Larkspur approved a CAP to develop strategies that the City's government operations and the community can take to reduce GHG emissions and mitigate, to the extent feasible at the local level, the potential impacts of climate change. Through actions outlined in the CAP, such as increasing energy efficiency of buildings, encouraging less dependence on the automobile, and using clean, renewable energy sources, the community can experience lower energy bills, improved air quality, reduced emissions, and an enhanced quality of life.[24]

[22] California Air Resources Board, 2008. Website: www.climatechange.ca.gov/inventory/index.html. September.

[23] Bay Area Air Quality Management District, 2010. *Source Inventory of Bay Area Greenhouse Gas Emissions*. February.

[24] Larkspur, City of, 2010, op. cit.

Figure IV.D-2: Bay Area Greenhouse Gas Emissions by Sector (2007)



Source: BAAQMD, 2010. *Inventory of Bay Area Greenhouse Gas Emissions*. February.

The CAP also proposed an emissions reduction target. In July, 2010, the City of Larkspur established a Greenhouse Gas Emissions Reduction Target of 15 percent below 2005 levels by 2020, which is consistent with the State's direction to local governments in the AB 32 Scoping Plan. The first step toward reducing GHG emissions is to identify sources of emissions and establish baseline levels. In June 2009, the City of Larkspur completed, and the City Council adopted, Larkspur's 2005 Greenhouse Gas Emissions Inventory. The inventory identifies the sources and quantifies the volumes of GHG emissions resulting from governmental operations as well as activities and operations taking place throughout the community of Larkspur in 2005. The year 2005 is used rather than an earlier or later baseline year due to the more comprehensive and accurate data available for that year. Larkspur's 2005 Greenhouse Gas Emissions Inventory identified the following key findings:[25]

- Emissions from Government Operations
  - Larkspur's government operations produced approximately 540 metric tons of CO_2e in 2005, which is 0.5 percent of total community emissions.
  - The employee commute sector was the greatest source of government operations GHG emissions in 2005 – producing 214 metric tons of CO_2e, or 39.7 percent of total government operations emissions.

[25] Ibid.

  - The vehicle fleet sector was the second greatest source of government operations emissions, producing 120 metric tons of CO_2e, or 22.2 percent of total government operations emissions.
- Community-Wide Emissions
  - Larkspur's community produced approximately 106,222 metric tons of CO_2e in 2005.
  - The transportation sector was the greatest source of community GHG emissions in 2005 – producing 63,055 metric tons of CO_2e, or 59.4 percent of total community emissions.
  - Within the transportation sector, 58.2 percent of emissions are produced from travel on State Highway 101 as it passes through Larkspur's jurisdictional boundaries, which also traverses the SMART Station Area Plan area. The remaining 41.8 percent, or 26,347 metric tons of CO_2e, are produced during travel on local roads including regional route Sir Francis Drake Boulevard.
  - The residential sector produced 23,746 metric tons of CO_2e of GHG emissions in 2005, or 22.4 percent of total community emissions.

The City of Larkspur is committed to implementing the CAP in order to mitigate the effects of climate change. The City intends to monitor progress towards achieving the approved emissions reduction target and if needed, plans to update the CAP based on the results from the monitoring.

d. Regulatory Framework. The federal and State regulatory framework related to GHG emissions is described below.

(1) Federal Regulations. The United States has historically had a voluntary approach to reducing GHG emissions. However, on April 2, 2007, the United States Supreme Court ruled that the Environmental Protection Agency (EPA) has the authority to regulate CO_2 emissions under the federal Clean Air Act (CAA). While there currently are no adopted federal regulations for the control or reduction of GHG emissions, the EPA commenced several actions in 2009 that are required to implement a regulatory approach to global climate change, including the ones described below.

On September 22, 2009, EPA issued a final rule for mandatory reporting of GHGs from large GHG emission sources in the United States. In general, this national reporting requirement will provide the EPA with accurate and timely GHG emissions data from facilities that emit 25,000 metric tons or more of CO_2 per year. This publically available data will allow the reporters to track their own emissions, compare them to similar facilities, and aid in identifying cost effective opportunities to reduce emissions in the future. Reporting is at the facility level, except that certain suppliers of fossil fuels and industrial GHGs along with vehicle and engine manufactures will report at the corporate level. An estimated 85 percent of the total U.S. GHG emissions, from approximately 10,000 facilities, are covered by this rule.

On December 7, 2009, the EPA Administrator signed a final action under the CAA, finding that six GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6) constitute a threat to public health and welfare, and that the combined emissions from motor vehicles cause and contribute to global climate change. This EPA action does not impose any requirements on industry or other entities. However, the findings are a prerequisite to finalizing the GHG emission standards for light-duty vehicles mentioned below. EPA received ten petitions challenging this determination. On July 29, 2010, EPA denied these petitions.

On April 1, 2010, the EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) announced a final joint rule to establish a national program consisting of new standards for model year 2012 through 2016 light-duty vehicles that will reduce GHG emissions and improve fuel economy. EPA is finalizing the first-ever national GHG emissions standards under the CAA, and NHTSA is finalizing Corporate Average Fuel Economy standards under the Energy Policy and Conservation Act. The EPA GHG standards require light-duty vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile in model year 2016, equivalent to 35.5 miles per gallon.

In December 2010, the EPA issued its plan for establishing GHG pollution standards under the CAA in 2011. The agency looked at a number of sectors and is moving forward on GHG standards for fossil fuel power plants and petroleum refineries – two of the largest industrial sources, representing nearly 40 percent of the GHG pollution in the United States.[26]

On August 9, 2011, EPA and the NHTSA announced the first-ever standards to reduce GHG emissions and improve the fuel efficiency of heavy-duty trucks and buses. The final combined standards of the Heavy-Duty National Program will reduce CO_2 emissions by about 270 MMT and save about 530 million barrels of oil over the life of vehicles built for the 2014 to 2018 model years. The heavy duty sector addressed in the EPA and NHTSA rules (including the largest pickup trucks and vans, semi-trucks, and all types and sizes of work trucks and buses in between) accounts for nearly 6 percent of all U.S. GHG emissions and 20 percent of transportation emissions. In addition, air quality will continue to improve as less fuel use leads to reduced ozone and particulate matter.

(2) State Regulations. The CARB is typically the lead agency for implementing climate change regulations in the State. There are many regulations and statutes in California that address both directly and indirectly, GHG emissions, such as renewable portfolio standards (SB 1078, SB 107, SB 2[1X]) and energy efficiency standards (Title 24, Cal. Code Regs.). Many of the most prominent state regulatory activities addressing specifically climate change and GHG emissions are discussed below.

Assembly Bill 1493 (2002). In a response to the transportation sector's significant contribution to California's CO_2 emissions, AB 1493 (Pavley) was enacted on July 22, 2002. AB 1493 requires the CARB to set GHG emission standards for passenger vehicles and light duty trucks (and other vehicles whose primary use is noncommercial personal transportation in the State) manufactured in 2009 and all subsequent model years. These standards (starting in model years 2009 to 2016) were approved by the CARB in 2004, but the needed waiver of Clean Air Act Preemption was not granted by the EPA until June 30, 2009. The CARB responded by amending its original regulation, now referred to as Low Emission Vehicle III GHG, to take effect for model years starting in 2017 to 2025.[27]

Executive Order S-3-05 (2005). Governor Arnold Schwarzenegger signed Executive Order S-3-05 on June 1, 2005, which proclaimed that California is vulnerable to the impacts of climate change. To combat those concerns, the executive order established California's GHG emissions reduction targets, which established the following goals:

[26] U.S. Environmental Protection Agency, 2010. Press Release. December 23.

[27] California Air Resources Board, 2010. California Clean Car Standards – Pavely, Assembly Bill 1493. Website: arb.ca.gov/cc/ccms/ccms.htm (accessed November 2011).

- Greenhouse gas emissions should be reduced to 2000 levels by 2010;
- Greenhouse gas emissions should be reduced to 1990 levels by 2020; and
- Greenhouse gas emissions should be reduced to 80 percent below 1990 levels by 2050.

The Secretary of the California Environmental Protection Agency (CalEPA) is required to coordinate efforts of various State agencies in order to collectively and efficiently reduce GHGs. A biannual progress report must be submitted to the Governor and State Legislature disclosing the progress made toward GHG emission reduction targets. In addition, another biannual report must be submitted illustrating the impacts of global warming on California's water supply, public health, agriculture, the coastline, and forestry, and report possible mitigation and adaptation plans to address these impacts.

Assembly Bill 32 (2006), California Global Warming Solutions Act. California's major initiative for reducing GHG emissions is AB 32, passed by the State legislature on August 31, 2006. This effort aims at reducing GHG emissions to 1990 levels by 2020. The CARB has established the level of GHG emissions in 1990 at 427 MMT CO_2e. The emissions target of 427 MMT requires the reduction of 169 MMT from the State's projected business-as-usual 2020 emissions of 596 MMT. AB 32 requires the CARB to prepare a Scoping Plan that outlines the main State strategies for meeting the 2020 deadline and to reduce GHGs that contribute to global climate change. The Scoping Plan was approved by the CARB on December 11, 2008, and includes measures to reduce GHG emissions related to energy efficiency, water use, recycling, solid waste, and other sources.[28] The Scoping Plan includes a range of GHG reduction actions that may include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system. The Scoping Plan, even after CARB approval, remains a recommendation. The measures in the Scoping Plan will not be binding until after they are adopted through the normal rulemaking process. The CARB rulemaking process includes preparation and release of each of the draft measures, public input through workshops, and a public comment period, followed by a CARB hearing and rule adoption.

In addition to reducing GHG emissions to 1990 levels by 2020, AB 32 directed the CARB and the newly created Climate Action Team (CAT) to identify a list of "discrete early action GHG reduction measures" that could be adopted and made enforceable by January 1, 2010. On January 18, 2007, Governor Schwarzenegger signed Executive Order S-1-07, further solidifying California's dedication to reducing GHGs by setting a new Low Carbon Fuel Standard. The Executive Order sets a target to reduce the carbon intensity of California transportation fuels by at least 10 percent by 2020 and directs the CARB to consider the Low Carbon Fuel Standard as a discrete early action measure.

In June 2007, the CARB approved a list of 37 early action measures, including three discrete early action measures (Low Carbon Fuel Standard, Restrictions on GWP Refrigerants, and Landfill CH_4 Capture).[29] Discrete early action measures are measures that were required to be adopted as regulations and made effective no later than January 1, 2010, the date established by Health and Safety Code

[28] California Air Resources Board, 2008. *Climate Change Scoping Plan: a framework for change*. December.

[29] California Air Resources Board, 2007. *Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California Recommended for Board Consideration*. October. The Low Carbon Fuel Standard has been the subject of litigation in federal court that is still pending.

Section 38560.5. The CARB adopted additional early action measures in October 2007 that tripled the number of discrete early action measures. These measures relate to truck efficiency, port electrification, reduction of PFCs from the semiconductor industry, reduction of propellants in consumer products, proper tire inflation, and SF6 reductions from the non-electricity sector. The combination of early action measures is estimated to reduce State-wide GHG emissions by nearly 16 MMT.[30]

To assist public agencies in analyzing the effects of GHGs under CEQA, Senate Bill 97 (Chapter 185, 2007) required the Governor's Office of Planning and Research (OPR) to develop CEQA guidelines on how to minimize and mitigate a project's GHG emissions. On December 30, 2009, the Natural Resources Agency adopted amendments to the *CEQA Guidelines* related to climate change. These amendments became effective on March 18, 2010.

In December 2008, CARB adopted its Climate Change Scoping Plan, which contains the main strategies California will implement to achieve reduction of approximately 169 MMT of CO_2e, or approximately 30 percent from the State's projected 2020 emission level of 596 MMT of CO_2e under a business-as-usual scenario (this is a reduction of 42 MMT CO_2e, or almost 10 percent from 2002-2004 average emissions). The Scoping Plan also includes CARB-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 MMT CO_2e);
- The Low-Carbon Fuel Standard (15.0 MMT CO_2e);
- Energy efficiency measures in buildings and appliances and the widespread development of combined heat and power systems (26.3 MMT CO_2e); and
- A renewable portfolio standard for electricity production (21.3 MMT CO_2e).

The Scoping Plan identifies 18 emission reduction measures that address cap-and-trade programs, vehicle gas standards, energy efficiency, low carbon fuel standards, renewable energy, regional transportation-related GHG targets, vehicle efficiency measures, goods movement, solar roof programs, industrial emissions, high speed rail, green building strategies, recycling, sustainable forests, water, and air. The measures would result in a total reduction of 174 MMT CO_2e by 2020.

On August 24, 2011, CARB unanimously approved both CARB's new supplemental assessment and re-approved its Scoping Plan, which provides the overall roadmap and rule measures to carry out AB 32. CARB also approved a more robust CEQA equivalent document supporting the supplemental analysis of the cap-and-trade program. CARB also announced that it would be delaying the date that entities would be required to comply with its cap-and-trade program, which was initiated in January, 2012.

CARB has not yet determined what amount of GHG reductions it recommends from local government operations; however, the Scoping Plan states that land use planning and urban growth decisions will

[30] California Air Resources Board, 2007. "ARB approves tripling of early action measures required under AB 32" News Release 07-46. Website: www.arb.ca.gov/newsrel/nr102507.htm. October 25.

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, CARB is also developing an additional protocol for community emissions). CARB 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. With regard to land use planning, the Scoping Plan expects an approximately 5.0 MMT CO_2e reduction due to implementation of SB 375, which is discussed further below.

Senate Bill 1368 (2006). SB 1368 is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 requires the California Public Utilities Commission (PUC) to establish a GHG emission performance standard for baseload generation from investor-owned utilities and local publicly-owned utilities These standards cannot exceed the GHG emission rate from a baseload combined-cycle natural gas fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the PUC.

Executive Order S-1-07. Executive Order S-1-07 in 2007 indicates that the transportation sector accounts for over 40 percent of Statewide GHG emissions and establishes a goal to reduce the carbon intensity of transportation fuels sold in California by a minimum of 10 percent by 2020.

Senate Bill 97 (2007). SB 97, signed by the Governor in August 2007 (Chapter 185, Statutes of 2007; Public Resources Code, Sections 21083.05 and 21097), acknowledges climate change is a prominent environmental issue that requires analysis under CEQA. This bill directed the OPR to prepare, develop, and transmit to the California Natural Resources Agency guidelines for mitigating GHG emissions or the effects of GHG emissions, as required by CEQA.

The California Natural Resources Agency adopted the amendments to the *CEQA Guidelines* in January 2010, which went into effect in March 2010. The amendments do not identify a threshold of significance for GHG emissions, nor do they prescribe assessment methodologies or specific mitigation measures. The amendments encourage lead agencies to consider many factors in performing a CEQA analysis, but preserve the discretion granted by CEQA to lead agencies in making their own determinations based on substantial evidence. The amendments also encourage public agencies to make use of programmatic mitigation plans and programs when they perform individual project analyses.

Senate Bill 375 (2008). Signed into law on October 1, 2008, SB 375 supplements GHG reductions from new vehicle technology and fuel standards with reductions from more efficient land use patterns and improved transportation. Under the law, CARB approved GHG reduction targets in February 2011 for California's 18 federally designated regional planning bodies, known as Metropolitan Planning Organizations (MPOs). CARB may update the targets every 4 years and must update them every 8 years. MPOs in turn must demonstrate how their plans, policies and transportation investments meet the targets set by CARB through Sustainable Community Strategies (SCS). The SCS are included with the Regional Transportation Plan (RTP), a report required by State law. However, if an MPO finds that their SCS will not meet the GHG reduction target, they may prepare an Alternative Planning Strategy (APS). The APS identifies the impediments to achieving the targets.

Executive Order S-13-08. Governor Schwarzenegger signed Executive Order S-13-08 on November 14, 2008, which directs California to develop methods for adapting to climate change through preparation of a Statewide plan. The executive order directed OPR, in cooperation with the California Natural Resources Agency, to provide land use planning guidance related to sea level rise and other climate change impacts by May 30, 2009.

Office of Planning and Research. On December 30, 2009, the California Natural Resources Agency adopted amendments to the *CEQA Guidelines* related to Climate Change. These amendments became effective on March 18, 2010. Revisions to Appendix G of the CEQA Guidelines suggest that development projects be evaluated based on the following thresholds:

- Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; and
- Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.

(3) Bay Area Air Quality Management District. BAAQMD is the regional government agency that regulates sources of air pollution with the nine San Francisco Bay Area counties. The BAAQMD regulates GHG emissions through the following plans, programs, and guidelines.

Regional Clean Air Plans. BAAQMD and other air districts prepare clean air plans in accordance with the State and federal Clean Air Acts. The Bay Area 2010 Clean Air Plan (Bay Area 2010 CAP) provides a comprehensive plan to improve Bay Area air quality and protect public health through implementation of a control strategy designed to reduce emissions and decrease ambient concentrations of harmful pollutants. The most recent Bay Area 2010 CAP also includes measures designed to reduce GHG emissions.

Bay Area Air Quality Management District Climate Protection Program. The BAAQMD established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality in the San Francisco Bay Area Air Basin. The climate protection program includes measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative sources of energy, all of which assist in reducing emissions of GHG and in reducing air pollutants that affect the health of residents. BAAQMD also seeks to support current climate protection programs in the region and to stimulate additional efforts through public education and outreach, technical assistance to local governments and other interested parties, and promotion of collaborative efforts among stakeholders.

BAAQMD CEQA Air Quality Guidelines. The BAAQMD adopted revised *CEQA Air Quality Guidelines* on June 2, 2010 and then adopted a modified version of the Guidelines in May, 2011. The BAAQMD *CEQA Air Quality Guidelines* include thresholds of significance for GHG emissions.[31] Under the latest *CEQA Air Quality Guidelines*, a local government may prepare a Qualified

[31] On March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the thresholds of significance in the 2011 BAAQMD CEQA Air Quality Guidelines. The court issued a writ of mandate ordering the BAAQMD to set aside the thresholds and cease dissemination of them until the BAAQMD complied with CEQA. In view of the court's order, the BAAQMD is no longer recommending that the thresholds of significance be used as a generally applicable measure of a project's significant air quality impacts.

Greenhouse Gas Reduction Strategy that is consistent with AB 32 goals. If a project is consistent with an adopted Qualified Greenhouse Gas Reduction Strategy and General Plan that addresses the project's GHG emissions, it can be presumed that the project will not have significant GHG emissions under CEQA.[32] The BAAQMD also adopted a quantitative threshold for project level analyses based on estimated GHG emissions as well as per capita metrics.

e. Larkspur General Plan Policies. The City of Larkspur's 1990 General Plan does not include policies on GHG emissions or global climate change. However, as discussed above, in June 2010, the City of Larkspur approved a CAP to develop strategies that the City's government operations and the community can take to reduce its GHG emissions and mitigate, to the extent feasible at the local level, the potential impacts of climate change. Through actions outlined in the CAP, such as increasing energy efficiency of buildings, encouraging less dependence on the automobile, and using clean, renewable energy sources, the community can experience lower energy bills, improved air quality, reduced emissions, and an enhanced quality of life.

More specifically, the CAP includes recommended programs in each the following areas to achieve GHG emission reductions in the community and government operations:

- natural systems, carbon sequestration and emissions offset;
- land use and transportation;
- green building, energy efficiency and renewable energy;
- waste reduction, recycling, and zero waste; and
- water and wastewater.

2. Impacts and Mitigation Measures

This section evaluates the potential global climate change impacts that could result from implementation of the Station Area Plan. It establishes the thresholds of significance, identifies the methodology used in this section, and then evaluates the impacts associated with the Station Area Plan. Where potentially significant impacts are identified, mitigation measures are recommended as appropriate.

a. Criteria of Significance. Implementation of the SMART Station Area Plan would result in significant impacts on global climate change if it would:

- Conflict with the City's adopted Climate Change Action Plan; or
- Result in operational-related GHG emissions that exceed 4.6 metric tons of CO_2e annually per service population; and
- Result in operation-related GHG emissions that exceed 1,100 metric tons of CO_2e annually.

These significance thresholds were adopted as part of the May 2011 CEQA Air Quality Guidelines. It should be noted that on March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the thresholds of significance in the BAAQMD CEQA Air Quality Guidelines. The court did not determine whether the thresholds of

[32] Bay Area Air Quality Management District, 2011. *CEQA Air Quality Guidelines*. May.

significance were valid on their merits, but found that the adoption of the thresholds was a project under CEQA. The court issued a writ of mandate ordering the BAAQMD to set aside the thresholds and cease dissemination of them until the BAAQMD complied with CEQA. In May of 2012, the BAAQMD filed an appeal of the court's decision, the results of which are currently pending.

Although lead agencies may rely on the 2011 BAAQMD CEQA Air Quality Guidelines for assistance in calculating air pollution emissions, obtaining information regarding the health impacts of air pollutants, and identifying potential mitigation measures, the BAAQMD has been ordered to set aside the thresholds and is no longer recommending that they be used as a general measure of a project's significant air quality impacts. The BAAQMD also recognizes that lead agencies may rely on the previously recommended thresholds of significance contained in its CEQA Air Quality Guidelines adopted in 1999. However, the 1999 CEQA Guidelines do not contain thresholds to determine the significance of GHG emissions.

The court's invalidation of BAAQMD's thresholds presents uncertainty for current project applicants and local agencies regarding proper evaluation of air quality and GHG emissions in CEQA documents. Although reliance on the thresholds is no longer required, local agencies still have a duty to evaluate impacts related to air quality and GHG emissions. In addition, CEQA grants local agencies broad discretion to develop their own thresholds of significance, or to rely on thresholds previously adopted or recommended by other public agencies or experts so long as they are supported by substantial evidence. Accordingly, the City of Larkspur has not adopted its own GHG emission thresholds and will continue to use the BAAQMD's thresholds to evaluate project impacts in order to evaluate the potential effects of the project on global climate change. The City believes that these protective thresholds are appropriate in the context of the size, scale, and location of the project.

The BAAQMD's approach to developing a quantitative threshold of significance for GHG emissions was to identify the emissions level for which a project would not be expected to substantially conflict with existing California legislation and policy adopted to reduce Statewide GHG emissions. According to the BAAQMD CEQA Air Quality Guidelines, if a project would generate GHG emissions above the threshold level, it would be considered to contribute substantially to a cumulative impact, and would be considered significant. The Alameda County Superior Court did not question the science behind the thresholds or their merit. Therefore, the City of Larkspur finds that, despite the court ruling, the science and reasoning contained in the 2011 BAAQMD CEQA Air Quality Guidelines provide the latest state-of-the-art guidance available. For that reason, substantial evidence supports continued use of the 2011 BAAQMD CEQA Air Quality Guidelines and the significance thresholds contained therein.

b. Impacts Analysis. The following section describes global climate change impacts associated with implementation of the Station Area Plan.

(1) Consistency with the City's Climate Change Action Plan. The City of Larkspur developed a CAP knowing that climate change may significantly impact Larkspur's residents and businesses, as well as other communities around the world, and that local governments play a role in reducing GHG emissions and mitigating the potential impacts of climate change.

The CAP consists of strategies that the City and community can take to address climate change. These strategies include increasing building energy efficiency, encouraging less dependence on the automobile, and using clean, renewable energy sources. In tandem with the City's 2005 Greenhouse

Gas Emissions Inventory, the CAP acts as the beginning of an ongoing planning process that includes assessing, planning, mitigating and adapting to climate change. The CAP calls for planners to "Study the Larkspur Landing Circle area and enhance the opportunities presented in the location of the Larkspur Ferry, the Marin Airport, and eventually the SMART train station."

Larkspur's CAP includes specific mitigation measures that government and the community can use to reduce, and encourage the reduction of, GHG emissions. For example, emissions generated from the transportation sector are one of the largest sources of GHG emissions, and transportation and land use development are strongly interrelated. Therefore, the CAP encourages compact, transit-oriented development, increasing walking and biking for local trips, and increasing public transit use in Larkspur. This is accomplished through adopting policies that promote compact and efficient development, orienting new development in close proximity to transit systems and services, educating the public on the health and environmental benefits of walking, cycling, and taking public transit, and providing government agency employees with incentives to use alternatives to single occupant auto commuting. CAP policies also encourage the use of sustainable transportation modes by identifying the needs of the community's pedestrian, bicycle, and mass transit facilities and updating the pedestrian and bicycle plan and investment program for these types of facilities.

Measures to reduce emissions from electricity and natural gas are also identified in the CAP. These include improving energy efficiency in existing commercial and residential buildings, reducing energy use in new commercial and residential buildings, and installing residential and commercial renewable energy systems as well as upgrading City buildings, street lighting, and traffic signals with energy-efficient technologies.

Other measures included in the CAP assist in the reduction of waste and the promotion of recycling and reuse of products to reduce impacts on the environment. The CAP includes a measure to reduce water use in the community by increasing customer education programs on water conservation to meet the growing demand for water.

The Station Area Plan promotes the goals of Larkspur's CAP by including Urban Design Guidelines that encourage more compact, transit-oriented development and provide for improvements to pedestrian and bicycle circulation throughout the Plan area, as well as increasing access to public transportation in order to reduce vehicle miles traveled.

More specifically, the Urban Design Guidelines of the Station Area Plan promote development of multi-modal neighborhood streets in the area to provide access to new development for autos, bicyclists and pedestrians. The guidelines call for new streets to have a minimum roadway width so as to calm traffic and allow for safe access by bicycles, pedestrians and autos. The Urban Design Guidelines also state that additional pedestrian paths should be provided throughout new development areas. These new pedestrian paths allow convenient pedestrian movement within and through the Plan area, making access to transit, services and amenities more convenient. As new development or redevelopment occurs on opportunity sites, the Urban Design Guidelines state that new private streets and lanes will be needed. Guidelines for the new private streets and lanes include: sidewalks for pedestrians along all new streets and accommodations for bicyclists; adequate lighting for pedestrian safety; plantings to ensure visual interest to pedestrians; a landscaped buffer between the streets and lanes and residences; and safe and convenient bike parking at destinations along each route.

The Urban Design Guidelines also include incorporating sustainability features into the Plan area by providing trees and landscaped areas along pedestrian walkways, in parking lots, and in public spaces in the Plan area. The Urban Design Guidelines also identify incorporating low maintenance plantings and stormwater management into landscape design, installing pervious paving where appropriate, utilizing recycled and recyclable materials, and prioritizing pedestrians and cyclists in streetscape treatments.

Opportunity sites within the Plan area will be accessed primarily from Sir Francis Drake Boulevard, Larkspur Landing Circle and Redwood Highway. The Station Area Plan contains design guidelines for Sir Francis Drake Boulevard that include providing sidewalks, where needed, to allow pedestrian access to planned bus transit facilities, and also, where feasible, adding pedestrian amenities to the multi-use trail along the south side of the road to encourage biking and walking. The City of Larkspur intends to continue coordination with other local and regional agencies to pursue possible enhancements to Sir Francis Drake Boulevard that will mitigate potential long-term traffic impacts and improve pedestrian and bicycle circulation.

With regard to Larkspur Landing Circle, the Urban Design Guidelines state that this street is lacking in pedestrian amenities and bicycle lanes. The guidelines for Larkspur Landing Circle include completing missing sidewalks, providing a minimum 6 feet in width within the public right-of-way, and separating the pedestrian walkway from the roadway with a planting strip wherever possible. Also, with future redevelopment of parcels adjacent to the SMART station, the City of Larkspur should consider providing additional pedestrian and bicycle access routes to surrounding destinations.

With the inclusion and implementation of the Urban Design Guidelines, the Station Area Plan would be consistent with the City's CAP. Furthermore, as the Station Area Plan is implemented, new development will be required to comply with the City's Green Building Ordinance, which is also consistent with Larkspur's CAP.

(2) Station Area Plan Greenhouse Gas Emissions. GHG emissions associated with construction and operational activities are described below.

Construction Activities. Construction activities, such as site preparation, site grading, on-site heavy-duty construction vehicles, equipment hauling materials to and from the site, and motor vehicles transporting construction crews would produce combustion emissions from various sources. During construction of projects associated with implementation of the Station Area Plan, GHGs would be emitted through the operation of construction equipment and from worker and builder supply vendor vehicles, each of which typically uses fossil-based fuels to operate. The combustion of fossil-based fuels would create GHGs such as CO_2, CH_4, and N_2O. Furthermore, CH_4 would be emitted during the fueling of heavy equipment.

It is anticipated that development of the opportunity sites would require demolition of existing buildings and hauling of demolished materials. An exact timeline for construction is unknown at this time, however, construction would be expected to occur over a 15- to 20-year period. Using the California Emission Estimator Model (CalEEMod v.2011.1), the total CO_2 emissions associated with construction equipment for implementation of the Station Area Plan would be approximately 20,895 tons CO_2e. Model output sheets are included in Appendix C.

The BAAQMD does not have a numeric threshold to determine the significance of construction emissions. However, specific projects would be required to implement the construction exhaust control measures listed in Mitigation Measure AIR-1 of Section IV.C, Air Quality, including minimization of construction equipment idling and implementation of proper engine tuning and exhaust controls. The mitigation measure would also require contractors to use electric equipment when feasible. These measures would reduce GHG emissions during the construction period to a less-than-significant level.

Operational Greenhouse Gas Emissions. The operational activities associated with implementation of the Station Area Plan could directly or indirectly contribute to the generation of GHG emissions. GHG emissions generated by the Station Area Plan would predominantly consist of CO_2. In comparison to criteria air pollutants (see Section IV.C, Air Quality) such as ozone and PM_{10}, CO_2 emissions persist in the atmosphere for a substantially longer period of time. While emissions of other GHGs, such as CH_4, are important with respect to global climate change, emission levels of other GHGs are less dependent on the land use and circulation patterns associated with the proposed project than are levels of CO_2.

GHG emissions generated from implementation of the Station Area Plan were estimated using the California Emissions Estimator Model v.2011.1.1(CalEEMod), which is the latest computer model for estimating air emissions from land use projects. CalEEMod was developed in cooperation with air districts throughout the State, and is designed as a uniform platform to quantify potential criteria pollutant and GHG emissions associated with construction and operation from a variety of land uses, such as residential and commercial facilities. CalEEMod utilizes widely-accepted models for emission estimates combined with appropriate default data that can be used if site-specific information is not available. These models and default estimates use sources from the EPA and CARB, as well as studies commissioned by California agencies such as the California Energy Commission and CalRecycle. Project emissions were estimated for energy use, water use, waste generation, and mobile sources, as described below.

Energy and Natural Gas Use. Buildings represent 39 percent of U.S. primary energy use and 70 percent of electricity consumption. Development associated with implementation of the Station Area Plan would increase the demand for electricity and natural gas due to new building space, residents and new employees and would indirectly result in increased GHG emissions from off-site electricity generation at power plants. Electricity and natural gas usage for the project was based on default values in CalEEMod.

Water Use. Water-related energy use consumes 19 percent of California's electricity every year. Energy use and related GHG emissions are based on water supply and conveyance, water treatment, water distribution, and wastewater treatment. Water use rates by land use type were estimated using CalEEMod default water use rate assumptions.

Solid Waste Disposal. The proposed project would also generate solid waste during the operation phase of the project. Solid waste disposal rates are based on default CalEEMod assumptions.

Mobile Sources. Mobile sources (vehicle trips and associated miles traveled) would be the largest emission source of GHGs associated with the proposed project. Transportation is also the largest source of GHG emissions in California and represents approximately 38 percent of annual CO_2 emissions generated in the State. As with most development projects, vehicle miles traveled (VMT) is the most direct indicator of CO_2 emissions from the proposed project and associated CO_2 emissions

function as the best indicator of total GHG emissions. Development associated with implementation of the Station Area Plan would generate an additional 8,284 daily trips over current conditions, with implementation of the Station Area Plan occurring within the next 20 years. Vehicle emissions would decrease with time due to increased regulation of tailpipe emissions; therefore, to provide a conservative analysis of the estimated emissions, this analysis assumes a 2030 build out date. Greenhouse gas emissions associated with the SMART Station Area Plan are shown in Table IV.D-2.

Table IV.D-2: Station Area Plan Greenhouse Gas Emissions

	Emissions (Metric Tons Per Year)				
Emission Source	**CO_2**	**CH_4**	**N_2O**	**CO_2e**	**Percent of Total**
Area Source	687.17	0.66	0.03	710	5
Transportation	7,609.57	0.29	0.13	7,657	54
Water/Wastewater	4,972.61	0.16	0.00	4,976	34
Waste	0.00	21.17	0.00	445	3
Energy	428.90	6.01	0.16	603	4
			Total Annual Emissions	**14,391**	

Source: LSA Associates, Inc., 2013.

As shown in Table IV.D-2, the GHG emissions associated with the project would be 14,391 metric tons CO_2e per year, which is above the BAAQMD project level threshold of 1,100 tons per year. To evaluate the project against the service population (SP) criterion, the GHG emission projections are divided by the SP or new employees and residents that would be accommodated in 2030 by the proposed project. If this number is less than 4.6 metric tons CO_2e/SP from all emission sectors, then according to the BAAQMD, the Plan's impact related to GHG emissions would be less than significant.

The proposed project would include 2,033 residents, 468 commercial employees, and 90 hotel employees, for a total service population of 2,591. As shown in Table IV.D-2, the Plan would generate 14,391 metric tons per year of CO_2e, resulting in a 5.5 metric tons per service population GHG emission rate, which is above the BAAQMD project-level threshold of 4.6 metric tons per service population. Therefore the Plan would have a significant impact with respect to GHG emissions or a cumulatively considerable contribution to substantial adverse physical effects on the environment related to global climate change, and mitigation measures would be required. It should be noted that in order to provide the most conservative analysis, the City as Lead Agency decided to use the BAAQMD threshold for *project-level* analysis (i.e., exceedence of 4.6 metric tons of CO_2e per service population annually) per the BAAQMD *CEQA Air Quality Guidelines*. However, if using the BAAQMD thresholds for *program-level* plans – which could include the Station Area Plan – and its annual exceedence of 6.6 metric tons of CO_2e per service population, the Plan would not result in a significant impact.

<u>Impact GCC-1</u>: Implementation of the Station Area Plan could result in GHG emissions that would have a significant impact and cumulatively contribute to global climate change. (S)

When mitigating GHG emissions from land use projects, the BAAQMD recommends incorporating transportation demand management measures to reduce mobile source emissions. One of the key principles to guide future development is to support the planning and implementation of transit-

oriented development densities and multi-modal circulation to support transit ridership; this could, in turn, reduce regional VMT. Transportation modeling completed for the project indicates that average daily traffic would be reduced by 19 percent over typical trip generation rates. The Station Area Plan also incorporates recommended measures for reducing GHG emissions including: mix of land uses, transit service, and bike and pedestrian infrastructure. Plan level land use measures that reduce vehicle miles traveled have been implemented to the extent feasible. The Plan incorporates all of the Plan level transportation emission reduction measures recommended by the BAAQMD such as the mix of uses, locating residential uses near transit, and prioritizing alternate modes of transportation. The following measure would further reduce GHG emissions; however, the impact would remain significant and unavoidable.

> Mitigation Measure GCC-1: To reduce GHG emissions associated with implementation of the Station Area Plan, the Plan shall include a vehicle trip cap and Transportation Demand Management (TDM) program to limit the increase in vehicle trips from the plan area to approximately 10 percent above the existing traffic generated by the site. The City shall monitor the program to measure traffic to ensure that traffic conditions are not worsened by development in the Plan area. Implementation of Mitigation Measure GCC-1would reduce vehicle emissions, however, the reduction in GHG emissions would not reduce impacts to a less-than-significant level. Therefore, this impact would be considered significant and unavoidable. (SU)

(3) Consistency with Plans Adopted for the Purpose of Reducing Greenhouse Gas Emissions. As discussed above, implementation of the Station Area Plan would be consistent with the emission reduction measures outlined in the City of Larkspur's CAP. Additionally, the California Environmental Protection Agency Climate Action Team (CAT) and CARB have developed several reports to achieve the Governor's GHG targets that rely on voluntary actions of California businesses, local government and community groups, and state incentive and regulatory programs. These include the CAT's 2006 "*Report to Governor Schwarzenegger and the Legislature*," CARB's 2007 "*Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California*," and CARB's "*Climate Change Proposed Scoping Plan: a Framework for Change."*

The reports identify strategies to reduce California's emissions to the levels proposed in Executive Order S-3-05 and AB 32 that are applicable to the Station Area Plan. The Proposed Scoping Plan is the most recent document, and the strategies included in the Scoping Plan that apply to the project are contained in Table IV.D-3, which summarizes the extent to which the project complies with the strategies to help California reach the emission reduction targets.

The strategies listed in Table IV.D-3 are either part of the Station Area Plan or would be required under local or State ordinances. As shown in Table IV.D-3, implementation of the Station Area Plan would comply with and would not conflict with or impede implementation of reduction goals identified in AB 32, the Governor's Executive Order S-3-05, and other strategies to help reduce GHGs to the level proposed by the Governor. Further, the BAAQMD set the service population emission threshold at a level at which a Plan would be expected to meet the Statewide emission reduction goals and as shown in Table IV.D-2 above, the project would meet the service population metric established by the BAAQMD.[33] Therefore, implementation of the Station Area Plan would have a less-than-significant impact related to consistency with plans adopted for the purpose of reducing GHG emissions.

[33] Ibid.

Table IV.D-3: Station Area Plan Compliance with Greenhouse Gas Emission Reduction Strategies

Strategy	Station Area Plan Compliance
Energy Efficiency Measures	
Energy Efficiency Maximize energy efficiency building and appliance standards, and pursue additional efficiency efforts including new technologies, and new policy and implementation mechanisms. Pursue comparable investment in energy efficiency from all retail providers of electricity in California (including both investor-owned and publicly owned utilities). **Renewables Portfolio Standard** Achieve 33 percent renewable energy mix statewide. **Green Building Strategy** Expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings.	**Compliant.** Development associated with implementation of the Station Area Plan would be required to comply with the updated Title 24 standards for building construction. Development projects within the Plan area would also be required to comply with the City's Green Building Ordinance, which would contribute to a reduction in the City's carbon footprint.
Water Conservation and Efficiency Measures	
Water Use Efficiency Continue efficiency programs and use cleaner energy sources to move and treat water. Approximately 19 percent of all electricity, 30 percent of all natural gas, and 88 million gallons of diesel are used to convey, treat, distribute and use water and wastewater. Increasing the efficiency of water transport and reducing water use would reduce GHG emissions.	**Compliant.** Any development associated with the Station Area Plan would be required to comply with the requirements of the City's Green Building Ordinance including measures to increase water use efficiency. The Urban Design Guidelines of the Station Area Plan include sustainability practices for streetscape treatments that include a variety of sustainable elements such as landscape design that integrates storm water management.
Solid Waste Reduction Measures	
Increase Waste Diversion, Composting, and Commercial Recycling, and Move Toward Zero-Waste. Increase waste diversion from landfills beyond the 50 percent mandate to provide for additional recovery of recyclable materials. Composting and commercial recycling could have substantial GHG reduction benefits. In the long term, zero-waste policies that would require manufacturers to design products to be fully recyclable may be necessary.	**Compliant.** Development associated with the Station Area Plan would meet the requirements of City policies on waste diversion. The Urban Design Guidelines for the Station Area Plan also provide sustainability guidelines that recommend the utilization of recycled and recyclable materials.

Table IV.D-3: Station Area Plan Compliance with Greenhouse Gas Emission Reduction Strategies

Strategy	Station Area Plan Compliance
Transportation and Motor Vehicle Measures	
Vehicle Climate Change Standards. AB 1493 (Pavley) required the State to develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of GHG emissions from passenger vehicles and light duty trucks. Regulations were adopted by the CARB in September 2004. **Light-Duty Vehicle Efficiency Measures.** Implement additional measures that could reduce light-duty GHG emissions. For example, measures to ensure that tires are properly inflated can both reduce GHG emissions and improve fuel efficiency. **Adopt Heavy- and Medium-Duty Fuel and Engine Efficiency Measures**. Regulations to require retrofits to improve the fuel efficiency of heavy-duty trucks that could include devices that reduce aerodynamic drag and rolling resistance. This measure could also include hybridization of and increased engine efficiency of vehicles. **Low Carbon Fuel Standard.** CARB identified this measure as a Discrete Early Action Measure. This measure would reduce the carbon intensity of California's transportation fuels by at least 10% by 2020.	**Compliant.** The Station Area Plan does not involve the manufacture, sale, or purchase of vehicles. However, vehicles that operate within and access the Plan area would comply with any vehicle and fuel standards that the CARB adopts.
Transportation and Motor Vehicle Measures *(Continued)*	
Regional Transportation-Related Greenhouse Gas Targets. Develop regional GHG emissions reduction targets for passenger vehicles. Local governments will play a significant role in the regional planning process to reach passenger vehicle GHG emissions reduction targets. Local governments have the ability to directly influence both the siting and design of new residential and commercial developments in a way that reduces GHGes associated with vehicle travel.	**Compliant.** Specific regional emission targets for transportation emissions do not directly apply to the Station Area Plan. The proposed project would contribute to an overall reduction in vehicle miles traveled and associated vehicle emissions by prioritizing pedestrians and cyclists, providing residential uses near transit options and by allowing for mixed use development.
Measures to Reduce High Global Warming Potential (GWP) Gases. CARB has identified Discrete Early Action measures to reduce GHG emissions from the refrigerants used in car air conditioners, semiconductor manufacturing, and consumer products. CARB has also identified potential reduction opportunities for future commercial and industrial refrigeration, changing the refrigerants used in auto air conditioning systems, and ensuring that existing car air conditioning systems do not leak**.**	**Compliant.** Products used, sold, or serviced in the Plan area would comply with current and future CARB rules and regulations.

Source: LSA Associates, Inc., 2013.

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E. NOISE

This section assesses the effects of the project on the noise environment within and around the study area of the Larkspur SMART Station Area Plan (Plan) area. The following discussion describes the general characteristics of sound and the categories of audible noise. The regulatory framework related to noise issues at the City, State and federal levels is then described. Lastly, potential noise impacts associated with implementation of the Station Area Plan are evaluated, and mitigation measures are recommended as necessary.

1. Setting

This section begins with an introduction to several key concepts and terms that are used in evaluating noise. It then explains the various agencies that regulate the noise environment in the City of Larkspur, and summarizes the applicable key standards. This setting section concludes with a description of current key noise sources that affect the City and the noise conditions that are experienced within the Plan area.

a. Characteristics of Sound. Noise is generally defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep.

To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is the number of complete vibrations or cycles per second of a wave that results in the range of tone from high to low. Loudness is the strength of a sound that describes a noisy or quiet environment, and it is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound waves combined with the reception characteristics of the human ear. Sound intensity refers to how hard the sound wave strikes an object, which in turn produces the sound's effect. This characteristic of sound can be precisely measured with instruments.

(1) Measurement of Sound. Sound is characterized by various parameters that describe the rate of oscillation (frequency) of sound waves, the distance between successive troughs or crests in the wave, the speed that it travels, and the pressure level or energy content of a given sound. The sound pressure level has become the most common descriptor used to characterize the loudness (or amplitude) of an ambient sound, and the decibel (dB) scale is used to quantify sound intensity. A decibel (dB) is a unit of measurement which indicates the relative intensity of a sound. The 0 point on the dB scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Changes of 3 dB or less are only perceptible in laboratory environments. Audible increases in noise levels generally refer to a change of 3 dB or more, as this level has been found to be barely perceptible to the human ear in outdoor environments. Increases of 5 dB or more are generally considered the smallest increase in noise levels to be readily perceptible in suburban or urban outdoor environments.

Because sound can vary in intensity by over one million times within the range of human hearing, a logarithmic loudness scale[1] is used to keep sound intensity numbers at a convenient and manageable

[1] Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale, representing points on a sharply rising curve. The logarithmic decibel scale allows an extremely wide range of acoustic energy to be characterized in a manageable notation.

level. Thus, a 10 dBA increase in the level of a continuous noise represents a perceived doubling of loudness, while a 20 dBA increase is 100 times more intense, and a 30 dBA increase is 1,000 times more intense. As noise spreads from a source, it loses energy so that the farther away the noise receiver is from the noise source, the lower the perceived noise level. Noise levels diminish or attenuate as distance from the source increases based on an inverse square rule, depending on how the noise source is physically configured. Noise levels from a single-point source, such as a single piece of construction equipment at ground level, attenuate at a rate of 6 dB for each doubling of distance (between the single-point source of noise and the noise-sensitive receptor of concern). Heavily traveled roads with few gaps in traffic behave as continuous line sources and attenuate roughly at a rate of 3 dB per doubling of distance.

Since the human ear is not equally sensitive to all pitches (sound frequencies) within the entire spectrum, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity in a process called "A-weighting," expressed as "dBA." The dBA or A-weighted decibel refers to a scale of noise measurement that approximates the range of sensitivity of the human ear to sounds of different frequencies. Table IV.E-1 contains a list of typical acoustical terms and definitions. Figure IV.E-1 shows representative noise sources and their corresponding noise levels in dBA.

Table IV.E-1: Definitions of Acoustical Terms

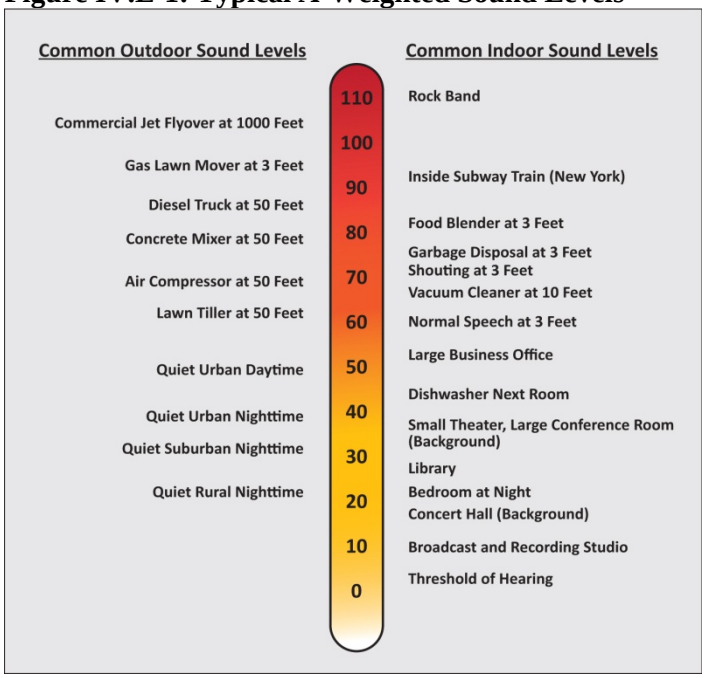
Term	Definitions
Decibel, dB	A unit of level that denotes the ratio between two quantities proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hz	Of a function periodic in time, the number of times that the quantity repeats itself in one second (i.e., number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. 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. All sound levels in this report are A-weighted, unless reported otherwise.
L_{01}, L_{10}, L_{50}, L_{90}	The fast A-weighted noise levels equaled or exceeded by a fluctuating sound level for 1 percent, 10 percent, 50 percent, and 90 percent of a stated time period.
Equivalent Sound Level, L_{eq}	The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time varying sound.
Community Noise Equivalent Level, CNEL	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of five decibels to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 decibels to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Noise Level, L_{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 decibels to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
L_{max}, L_{min}	The maximum and minimum A-weighted sound levels measured on a sound level meter, during a designated time interval, using fast time averaging.
Ambient Noise Level	The all-encompassing noise associated with a given environment at a specified time, usually a composite of sound from many sources at many directions, near and far; no particular sound is dominant.

Source: Harris, C.M., 1998. *Handbook of Acoustical Measurements and Noise Control.*

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. Equivalent continuous sound level (L_{eq}) is the total sound energy of time varying noise over a sample period. However, the predominant

rating scales for communities in the State of California are the Leq, the community noise equivalent level (CNEL), and the day-night average level (L_{dn}) based on A-weighted decibels (dBA). CNEL is the time varying noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly Leq for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale, but without the adjustment for events occurring during the evening relaxation hours. CNEL and L_{dn} are within one dBA of each other and are normally inter-changeable. The noise adjustments are added to the noise events occurring during the more sensitive hours. Typical A-weighted sound levels from various sources are described in Figure IV.E-1.

Figure IV.E-1: Typical A-Weighted Sound Levels



Source: Compiled by LSA Associates, Inc., 2013.

Other noise rating scales of importance when assessing the annoyance factor include the maximum noise level (L_{max}), which is the highest exponential time averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis are specified in terms of maximum levels denoted by L_{max} for short-term noise impacts. L_{max} reflects peak operating conditions, and addresses the annoying aspects of intermittent noise.

Noise impacts can be described in three categories. The first is audible impacts that refer to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3.0 dBA or greater, since, as described earlier, this level has been found to be barely perceptible in exterior environments. The second category, potentially audible, refers to a change in the noise level between 1.0 and 3.0 dBA. This range of noise levels has been found to be noticeable only in laboratory environments. The last category is changes in noise levels of less than 1.0 dBA that are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

(2) Psychological and Physiological Effects of Noise. According to the U.S. Department of Housing and Urban Development's 1985 Noise Guidebook, permanent physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 to 90 dBA. Exposure to high noise levels affects our entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, and thereby affecting blood pressure, functions of the ear, and the nervous system. In comparison, extended periods of noise exposure above 90 dBA would result in permanent cell

damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear even with short-term exposure. This level of noise is called the threshold of feeling. To avoid adverse effects on human physical and mental health in the workplace or in communities, the U.S. Department of Labor, Occupation Health and Safety Administration (OSHA) requires the protection of workers from hearing loss when the noise exposure equals or exceeds an 8-hour time-weighted average of 85 dBA.[2]

Unwanted community effects of noise occur at levels much lower than those that cause hearing loss and other health effects. Noise annoyance occurs when it interferes with sleeping, conversation, noise-sensitive work, including learning or listening to radio, television, or music. According to the World Health Organization (WHO) noise studies, few people are seriously annoyed by daytime activities with noise levels below 55 dBA, or are only moderately annoyed with noise levels below 50 dBA.[3] Exposure to high noise levels is thought to affect the entire human system. In addition to hearing loss, WHO identified other potential health effects such as hypertension and heart disease (after many years of constant exposure to high noise levels in excess of 75 dBA). Noise can also adversely affect the nervous system, as well as trigger emotional reactions like anger, depression, and anxiety.

b. Characteristics of Groundborne Vibration. Vibrating objects in contact with the ground radiate vibration waves through various soil and rock strata to the foundations of nearby buildings. As the vibration propagates from the foundation throughout the remainder of the building, the vibration of floors and walls may cause perceptible vibration from the rattling of windows or a rumbling noise. The rumbling sound caused by the vibration of room surfaces is called groundborne noise. When assessing annoyance from groundborne noise, vibration is typically expressed as root mean square (rms) velocity in units of decibels of 1 micro-inch per second. To distinguish vibration levels from noise levels, the unit is written as "VdB." However, vibration impacts on building structures are generally assessed in terms of peak particle velocity (PPV). Human perception to vibration starts at levels as low as 67 VdB and sometimes lower. Annoyance due to vibration in residential settings starts at approximately 70 VdB. Groundborne vibration is almost never annoying to people who are outdoors. Although the motion of the ground may be perceived, without the effects associated with the shaking of the building, the motion does not provoke the same adverse human reaction.

In extreme cases, excessive groundborne vibration has the potential to cause structural damage to buildings. Common sources of groundborne vibration include trains and construction activities such as blasting, pile driving and operating heavy earthmoving equipment. Typical vibration source levels from construction equipment are shown in Table IV.E-2. Although the table gives one level for each piece of equipment, it should be noted that there is a considerable variation in reported ground vibration levels from construction activities. The data provides a reasonable estimate for a wide range of soil conditions.

[2] Occupational Safety & Health Administration, 2008. *Regulations, Standards 29 CFR, Occupational Noise Exposure 1910.95*. Website: www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=9735.

[3] World Health Organization, 1999. *Guidelines for Community Noise, Geneva*. Website: www.who.int/docstore/peh/noise/guidelines2.html.

Factors that influence groundborne vibration include the:

- **Vibration Source**: Type of activity or equipment, such as impact or mobile, and depth of vibration source;
- **Vibration Path**: Soil type, rock layers, soil layering, depth to water table, and frost depth; and
- **Vibration Receiver**: Foundation type, building construction, and acoustical absorption.

Among these factors that influence groundborne vibration, there are significant differences in the vibration characteristics when the source is underground compared to at the ground surface. In addition, soil conditions are known to have a strong influence on the levels of groundborne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth to bedrock. Vibration propagation is more efficient in stiff clay soils than in loose sandy soils, and shallow rock seems to concentrate the vibration energy close to the surface and can result in groundborne vibration problems at large distances from the source. Factors such as layering of the soil and depth to the water table can have significant effects on the propagation of groundborne vibration. Soft, loose, sandy soils tend to attenuate more vibration energy than hard, rocky materials. Vibration propagation through groundwater is more efficient than through sandy soils.

Table IV.E-2: Typical Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 ft (in/sec)	Approximate VdB at 25 feet
Pile Driver (impact)	Upper range	1.518	112
	Typical	0.644	104
Pile Driver (sonic)	Upper range	0.734	105
	Typical	0.170	93
Clam shovel drop (slurry wall)		0.202	94
Hydromill (slurry wall)	In soil	0.008	66
	In rock	0.017	75
Vibratory roller		0.210	94
Hoe ram		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Source: Federal Transit Administration, 2006. *Transit Noise and Vibration Impact Assessment.* May.

c. Noise Regulatory Framework. The following section summarizes the regulatory framework related to noise, including federal, State and City of Larkspur plans, policies and standards.

(1) U.S. Environmental Protection Agency (EPA). In 1972, Congress enacted the Noise Control Act. This act authorized the EPA to publish descriptive data on the effects of noise and establish levels of sound "requisite to protect the public welfare with an adequate margin of safety." These levels are separated into health (hearing loss levels) and welfare (annoyance levels), as shown in Table IV.E-3. The EPA cautions that these identified levels are not standards because they do not take into account the cost or feasibility of the levels.

For protection against hearing loss, 96 percent of the population would be protected if sound levels are less than or equal to an $L_{eq}(24)$ of 70 dBA. The "(24)" signifies an L_{eq} duration of 24 hours. The EPA activity and interference guidelines are designed to ensure reliable speech communication at about 5 feet in the outdoor environment. For outdoor and indoor environments, interference with activity and annoyance should not occur if levels are below 55 dBA and 45 dBA, respectively.

The noise effects associated with an outdoor L_{dn} of 55 dBA are summarized in Table IV.E-4. At 55 dBA L_{dn}, 95 percent sentence clarity (intelligibility) may be expected at 11 feet, and no community reaction. However, 1 percent of the population may complain about noise at this level and 17 percent may indicate annoyance.

(2) State of California. The State of California has established regulations that help prevent adverse impacts to occupants of buildings located near noise sources. Referred to as the "State Noise Insulation Standard," it requires buildings to meet performance standards through design and/or building materials that would offset any noise source in the vicinity of the receptor. State construction regulations include requirements that are intended to limit the extent of noise transmitted into habitable spaces of new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings.

These requirements are found in the California Code of Regulations, Title 24 (known as the Building Standards Administrative Code), Part 2 (known as the California Building Code), Appendix Chapters 12 and 12A. For limiting noise transmitted between adjacent dwelling units, the noise insulation standards specify the extent to which walls, doors, and floor ceiling assemblies must block or absorb sound. For limiting noise from exterior noise sources, the noise insulation standards set an interior standard of 45 dBA L_{dn} in any habitable room with all doors and windows closed. In addition, the standards require preparation of an acoustical analysis demonstrating the manner in which dwelling units have been designed to meet this interior standard, where such units are proposed in an area with exterior noise levels greater than 60 dBA L_{dn}.

Table IV.E-3: Summary of EPA Noise Levels

Effect	Level	Area
Hearing loss	$L_{eq}(24) \leq 70$ dB	All areas.
Outdoor activity interference and annoyance	$L_{dn} \leq 55$ dB	Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use.
	$L_{eq}(24) \leq 55$ dB	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	$L_{eq} \leq 45$ dB	Indoor residential areas.
	$L_{eq}(24) \leq 45$ dB	Other indoor areas with human activities such as schools, etc.

Source: U.S. Environmental Protection Agency, 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. March.

Table IV.E-4: Summary of Human Effects in Areas Exposed to 55 dBA L_{dn}

Type of Effects	Magnitude of Effect
Speech – Indoors	100 percent sentence intelligibility (average) with a 5 dB margin of safety.
Speech – Outdoors	100 percent sentence intelligibility (average) at 1.4 feet. 99 percent sentence intelligibility (average) at 3.2 feet. 95 percent sentence intelligibility (average) at 11.5 feet.
Average Community Reaction	None evident; 7 dB below level of significant complaints and threats of legal action and at least 16 dB below "vigorous action."
Complaints	1 percent dependent on attitude and other non-level related factors.
Annoyance	17 percent dependent on attitude and other non-level related factors.
Attitude Towards Area	Noise essentially the least important of various factors.

Source: U.S. Environmental Protection Agency, 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. March.

The State has also established land use compatibility guidelines for determining acceptable noise levels for specified land uses.[4] The City has adopted and modified the State's land use compatibility guidelines as shown in Table IV.E-5 and discussed below.

(3) City of Larkspur. The City of Larkspur addresses noise in the Health & Safety Chapter of the General Plan[5] and in Chapter 9.54 of the Municipal Code.[6]

Applicable goals, policies and programs from the Health and Safety Element are listed below:

Health and Safety Element

Goal 11: Reduce the adverse effects of noise upon persons living or working in Larkspur.

- Policy u: Ensure that all new living and work areas are developed with acceptable noise environments.
  - Action Program [38]: Maintain the following standards for noise levels in new residential developments.

    a. Indoor noise levels should not exceed 45 dBA.

    b. Outdoor noise levels should not exceed 55 dBA.

    Noise can be reduced through site planning, architectural layout, noise barriers, and construction modifications.

    - Site Planning. By taking advantage of the natural shape and contours of the site, it is often possible to arrange buildings and other facilities to reduce and possibly eliminate noise impacts. Planned unit developments are particularly conducive to site planning techniques.
    - Architectural Layout. Bedrooms will be considerably quieter if placed on the side of the house facing away from a roadway. Similarly, balconies facing roadways should be avoided. Quiet outdoor spaces can be provided by creating a U-shaped development that faces away from the roadway.
    - Noise Barriers. Noise barriers must be massive enough to prevent significant noise transmission through them and high enough to shield the receiver from the noise source. While effective - because of their massiveness - noise walls are not appropriate in all locations. They work well along freeways and in larger developments. Access doors should be placed in the walls at regular intervals for use during emergencies.
    - Construction Modifications. In general, windows and doors are the acoustical "weak links" in a building. If other noise reduction measures are not sufficient, sealed windows on the noisy side of the building and an alternate means of ventilating the building may help. Beyond this, thicker window panes or double-glazed windows will be required. Doors should face away from the noise source. They should be solid-core and equipped with an appropriate acoustical door gasket.

[4] California, State of, 1998. Governor's Office of Planning and Research, *General Plan Guidelines, (Appendix A, Figure 2)*.

[5] Larkspur, City of, 1990. *California General Plan*, *Chapter 7.*

[6] Larkspur, City of, 2012. Larkspur Municipal Code, Chapter 9.54. May 2.

- Policy v: For non-residential projects, use the "Land Use Compatibility Standards," Figure 7-9 (of the General Plan), to evaluate their suitability in particular locations.
    - Action Program [39]: Require acoustical studies for all projects that would be exposed to noise levels in excess of those deemed normally acceptable, as defined in Figure 7-9 (of the General Plan).
    - Action Program [40]: Require thorough noise assessments in all environmental analyses of major projects.

The City's land use compatibility standards for new development are shown in Table IV.E-5. The standards show that environments with ambient noise levels of up to 55 dBA L_{dn} are considered normally acceptable for new residential development. Interior noise levels should be maintained so as to not exceed 45 dBA L_{dn} for new residential development. Project specific acoustical studies are required for all new development projects that would be exposed to noise levels in excess of the established normally acceptable noise standards for the indicated land use.

The City has established exterior noise limits in the Noise Ordinance of the Municipal Code. These standards restrict persons from creating, or causing to be created, noise that exceeds 50 dBA between 7:00 a.m. and 10:00 p.m. or exceeding 40 dBA between the hours of 10:00 p.m. and 7:00 a.m. for more than 30 minutes within any hour as measured at any receiving residential land use. In addition, noise levels are not permitted to exceed 60 dBA at any time for more than 30 minutes within any hour as measured at a receiving commercial land use. However, noise from construction, demolition, or paving activities are exempt from these exterior noise standards provided such activities occur between the hours of 7:00 a.m. and 6:00 p.m. on weekdays (excluding holidays), and between 9:00 a.m. and 5:00 p.m. on Saturdays, Sundays, and legal holidays. This exemption is granted provided that all powered construction equipment is equipped with intake and exhaust mufflers recommended by the manufacturers thereof. Pavement breakers and jackhammers shall also be equipped with acoustical attenuating shields or shrouds recommended by the manufacturers.

d. Existing Noise Environment. The ambient noise environment within the Plan area is impacted by a variety of noise sources. Dominant noise sources throughout the City include freeway, traffic, railroad, and stationary noise sources.

(1) Existing Ambient Noise Levels. LSA conducted ambient noise monitoring surveys on January 24, 2013. A Larson-Davis Model 720 sound level meter was used to conduct the ambient noise survey. Short-term, 15-minute, ambient noise level measurements were taken at six locations within the Plan area.

Figure IV.E-2, Noise Monitoring Locations, shows the locations of all six noise monitoring sites. Table IV.E-6 lists the six short-term noise monitoring results, and Table IV.E-7 describes each noise monitoring location and the audible noise sources at each location.

LSA

FIGURE IV.E-2

N

Noise Monitoring Location

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FEET

City of Larkspur SMART Station Area Plan EIR

Noise Monitoring Locations

SOURCE: LSA ASSOCIATES, INC., 2013.

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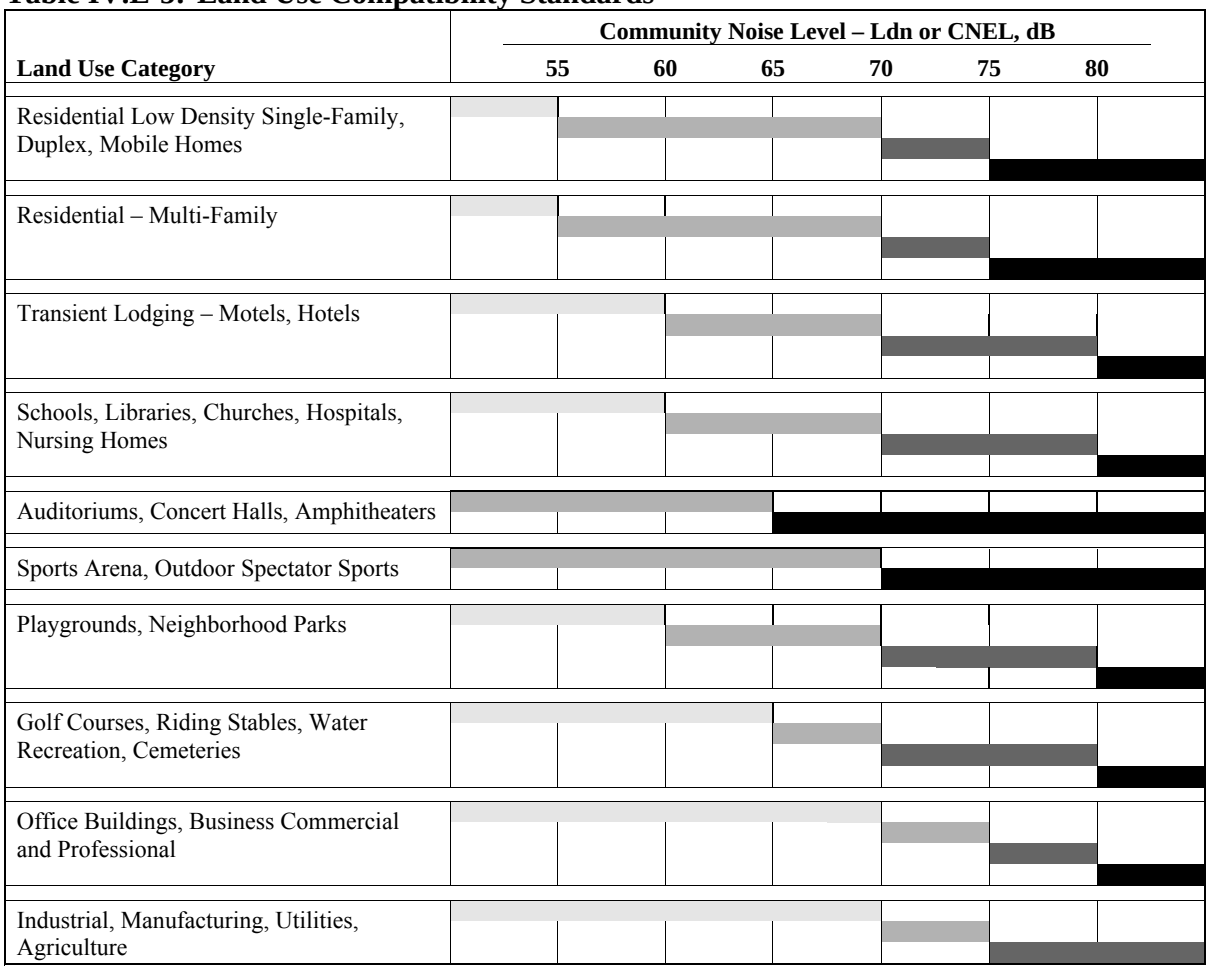
Table IV.E-5: Land Use Compatibility Standards



NORMALLY ACCEPTABLE
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

CONDITIONALLY ACCEPTABLE
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.

NORMALLY UNACCEPTABLE
New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

CLEARLY UNACCEPTABLE
New construction or development clearly should not be undertaken.

Noise Source Characteristics
The land use/noise compatibility recommendations should be viewed in relation to the specific source of the noise. For example, aircraft and railroad noise is normally made up of higher single noise events than auto traffic, but occurs less frequently. Therefore, different sources yielding the same composite noise exposure do not necessarily create the same noise environment.

Suitable Interior Environments
One objective of locating both single and multi-family residential units relative to a known noise source is to maintain a suitable interior noise environment at no greater than 45 dB CNEL or Ldn. This requirement, coupled with the measured or calculated noise reduction performance of the type of structure under consideration, should govern the minimum acceptable distance to a noise source.

Source: State of California, Office of Noise Control, 1975, as modified by City of Larkspur, 1982.

Table IV.E-6: Short-Term (15-minute) Ambient Noise Monitoring Results Thursday, January 24, 2013

Site Number	Start Time	dBA L_{eq}	dBA L_{max}	dBA L_{min}
ST-1	11:31 a.m.	65.1	79.3	60.3
ST-2	1:53 p.m.	51.9	72.3	43.7
ST-3	10:53 a.m.	50.4	73.9	40.5
ST-4	12:39 p.m.	45.9	73.5	39.9
ST-5	3:17 p.m.	57.9	76.8	43.8
ST-6	12:08 p.m.	56.1	89.5	47.2

Source: LSA Associates, Inc., January 2013.

Table IV.E-7: Noise Monitoring Locations and Noise Sources

Site Number	Location Description	Noise Sources
ST-1	Marin RV Park pool deck	Traffic on U.S. 101
ST-2	Plaza between dwelling units	Delivery vehicles, HVAC on nearby commercial building
ST-3	Greenbrae School Park	Leaf blower 100 yards away, traffic on local streets
ST-4	Open courtyard by Building 19	Water feature, traffic on local streets, people conversing
ST-5	Neighborhood park adjacent to day care	Traffic on Larkspur Landing Road, distant freeway noise
ST-6	Outdoor use area of office complex	Traffic on U.S. 101 and local streets, people conversing, HVAC system

Source: LSA Associates, Inc., January 2013.

The noise monitoring results show that existing noise levels throughout the Plan area range from 45.9 to 65.1 dBA L_{eq}. In addition to vehicular traffic, other documented audible noise sources that contribute to the ambient noise environment include delivery loading/unloading operations, HVAC systems, lawn maintenance equipment, people conversing and children playing.

(2) Existing Traffic Noise Levels. Motor vehicles with their distinctive noise characteristics are a dominant noise source in Larkspur. The amount of noise varies according to many factors, such as volume of traffic, vehicle mix (percentage of cars and trucks), average traffic speed, and distance from the observer. Major contributing roadway noise sources in the vicinity of the Plan area include vehicular traffic on U.S. 101 and Sir Francis Drake Boulevard.

Existing traffic noise levels along local roadway segments throughout the Plan area were calculated using the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108). This model data input requirements include traffic volumes, vehicle mix, vehicle speed, and roadway geometry to compute typical equivalent noise levels during daytime, evening, and nighttime hours. Traffic data used in the noise prediction model were obtained from the traffic analysis prepared by Fehr & Peers in the Traffic and Circulation section of this Draft EIR. The resultant noise levels were weighted and summed over 24-hour periods to determine the day-night average level (L_{dn}) values. L_{dn} is the 24 hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 decibels to sound levels occurring in the night between

10:00 p.m. and 7:00 a.m. Existing traffic noise contours and noise levels along modeled roadway segments are shown in Table IV.E-8.

Table IV.E-8: Existing Traffic Noise Levels

Roadway Segment	Average Daily Trips	Centerline to 70 dBA L_{dn} (feet)	Centerline to 65 dBA L_{dn} (feet)	Centerline to 60 dBA L_{dn} (feet)	Centerline to 60 dBA L_{dn} (feet)	L_{dn} (dBA) 50 Feet From Centerline of Outermost Lane
Sir Francis Drake Boulevard – La Cuesta Drive to Eliseo Drive	41,200	72	148	316	679	69.8
Sir Francis Drake Boulevard – Eliseo Drive to U.S. 101 SB Ramps	47,900	79	163	349	750	70.5
Sir Francis Drake Boulevard – U.S. 101 NB Ramps to Larkspur Landing Circle	37,100	70	139	295	633	69.0
Sir Francis Drake Boulevard – Larkspur Landing Circle to Larkspur Landing Circle	23,700	< 50 [a]	104	219	470	67.4
Sir Francis Drake Boulevard – Larkspur Landing Circle to Drakes Cove Road	25,700	< 50	108	231	496	68.2
Eliseo Drive – Sir Francis Drake Boulevard to Bretano Way	4,100	< 50	< 50	< 50	71	55.9
Larkspur Landing Circle – Sir Francis Drake Boulevard to Old Quarry Road S.	8,900	< 50	< 50	57	118	58.7
Larkspur Landing Circle – Drakes Way to Sir Francis Drake Boulevard	7,100	< 50	< 50	< 50	102	57.8

[a] Traffic noise within 50 feet of roadway centerline requires site specific analysis.

Source: LSA Associates, Inc., 2013.

(3) Existing Aircraft Noise Levels. The San Francisco International Airport is located approximately 22 miles south of the Plan area and the Oakland International Airport is located approximately 21 miles southeast of the Plan area. The project site is located outside of the 65-CNEL noise contours for both the San Francisco International Airport and the Oakland International Airport. The San Rafael Private Heliport is located approximately 1.2 miles east of the Plan area.

(4) Railroad Noise Levels. Rail operations are a source of noise within cities with existing rail networks. While there are currently no active rail lines within the City of Larkspur, future build-out of the approved SMART rail line would include construction of the Larkspur SMART Station and the associated expanded rail line service that would occur within the Plan area. This rail line is expected to be located along the east side of U.S. 101 within the Plan area. Potential noise impacts from this rail line were analyzed in the *Sonoma-Marin Area Rail Transit (SMART) Final Environmental Impact Report*.[7] According to this report, cumulative daily noise exposure from passenger and freight rail operations at distances greater than 50 feet from the tracks would be less than 60 dBA L_{dn}. At a distance of 100 feet from the centerline of the railroad tracks, these noise levels

[7] Parsons Brinckerhoff, 2006. *Sonoma-Marin Area Rail Transit Project Final Environmental Impact Report*. June.

would attenuate to below 55 dBA L_{dn}, the level considered normally acceptable for outdoor use in residential areas.

(5) Existing Stationary Noise Sources. As summarized above in the regulatory discussion, stationary noise sources are regulated under Chapter 9.54, Noise Control Regulations, of the City's Municipal Code, which states that no person shall create, or cause to be created, any noise that exceeds the applicable exterior noise standards for the receiving land use.

Existing stationary noise sources throughout the Plan area include mechanical systems such as heating ventilation and cooling (HVAC) systems, delivery truck idling and loading/unloading activities, boat/ferry launching activities, recreational activities, and parking lot activities (such as slamming car doors and talking). Of these noise sources, noise generated by delivery truck activity typically generate the highest maximum noise levels. Delivery truck loading and unloading activities can result in maximum noise levels from 75 dBA to 85 dBA Lmax at 50 feet. Typical parking lot activities, such as people conversing or doors slamming, generates approximately 60 dBA to 70 dBA L_{max} at 50 feet.

2. Impacts and Mitigation Measures

This section analyzes the potential noise impacts that could result from implementation of the Station Area Plan. This section begins with a listing of criteria of significance, which establish the thresholds for determining whether an impact is significant. The latter part of this section presents the potential noise impacts associated with implementation of the project. Mitigation measures are recommended, as appropriate.

a. Criteria of Significance. Based on the CEQA Guidelines, a project would have a significant effect on the environment related to noise if it would substantially increase the ambient noise levels for adjoining areas or conflict with adopted environmental plans and goals of the community in which it is located. The following are the criteria of significance established by the City of Larkspur.

The project would have a significant effect pertaining to noise if it would:

- Expose persons to or generate noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies;
- Expose persons to or generate excessive groundborne vibration and noise levels;
- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without 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, so that the project would result in exposure of people residing or working in the project area to excessive noise levels; or
- Be located within the vicinity of a private airstrip, so that the project would expose people residing or working in the project area to excessive noise levels.

b. Impacts Analysis. Noise impacts related to implementation of the Station Area Plan are discussed as follows.

(1) Noise Levels in Excess of Standards. Potential noise impacts could occur with implementation of the Station Area Plan including excessive noise associated with stationary, railroad, and traffic noise sources throughout the Plan area.

Stationary Noise Sources. Development associated with implementation of the Station Area Plan may include installation or creation of new stationary sources of noise. For commercial uses, these noise sources could include loading/unloading operations, generators, and outdoor speakers. For residential uses, stationary noise sources may include air conditioners or pool pumps. Of the on-site stationary noise sources, noise generated by delivery truck activity would generate the highest maximum noise levels. Delivery truck loading and unloading activities can result in maximum noise levels from 75 dBA to 85 dBA L_{max} at 50 feet. Representative parking activities, such as people conversing or doors slamming, would generate approximately 60 dBA to 70 dBA L_{max} at 50 feet. These stationary sources of noise would have the potential to disturb adjacent sensitive receptors. However, stationary noise sources within the City are regulated by the standards in the Noise Ordinance of the Municipal Code. Ordinance 9.54.040 Exterior Noise Limits establishes exterior noise limit standards that restrict persons from creating, or causing to be created, noise that exceeds 50 dBA between 7:00 a.m. and 10:00 p.m. or exceeding 40 dBA between the hours of 10:00 p.m. and 7:00 a.m. for more than 30 minutes within any hour as measured at any receiving residential land use. In addition, noise levels are not permitted to exceed 60 dBA at any time for more than 30 minutes within any hour as measured at a receiving commercial land use.

Implementation of the Station Area Plan could also result in the development of new sensitive land uses in the vicinity of existing stationary noise sources. However, the City's Land Use Compatibility Standards (shown in Table IV.E-5) require project-by-project environmental review to ensure that noise impacts from stationary sources are considered and mitigated for specific projects. Environments with ambient noise levels of up to 55 dBA L_{dn} are considered normally acceptable for new residential development and no mitigation would be required. However, new construction or development of residential land uses in environments with ambient noise levels above 55 dBA and up to 70 dBA L_{dn} would require detailed analysis of noise reduction requirements and noise insulation features to be included in the design to ensure that interior noise level standards are maintained. The noise monitoring results, shown in Table IV.E-6, show that existing noise levels throughout the Plan area range from 45.9 dBA to 65.1 dBA L_{eq}. A significant impact would occur if development of noise sensitive land uses occurred in locations within the Plan area that have documented ambient noise levels in excess of 55 dBA L_{dn}. Therefore, in order to reduce this impact to less-than-significant, the following mitigation measure shall be implemented.

<u>Impact NOISE-1</u>: Development associated with implementation of the Station Area Plan could expose persons to noise levels from stationary noise sources that are in excess of normally acceptable land use compatibility standards. (S)

<u>Mitigation Measure NOISE-1</u>: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:

- All proposed new development within the Plan area shall comply with the City's Municipal Code exterior noise limit standards as defined in Municipal Code 9.54.040 Exterior Noise

> Limits. In addition, the City shall require all proposed development of noise sensitive land uses within the Plan area, that would be exposed to average daily ambient noise levels in excess of the City's established normally acceptable standards for that land use, to submit an acoustical analysis prior to issuance of building permits. This analysis must be prepared by a qualified acoustical analyst and must specify noise insulation features to be incorporated into the project design that would reduce stationary noise impacts to meet the City's interior noise standard for such proposed land uses. Noise insulation features may include shielding to protect noise-sensitive outdoor activity areas or may include building sound insulation treatments such as sound-rated windows to protect interior spaces. (LTS)

Implementation of Mitigation Measure NOISE-1 would ensure that the exposure of sensitive receptors to excessive noise levels from stationary noise sources is sufficiently mitigated to be less-than-significant.

Railroad Noise Sources. As was noted in the setting discussion above, future build-out of the approved SMART rail line would include construction of the Larkspur SMART Station and operation of the associated rail line service. This rail line is expected to be located along the east side of U.S. 101 within the Plan area, ending at the proposed Larkspur SMART Ferry Terminal. Potential noise impacts from this rail line were analyzed in the *Sonoma-Marin Area Rail Transit (SMART) Final Environmental Impact Report*.[8] According to this report, cumulative daily noise exposure from passenger and freight rail operations at distances greater than 50 feet from the tracks would be less than 60 dBA L_{dn}. At a distance of 100 feet from the centerline of the railroad tracks, these noise levels would attenuate to below 55 dBA L_{dn}, which would meet the City's normally acceptable land use compatibility standard for residential development (see Table IV.E-5). Therefore, implementation of the Station Area Plan would not result in the exposure of sensitive receptors to excessive noise levels from railroad noise sources, and this impact would be considered less than significant and no additional mitigation measures are required.

Traffic Noise Sources. The FHWA highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate traffic-related noise conditions in the vicinity of the Plan area. The resultant noise levels were weighed and summed over a 24-hour period in order to determine the L_{dn} values. Table IV.E-9 summarizes traffic noise levels along modeled roadway segments under Existing and Existing Plus Project traffic conditions. Table IV.E-10 summarizes traffic noise levels under Cumulative and Cumulative Plus Project traffic conditions. The traffic noise model printouts for all calculations are included in Appendix D of this EIR.

[8] Parsons Brinckerhoff, 2006, op. cit.

Table IV.E-9: Existing and Existing Plus Project Traffic Noise Levels

Roadway Segment	Existing Plus Project ADT	L_{dn} (dBA) 50 Feet From Centerline of Outermost Lane		Increase from Existing Conditions	Significant increase over conditions without the project?
		Existing	Existing Plus Project		
Sir Francis Drake Boulevard – La Cuesta Drive to Eliseo Drive	42,000	69.8	69.9	0.1	No
Sir Francis Drake Boulevard – Eliseo Drive to U.S. 101 SB Ramps	49,200	70.5	70.6	0.1	No
Sir Francis Drake Boulevard – U.S. 101 NB Ramps to Larkspur Landing Circle	41,100	69.0	69.4	0.4	No
Sir Francis Drake Boulevard – Larkspur Landing Circle to Larkspur Landing Circle	25,900	67.4	67.8	0.4	No
Sir Francis Drake Boulevard – Larkspur Landing Circle to Drakes Cove Road	26,500	68.2	68.3	0.1	No
Eliseo Drive – Sir Francis Drake Boulevard to Bretano Way	4,200	55.9	56.0	0.1	No
Larkspur Landing Circle – Sir Francis Drake Boulevard to Old Quarry Road S.	9,900	58.7	59.2	0.5	No
Larkspur Landing Circle – Drakes Way to Sir Francis Drake Boulevard	9,500	57.8	59.0	1.2	No

Source: LSA Associates, Inc., 2013.

Table IV.E-10: Cumulative and Cumulative Plus Project Traffic Noise Levels

Roadway Segment	Cumulative Plus Project ADT	L_{dn} (dBA) 50 Feet From Centerline of Outermost Lane		Increase from Cumulative No Project Conditions	Significant increase over conditions without the project?
		Cumulative No Project	Cumulative Plus Project		
Sir Francis Drake Boulevard – La Cuesta Drive to Eliseo Drive	50,200	70.6	70.7	0.1	No
Sir Francis Drake Boulevard – Eliseo Drive to U.S. 101 SB Ramps	58,500	71.2	71.3	0.1	No
Sir Francis Drake Boulevard – U.S. 101 NB Ramps to Larkspur Landing Circle	52,800	70.2	70.5	0.3	No
Sir Francis Drake Boulevard – Larkspur Landing Circle to Larkspur Landing Circle	35,600	68.9	69.2	0.3	No
Sir Francis Drake Boulevard – Larkspur Landing Circle to Drakes Cove Road	37,500	69.7	69.8	0.1	No
Eliseo Drive – Sir Francis Drake Boulevard to Bretano Way	4,600	56.4	56.4	0.0	No
Larkspur Landing Circle – Sir Francis Drake Boulevard to Old Quarry Road S.	11,100	59.3	59.7	0.4	No
Larkspur Landing Circle - Drakes Way to Sir Francis Drake Boulevard	11,300	58.7	59.8	1.1	No

Source: LSA Associates, Inc., 2013.

A significant impact would occur if project-related traffic noise levels, as measured at proposed on-site noise sensitive land uses, would exceed the City's normally acceptable standard for that land use type. The City's Land Use Compatibility Standards (shown in Table IV.E-5) require project-by-project environmental review to ensure that noise impacts on new proposed development are considered and mitigated for specific projects. Environments with ambient noise levels of up to 55 dBA L_{dn} are considered normally acceptable for new residential development and no mitigation would be required. However, new construction or development of residential land uses in environments with ambient noise levels above 55 dBA and up to 70 dBA L_{dn} would require detailed analysis of noise reduction requirements and noise insulation features to be included in the design to ensure that interior noise levels are maintained.

According to the modeling results, traffic noise levels along Sir Francis Drake Boulevard would range from 68.3 dBA to 70.6 dBA L_{dn} under Existing Plus Project conditions as measured at 50 feet from the roadway centerline. Under Cumulative Plus Project conditions, traffic noise levels along Sir Francis Drake Boulevard would range from 69.2 dBA to 71.3 dBA L_{dn} as measured at 50 feet from the roadway centerline.

Based on the latest traffic counts available from Caltrans,[9] existing traffic noise levels along U.S. 101 range up to 79.1 dBA L_{dn} as measured at 50 feet from the centerline of the outermost travel lane. These noise levels attenuate to below 70 dBA L_{dn} at a distance of approximately 350 feet from the roadway centerline, and to below 55 dBA L_{dn} at a distance of approximately 3,500 feet from the roadway centerline.

It should be noted that these projected traffic noise levels along these modeled roadway segments do not take into account any existing sound walls or terrain features that could reduce traffic noise levels at adjacent land uses, but rather assume a worst-case direct line-of-sight over hard surface to the modeled traffic noise sources. This assumption and level of analysis is appropriate for a program-level noise analysis.

Thus, any new residential development within the Plan area along roadway segments that would experience traffic noise levels in excess of 55 dBA L_{dn} would be required to incorporate noise reduction features into the design of the project to reduce traffic noise impacts to a less-than-significant level. In addition, any new office, business, commercial or professional development that would experience traffic noise levels in excess of 70 dBA L_{dn} would require a similar noise impact analysis and appropriate mitigation.

<u>Impact NOISE-2</u>: Local traffic would generate long-term exterior noise exceeding normally acceptable levels (under the City's land use compatibility standards) within and in the vicinity of the Plan area and could expose sensitive land uses to unacceptable noise levels. (S)

[9] Caltrans, 2011. *Traffic and Vehicle Data Systems Unit*. Website: www.dot.ca.gov/hq/traffops/saferesr/trafdata/2011all/index.html.

Mitigation Measure NOISE-2: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:

- All proposed new development of noise sensitive land uses within the Plan area, that would be exposed to average daily ambient noise levels in excess of the City's established normally acceptable standards for that land use, is required to submit an acoustical analysis prior to issuance of building permits. This analysis must be prepared by a qualified acoustical analyst and must specify noise insulation features to be incorporated into the project design that would reduce traffic noise impacts to meet the City's interior noise standard for such proposed land uses. Noise insulation features may include shielding to protect noise-sensitive outdoor activity areas or may include building sound insulation treatments such as sound-rated windows to protect interior spaces. (LTS)

Implementation of Mitigation Measure NOISE-2 would ensure that the exposure of sensitive receptors to excessive noise levels from traffic noise sources is sufficiently mitigated to be less-than-significant.

(2) Generate Excessive Groundborne Vibration. Common sources of groundborne vibration and noise include trains and construction activities such as blasting, pile driving and operating heavy earthmoving equipment. No permanent noise sources that would expose persons to excessive groundborne vibration or noise levels are proposed as part of the Station Area Plan. There are no existing permanent sources of groundborne vibration or noise in the Station Area Plan area vicinity that could impact proposed sensitive land uses. However, construction activities associated with projects that could occur under the Station Area Plan could result in exposure of sensitive land uses to excessive groundborne vibration and noise levels. Problems, such as disturbance, due to groundborne vibration and noise from these sources are usually contained to areas within about 100 feet of the vibration source.[10] Typical groundborne vibration levels measured at a distance of 50 feet from heavy construction equipment in full operation, such as vibratory rollers, range up to approximately 94 VdB. These vibration levels would not be expected to cause damage to residential buildings of normal northern California construction. However, such vibration levels can cause annoyance for occupants of nearby buildings. In order to reduce exposing persons to excessive groundborne vibration and noise levels, the following mitigation measure, enforcing best management practices, shall be implemented.

Impact NOISE-3: Construction activities associated with implementation of the Station Area Plan could create significant short-term vibration impacts on nearby sensitive land uses. (S)

The following mitigation measure would reduce construction-related vibration impacts resulting from development associated with implementation of the Station Area Plan to a less-than-significant level.

Mitigation Measure NOISE-3: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:

[10] U.S. Department of Transportation, 1995. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*. April.

- In the event that pile driving would be required for any proposed project within the Plan area, all residents within 600 feet of the project site shall be notified of the schedule for its use a minimum of one week prior to its commencement. The contractor shall implement "quiet" pile driving technology (such as pre-drilling of piles, the use of more than one pile driver to shorten the total pile driving duration, or the use of portable acoustical barriers) where feasible, in consideration of geotechnical and structural requirements and conditions.
- The project contractor shall phase demolition, earth-moving, and ground-impacting operations so as not to occur in the same time period. Unlike noise, the total vibration levels produced could be significantly less when each vibration source operates separately.
- The project contractor shall select demolition methods not involving impact, where possible (for example, milling generates lower vibration levels than excavation using clam shell or chisel drops).
- The project contractor shall avoid using vibratory rollers and packers near sensitive areas whenever possible. (LTS)

Implementation of Mitigation Measure NOISE-3 would ensure that the exposure of sensitive receptors to excessive groundborne vibration levels from demolition and construction activities is sufficiently mitigated to be less-than-significant.

(3) Substantial Permanent Increase in Ambient Noise Levels. Implementation of the Station Area Plan would result in increased ambient noise levels within the Plan area. Increases in ambient noise levels would result from projected increases in average daily vehicle trips, as well as from new stationary noise sources such as new mechanical equipment, new parking lot activity, and new loading and unloading activity within the Plan area. While stationary noise sources could result in temporary noise increases in their immediate vicinity, implementation of Mitigation Measure NOISE-1 would reduce this impact to less-than-significant.

Under Existing Plus Project conditions, modeled roadway segments throughout the Plan area would experience increases in traffic noise levels ranging from 0.1 dBA to 1.2 dBA compared to Existing Conditions without the project. These modeled roadway segments would experience traffic noise level increases ranging from 0.0 dBA to 1.1 dBA under Cumulative Plus Project conditions compared to levels that would exist under cumulative conditions without the project. Increases in noise levels of less than 3 dBA are essentially undetectable to the human ear in outdoor environments.

Due to the logarithmic nature of noise addition, a 20 percent increase in traffic volumes will result in only a 1 decibel increase in the average noise level. Total projected trips with implementation of the Station Area Plan would not result in even a 20 percent increase in the total average daily traffic volume on U.S. 101. Therefore, the project would not create a substantial permanent increase in traffic noise and this impact would be less-than-significant.

(4) Substantial Temporary or Periodic Increase in Ambient Noise Levels. Construction activities associated with implementation of the Station Area Plan could result in substantial temporary or periodic increases in ambient noise levels near construction sites throughout the Plan area.

Two types of short-term noise impacts would occur during demolition, site preparation, and construction of proposed projects. The first type would result from the increase in traffic flow on local streets, associated with the transport of workers, equipment, and materials to and from project sites. The transport of workers and construction equipment and materials to project sites within the Plan area would incrementally increase noise levels on access roads leading to the sites.

The second type would result from equipment use and activities associated with demolition, site preparation, and construction of proposed projects. Construction is performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These phases would change the character of the noise generated on project sites and, therefore, the noise levels surrounding sites as construction progresses.

Table IV.E-11 lists typical maximum noise levels for various pieces of construction equipment, as measured at a distance of 50 feet from the operating equipment. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. The site preparation phase, which includes excavation and grading, tends to generate the highest noise levels, because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery such as backhoes, bulldozers, draglines, and front loaders. Earthmoving and compacting equipment includes compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full-power operation followed by 3 or 4 minutes at lower power settings. Typical maximum noise levels during the site preparation phase of construction can range up to 91 dBA L_{max} at 50 feet from multiple pieces of operating equipment.

Table IV.E-11: Typical Construction Equipment Maximum Noise Levels, L_{max}

Type of Equipment	Range of Maximum Sound Levels (dBA at 50 feet)	Suggested Maximum Sound Levels for Analysis (dBA at 50 feet)
Pile Drivers	81 to 96	93
Rock Drills	83 to 99	96
Jackhammers	75 to 85	82
Pneumatic Tools	78 to 88	85
Pumps	74 to 84	80
Scrapers	83 to 91	87
Haul Trucks	83 to 94	88
Cranes	79 to 86	82
Portable Generators	71 to 87	80
Rollers	75 to 82	80
Dozers	77 to 90	85
Tractors	77 to 82	80
Front-End Loaders	77 to 90	86
Hydraulic Backhoe	81 to 90	86
Hydraulic Excavators	81 to 90	86
Graders	79 to 89	86
Air Compressors	76 to 89	86
Trucks	81 to 87	86

Source: Bolt, Beranek & Newman, 1987. *Noise Control for Buildings and Manufacturing Plants*.

Construction of specific projects envisioned with implementation of the Station Area Plan would require the use of earthmovers such as bulldozers and scrapers, loaders and graders, water trucks, and pickup trucks. Pile driving could also be used as a construction technique for some projects based on geologic constraints. As shown in Table IV.E-11, the typical maximum noise level generated by backhoes on the proposed project site is assumed to be 86 dBA L_{max} at 50 feet from the operating equipment. The maximum noise level generated by bulldozers is approximately 85 dBA L_{max} at 50 feet. Noise level generated by pile driving can range up to 93 dBA L_{max} at 50 feet from the operating equipment. Each doubling of the sound sources with equal strength would increase the noise level by 3 dBA. Assuming each piece of construction equipment operates at some distance apart from the

other equipment, the worst-case combined noise level during the loudest phase of construction would be 94 dBA L_{max} at a distance of 50 feet.

Noise from construction, demolition, or paving activities are exempt from the City's exterior noise standards of the Noise Ordinance of the Municipal Code, provided such activities occur between the hours of 7:00 a.m. and 6:00 p.m. on weekdays (excluding holidays), and between 9:00 a.m. and 5:00 p.m. on Saturdays, Sundays, and legal holidays. This exemption is granted provided that all powered construction equipment is equipped with intake and exhaust mufflers recommended by the manufacturers. Pavement breakers and jackhammers shall also be equipped with acoustical attenuating shields or shrouds recommended by the manufacturers thereof.

Impact NOISE-4: Construction activities associated with implementation of the Station Area Plan could create significant short-term noise impacts on nearby sensitive land uses. (S)

The following mitigation measure would reduce construction-related noise impacts resulting from development associated with implementation of the Station Area Plan to a less-than-significant level.

Mitigation Measure NOISE-4: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:

- Construction contractors shall ensure that all powered construction equipment are equipped with intake and exhaust mufflers recommended by the manufacturers thereof. Pavement breakers and jackhammers shall also be equipped with acoustical attenuating shields or shrouds recommended by the manufacturers thereof.
- Where feasible, construction contractors shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site.
- Construction contractors shall, to the maximum extent practical, locate on-site equipment staging areas so as to maximize the distance between construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction.
- Construction contractors shall ensure that all noise producing construction activities, including warming-up or servicing equipment and any preparation for construction, shall be limited to the hours between 7:00 a.m. and 6:00 p.m. on weekdays (excluding holidays), and between 9:00 a.m. and 5:00 p.m. on Saturdays, Sundays, and legal holidays. (LTS)

Implementation of the multi-part Mitigation Measure NOISE-4 would sufficiently mitigate construction-related noise impacts to a less-than-significant level.

(5) Excessive Aircraft Noise. The San Francisco International Airport is located approximately 22 miles south of the Plan area and the Oakland International Airport is located approximately 21 miles southeast of the Plan area. The project site is located outside of the 65-CNEL noise contours for the both the San Francisco International Airport and the Oakland International Airport. The San Rafael Private Heliport is located approximately 1.2 miles east of the Plan area. While aircraft overflight noise is occasionally audible within the Plan area, due to the distance of the Plan area from surrounding airports, and due to the orientation of the runway approaches, the Plan area lies outside the 60 dBA CNEL contours of these airports. Therefore, development associated with implementation of the Station Area Plan would not expose people working or residing in the Plan area vicinity to excessive aircraft-related noise levels. This impact would be less than significant.

c. Cumulative Impacts of the Station Area Plan. A project would make a significant contribution to a cumulative noise impact if it results in a significant contribution to an environment with existing noise levels in excess of normally acceptable standards for the designated land uses. As described previously, traffic noise levels under Cumulative Plus Project conditions would result in increases along modeled roadway segments ranging up to 1.1 dBA compared to traffic noise levels under Cumulative conditions without the project. As noted in the traffic noise impact discussion in subsection (1) above, existing traffic noise levels along U.S. 101 are in excess of 55 dBA L_{dn} for the entire Plan area (up to 3,500 feet from the roadway centerline, assuming a direct line of sight). Therefore, noise level increases of up to 1.1 dBA along local roadway segments would not be perceptible compared to existing noise levels from traffic on U.S. 101. The project's contribution to the cumulative noise environment would be considered less-than-significant.

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F. BIOLOGICAL RESOURCES

This section provides a general description of the biological resources in and around the City of Larkspur. This section also evaluates potential impacts to biological resources that could result from implementing the proposed Larkspur SMART Station Area Plan and recommends mitigation measures to avoid or minimize these potential impacts, if necessary.

1. Setting

This section contains: (1) a description of the methods used by LSA to obtain the information contained in this section; (2) descriptions of the existing habitat types, wildlife habitat values, special-status species, and sensitive habitats within the Plan area; (3) an overview of the existing federal and State regulations pertaining to biological resources; and (4) a summary of goals, policies, and action programs in the 1990 General Plan that are applicable to biological resources.

a. Methods. Prior to conducting fieldwork, LSA reviewed previous background reports prepared for the Plan area. Information from these reports was used to gain familiarity with the habitat types present within the Plan area and identify areas of interest for a future site visit. Sources of information on vegetation and habitat types included:

- *Transportation Authority of Marin, Central Marin Ferry Connection Multi-use Pathway Phase 1 Project, Marin County, California, Initial Study/Mitigated Negative Declaration;*[1]
- *Transportation Authority of Marin, Central Marin Ferry Connection Multi-use Pathway Phase 1 Project, Marin County, California, Natural Resources Study Report;*[2]
- *The Initial Study for the Monahan Pacific Project;*[3] *and*
- *The 2000 Larkspur Landing Circle Expanded Initial Study*[4]

Concurrent with this review, LSA developed an aerial photograph base map of the Plan area using aerial imagery and geographic information system (GIS) layers depicting the Plan area boundary provided by the BMS Design Group. Given the relatively large size of the Plan area and its urban setting, LSA determined that a broad level of habitat analysis was appropriate for this report. As such, the habitat types identified in this chapter have been customized for the Plan area and rely on general habitat characteristics and land use patterns rather than plant species composition. Vegetation mapping was performed manually by LSA in ArcGIS 10, based on aerial photography provided by Esri and the United States Department of Agriculture.

[1] Transportation Authority of Marin, 2010. Central Marin Ferry Connection Multi-use Pathway Phase 1 Project, Marin County, California, *Initial Study/Mitigated Negative Declaration*. September.

[2] Transportation Authority of Marin, 2010. Central Marin Ferry Connection Multi-use Pathway Phase 1 Project, Marin County, California, *Natural Resources Study Report*. April.

[3] EDAW, Inc., 1999. *Initial Study for the Monahan Pacific Project*, City of Larkspur, California. June 4.

[4] Turnstone Consulting, 2004. *2000 Larkspur Landing Circle Expanded Initial Study*. October 20.

LSA collected information on special-status species known to occur or potentially occurring in the Plan area by searching the California Natural Diversity Database[5] (CNDDB) and California Native Plant Species (CNPS) Inventory of Rare and Endangered Plants[6] for records within the San Rafael U.S. Geological Survey (USGS) 7.5-minute quadrangle. Additional sources of information included *The Marin County Breeding Bird Atlas: A Distributional and Natural History of Coastal California Birds*,[7] and LSA biologists' personal knowledge of species occurrences in the Larkspur vicinity. For the purposes of this report, special-status species are defined as follows:

- Species that are listed, formally proposed, or designated as candidates for listing as threatened or endangered under the federal Endangered Species Act (ESA);
- Species that are listed, or designated as candidates for listing, as rare, threatened, or endangered under the California Endangered Species Act (CESA);
- Plant species on Lists 1A, 1B and 2 in the CNPS Inventory of Rare and Endangered Plants;
- Animal species designated as Species of Special Concern or Fully Protected by the California Department of Fish and Wildlife (CDFW);
- Species that meet the definition of rare, threatened, or endangered under Section 15380 of the CEQA guidelines; or
- Species considered to be a taxon of special concern by the relevant local agencies.

LSA biologist Dan Sidle conducted a reconnaissance-level survey of the Plan area on June 7, 2012. The purpose of this visit was to assess the habitat conditions and the potential for those habitats to support special-status plant and animal species. Although it was not feasible to cover the entire Plan area on foot, representative areas for each habitat type were identified prior to fieldwork and visited during the survey. Basic information on dominant plant species and animal species were collected. Due to the broad level of habitat mapping for the Plan area, most habitat type boundaries were easily identified on the aerial photograph base map prior to fieldwork. No focused rare plant or special-status animal surveys were conducted for the Plan area, nor was a formal jurisdictional delineation of waters of the United States conducted.

Plant taxonomy and nomenclature in this chapter follows Baldwin et al.[8] Common and scientific names for special-status species or subspecies conform to the CNDDB.[9] Common and scientific

[5] California Department of Fish and Wildlife, 2012. *California Natural Diversity Database* (commercial version), Biogeographic Data Branch. April 29.

[6] California Native Plant Society, 2012. *Inventory of rare and endangered plants in California* (online edition, v7-09a). Website: www.cnps.org/inventory (accessed May 21).

[7] Shuford, W.D., 1993. *The Marin County Breeding Bird Atlas: A Distributional and Natural History of Coastal California Birds*. California Avifauna Series 1.

[8] Baldwin, B.G., et al., eds., 2012. *The Jepson Manual: Vascular Plants of California, Second Edition*. University of California Press, Berkeley.

[9] California Department of Fish and Wildlife, 2012, op. cit.

names for fish, reptiles, amphibians, birds, and mammals conform to Nelson et al,[10] Crother,[11] the American Ornithologists' Union (AOU) *Check-list of North American Birds*,[12] and Baker and others,[13] respectively.

b. Existing Biological Resources. The following section provides a description of the geography of the Plan area, habitat types, wildlife habitat values, special-status species, and sensitive habitat.

The Plan area comprises approximately 404.94 acres of Marin County and is bounded to the north and west by residential, commercial, and industrial development; to the south by urban development, Corte Madera Creek, and Corte Madera Marsh State Ecological Reserve; and to the east by open space, Shoreline Band Park, and San Quentin State Prison. Corte Madera Creek flows east and becomes the Corte Madera Channel before flowing into the San Francisco Bay.

(1) Habitat Types. As shown in Table IV.F-1, LSA identified eight habitat types within the approximately 404.94-acre Plan area: developed; ruderal/non-native annual grassland; non-native woody vegetation; coast live oak woodland; riparian woodland; tidal marsh/mudflat; freshwater/ brackish marsh; and creek/open water. Figure IV.F-1 identifies the locations of these habitat types.

Table IV.F-1: Acreages of Habitat Types within the Plan Area

Habitat Type	Approximate Acres
Developed	320.73
Ruderal/Non-native annual grassland	20.22
Non-native woody vegetation	11.05
Coast live oak woodland	6.04
Riparian woodland	0.46
Tidal marsh/mudflat	7.34
Freshwater/brackish marsh	2.72
Creek/open water	36.38
TOTAL	**404.94**

Source: LSA Associates, Inc., 2013.

Three sub-areas are identified within the Plan area: Larkspur Landing – Sub-area 1A; Greenbrae Area – Sub-area 1B; and Redwood Highway Area – Sub-area 2. These sub-areas are shown on Figure IV.F-1.

Table IV.F-1 summarizes the approximate acreage of each habitat type within the Plan area, except for creeks. These acreages were calculated from polygons that were manually digitized using GIS software (i.e., ArcGIS 10) and based on habitat boundaries that were hand-drawn on aerial photo-

[10] Nelson, J.S., et al., eds., 2004. *A list of common and scientific names of fishes from the United States, Canada, and Mexico*. Sixth edition. American Fisheries Society Special Publication 20.

[11] Crother, B.I., editor, 2012. *Scientific and standard English names of amphibians and reptiles of North American north of Mexico*. Society for the Study of Amphibians and Reptiles (SSAR) Herpetological Circular 39.

[12] American Ornithologists' Union, 1998. *Check-list of North American birds*. Seventh edition. American Ornithologists' Union, Washington, D.C.

[13] Baker, R. J., et al., 2003. *Revised Checklist of North American Mammals North of Mexico, 2003*.

graphs by LSA Associates, Inc. Besides the open water habitats of the Corte Madera Creek and Corte Madera Channel, the majority of the undeveloped areas within the Plan area are located along the northern shoreline of Corte Madera Creek and in the northern and eastern portions of Sub-area 1A. These areas also support the majority of grassland, tidal marsh/mudflat, and woodland habitat, as shown in Figure IV.F-1.

Habitat types present in the Plan area are described below, and these descriptions are based on LSA's reconnaissance survey of the Plan area, unless otherwise noted.

Developed. Developed habitats of the Plan area include residential neighborhoods; commercial and industrial buildings; roads; parking lots, neighborhood parks, and associated landscaping consisting of lawns and ornamental trees and shrubs.

Ornamental trees in the developed portions of the Plan area are primarily non-native, but include some native species. Common non-native trees and shrubs observed in developed habitats include the following: blue gum (*Eucalyptus globulus*), sweet gum (*Liquidambar styraciflua*), weeping willow (*Salix babylonica*), acacia (*Acacia* spp.), fruit trees (*Prunus* spp.), oleander (*Nerium oleander*), pine (*Pinus* spp.), poplar (*Populus* spp.), olive (*Oleo europea*), tobira (*Pittosporum tobira*), American elm (*Ulmus americana*), and Mexican fan palm (*Washingtonia robusta*). Native but non-local trees in developed areas include Monterey pine (*Pinus radiata*), Douglas fir (*Pseudotsuga menziesii*), and coast redwood (*Sequoia sempervirens*). Coast live oak (*Quercus agrifolia*) is a local native species that was observed in developed areas of the Plan area.

Ornamental shrubs observed in the urban areas include bottlebrush (*Callistemon* sp.), pampas grass (*Cortaderia* sp.), Pride of Madeira (*Echium candicans*), agave (*Agave* sp.), broom (*Genista monspessulana*; *G. juncea*; *Cytisus scoparius*), and the native toyon (*Heteromeles arbutifolia*).

English ivy (*Hedera helix*), and Germany ivy (*Delairea odorata*) are also abundant in the developed portion of the Plan area.

Ruderal/Non-Native Annual Grassland Habitat. Most of the ruderal/non-native annual grassland habitat within the Plan area occurs in Sub-area 1B along Highway 101 and near the shoreline of Corte Madera Creek and along the northern portions of Sub-area 1A, as shown in Figure IV.F-1. The ruderal/non-native grassland habitat along the northern portions of Sub-area 1A is interspersed with some rocky outcrops associated with the quarry cuts that characterize the steep hillside above the multi-family housing. This habitat type is dominated by non-native annual grasses and non-native forbs.

Non-native plant species observed in ruderal/non-native grassland habitat include wild oats (*Avena fatua*), ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), Italian thistle (*Carduus pycnocephalus*), sweet fennel (*Foeniculum vulgare*), summer mustard (*Hirschfeldia incana*), hare barley (*Hordeum murinum* ssp. *leporinum*), Italian ryegrass (*Festuca perennis*), common mallow (*Malva neglecta*), prickly ox-tongue (*Helminthotheca echioides*), cut-leaf plantain (*Plantago coronopus*), rose clover (*Trifolium* sp.), perennial pepperweed (*Lepidium latifolium*), wild radish (*Raphanus sativus*), brome fescue (*Vulpia* sp.), fountain grass (*Pennisetum setaceum*), lupine (*Lupinus* sp.) and pampas grass.

LSA

FIGURE IV.F-1

LEGEND

- Plan Area Boundary
- Coast Live Oak Woodland
- Riparian Woodland
- Non-native Woody Vegetation
- Ruderal/Non-native Annual Grassland
- Freshwater/Brackish Marsh
- Tidal Marsh/Mudflat
- Creek/Open Water
- Developed

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City of Larkspur SMART Station Area Plan EIR

Habitat Types

SOURCE: Aerial Imagery from Microsoft Bing ((c) 2012).

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Native species observed in this habitat include California poppy (*Eschscholzia californica*), coyote brush (*Baccharis pilularis*), and toyon.

Woodland. Woodland habitats within the Plan area consist of three broadly defined vegetation types: non-native woody vegetation, coast live oak woodland, and riparian woodland. Woodland habitats primarily occur along the eastern, northern, and southern portions of Sub-area 1A, as shown in Figure IV.F-1.

Non-Native Woody Vegetation. This habitat type occurs along the Highway 101 corridor in Sub-areas 1A and 1B and in the northern and eastern portion of Sub-area 1A. Dominant species observed in this habitat include eucalyptus (*Eucalyptus* sp.), broom, pine, acacia, coast live oak, and oleander. Associate species observed include cotoneaster (*Cotoneaster lacteus*), sweet fennel, pampas grass, coyote brush, toyon, and non-native forbs and annual grasses. Although a few native species were observed in this habitat, the dominant vegetation is non-native.

Coast Live Oak Woodland. Coast live oak woodland occurs in the eastern portion of Sub Area 1A and in the area surrounding the Wood Island business complex, situated just west of the Larkspur Ferry Terminal in Sub-area 1A. Coast live oaks provide the dominate canopy layer in these areas. Dominant understory species observed within this habitat type consist of broom and annual non-native grasses. Portions of the understory of the coast live oak woodland at Wood Island have been landscaped with mulch and planted with native and ornamental shrubs, such as sticky monkey-flower (*Mimulus aurantiacus*) and toyon, while understory vegetation in other parts of this woodland consist of mostly broom.

Riparian Woodland. Riparian woodland is dominated by riparian tree species that are adapted to wetland stream banks, floodplains and creek terraces that are seasonally flooded or permanently saturated by freshwater. Riparian woodland was observed within Sub-area 1A at Remillard Park and at Tubb Lake in the eastern portion of Sub-area 1A. These two patches of riparian woodland habitat are dominated by native willows (*Salix* sp.).

Tidal Marsh/Mudflat. Tidal marsh is a highly productive community consisting of salt-tolerant, hydrophytic plants that form moderate to dense cover. Plants are usually segregated vertically depending on their tolerance of inundation and saline soils. This habitat type is typically associated with and occurs adjacent to intertidal mudflats that are devoid of vegetation; during an ebb tide, the bottom is bare mud, cobble, or rock. Within the Plan area, this habitat type occurs along the tidal sloughs and marshlands along the northern shoreline of the Corte Madera Creek and Corte Madera Channel.

All tidal marsh habitats within the Plan area are similar in vertical structure, starting at the low elevation mudflat to the upland vegetation on adjacent levees. The lowest elevation vegetation strata contain pickleweed (*Salicornia pacifica*) co-dominated in places by saltgrass (*Distichlis spicata*) interspersed with areas of open water (or mudflat at low tide). Pickleweed and saltgrass are still dominant components on the elevated benches of the tidal marsh where patches of alkali heath (*Frankenia salina*), gumplant (*Grindelia stricta* ssp. *angustifolia*), and cordgrass (*Spartina* sp.) were observed. Large patches of cordgrass were observed in the tidal wetland east of Drake's Landing. The upland vegetation on the surrounding banks and levees is dominated by non-native grasses and ruderal herbs including mustard (*Brassica* sp.), ice plant (*Carpobrotus* sp.), English plantain (*Plantago lanceolata*), sweet fennel, and perennial pepperweed.

Freshwater/Brackish Marsh. This habitat type supports emergent vegetation that is adapted to permanently or seasonally flooded soils (wetlands), and occurs along the channels and wetlands north of Corte Madera Creek. This marsh habitat occurs east of Drake's Landing in the vicinity of the Highway 101 off- and on-ramps and along the western border of the Larkspur Ferry Terminal. The dominant vegetation in this habitat consists of dense monotypic stands of cattails (*Typha sp.*), or mixed stands of cattails and bulrush (*Scirpus* sp. and/or *Schoenoplectus sp.*). Freshwater habitats in the Plan area include Tubb Lake at the eastern portion of Sub-area 1A and the constructed unvegetated pond situated within a residential complex near the center of Sub-area 1-A. Tubb Lake supports Himalayan blackberry (*Rubus armeniacus*), tall flatsedge (*Cyperus eragrostis*), rush (*Juncus* sp.), teasel (*Dipsacus* sp.), rabbit's-foot grass (*Polypogon monspeliensis*), water milfoil (*Myriophyllum* sp.), and cattail.

Creek/Open Water. Creek and open water habitat within the Plan area occurs along the Corte Madera Creek and Corte Madera Channel. These open water habitats are tidally influenced and support brackish/saline habitat conditions. The northern shoreline of Corte Madera Creek and Corte Madera Channel contains rock rip-rap and/or tidal marsh habitat.

(2) Wildlife Habitat Values. The following sections provide information on wildlife species expected to occur in each habitat type. Not every species mentioned was observed during the reconnaissance-level survey, and several species not mentioned may nevertheless occur in the Plan area. As such, the following discussion should not be interpreted as an exhaustive list of every species that may potentially occur, but rather a broad overview of wildlife communities within each habitat type.

Developed Habitat. Most wildlife species that use developed habitats are generalists that have adapted to human-modified habitats, although the specific species present varies depending on the types and diversity of vegetation in an area. Industrial and commercial areas typically have less ornamental plantings and open lawns than residential neighborhoods and urban parks, and thus support fewer species. Species that use industrial and commercial areas are able to use ornamental landscaping as foraging habitat and/or escape cover, and some are able to exploit building crevices, rooftops, and/or ledges on buildings for nesting and/or roosting. Common urban bird species expected to use such features include mourning dove (*Zenaida macroura*), rock pigeon (*Columba livia*), American crow (*Corvus brachyrhynchos*), European starling (*Sturnus vulgaris*), house finch (*Carpodacus mexicanus*), and house sparrow (*Passer domesticus*). Residential neighborhoods and urban parks contain more trees, shrubs, and lawns than industrial and commercial areas, and thus support additional bird species such as Anna's hummingbird (*Calypte anna*), western scrub-jay (*Aphelocoma californica*), American robin (*Turdus migratorius*), northern mockingbird (*Mimus polyglottos*), chestnut-backed chickadee (*Poecile rufescens*), bushtit (*Psaltriparus minimus*), and California towhee (*Pipilo crissalis*). Many of these species also occur in undisturbed, more natural habitats (e.g., oak woodland, coastal scrub) throughout Marin County, but have successfully adapted to urban landscapes. During the winter, the resident bird community is supplemented by species that breed farther north or at higher elevations, such as cedar waxwing (*Bombycilla cedrorum*), ruby-crowned kinglet (*Regulus calendula*), yellow-rumped warbler (*Dendroica coronata*), Townsend's warbler (*Dendroica townsendi*), and golden-crowned sparrow (*Zonotrichia atricapilla*). Large heritage-sized oaks in several City parks may attract cavity-nesting oak woodland birds such as Nuttall's woodpecker (*Picoides nuttallii*) and oak titmouse (*Baeolophus inornatus*). All of these species may occur in adjacent residential areas, as well, provided that large trees are present.

Several amphibians and reptile species can occur in developed habitats if suitable cover is present. Ornamental shrubs, leaf litter, and well-watered lawns provide cover and foraging habitat for Sierran treefrog (*Pseudacris sierra*), western toad (*Bufo boreas*), arboreal salamander (*Aneides lugubris*), California slender salamander (*Batrachoseps attenuatus*), and common garter snake (*Thamnophis sirtalis*). Such species are more likely to occur in residential areas or parks rather than industrial or commercial areas.

Mammal species expected to occur in developed habitats include Virginia opossum (*Didelphis virginiana*), fox squirrel (*Sciurus niger*), Botta's pocket gopher (*Thomomys bottae*), house mouse (*Mus musculus*), Norway rat (*Rattus norvegicus*), house rat (*Rattus rattus*), northern raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and black-tailed deer (*Odicoileus hemionus*). Coyotes (*Canis latrans*) and gray fox (*Urocyon cinereoargenteus*) may forage in the more open or forested portions of developed areas.

Ruderal/Non-Native Annual Grassland Habitat. As stated above, the majority of ruderal/ non-native annual grassland habitat within the Plan area is located along the northern portion of Sub-area 1A, the Highway 101 corridor, and the southern portion of Drake's Landing. Grasslands provide foraging habitat for raptors such as white-tailed kite (*Elanus leucurus*), northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), and barn owl (*Tyto alba*). Other bird species typically associated with grasslands include killdeer (*Charadrius vociferus*), loggerhead shrike (*Lanius ludovicianus*), American pipit (*Anthus rubescens*), savannah sparrow (*Passerculus sandwichensis*), western meadowlark (*Sturnella neglecta*), and red-winged blackbird (*Agelaius phoeniceus*). Common amphibian and reptile species expected to occur in grasslands include western fence lizard (*Sceloporus occidentalis*), gopher snake (*Pituophis catenifer*), Sierran treefrog, western toad, and common garter snake. Areas with accumulated thatch and sufficient grass cover are likely to support small mammal species such as deer mouse (*Peromyscus maniculatus*), western harvest mouse (*Reithrodontomys megalotis*), California vole (*Microtus californicus*), and Botta's pocket gopher. Other common mammal species expected to occur in grasslands include black-tailed jackrabbit (*Lepus californicus*), northern raccoon, striped skunk, black-tailed deer, and coyote.

Non-Native Woody Vegetation and Woodland Habitats. Many of the same wildlife species that occur in developed habitats also use non-native woody vegetation and native woodland habitats since such areas within the Plan area largely consist of narrow corridors (e.g., along Highway 101 or Via La Cumbre) or patches (e.g., in the northern and eastern portions of Sub-area 1A) within an otherwise urbanized landscape. Nevertheless, the somewhat higher structural diversity of the coast live oak and riparian woodlands provides habitat for understory species such as spotted towhee (*Pipilo maculatus*), fox sparrow (*Passerella iliaca*), and hermit thrush (*Catharus guttatus*), the latter two of which winter but do not breed in the Bay Area. This increased structural diversity also provides migratory stopover habitat for species such as Pacific-slope flycatcher (*Empidonax difficilis*), warbling vireo (*Vireo gilvus*), yellow warbler (*Setophaga petechia*), Wilson's warbler (*Wilsonia pusilla*), black-headed grosbeak (*Pheucticus melanocephalus*), and western tanager (*Piranga ludoviciana*). Some of these species may forage in adjacent residential areas, as well. Larger trees provide nesting habitat for red-shouldered hawk (*Buteo lineatus*), Cooper's hawk (*Accipiter cooperii*), and downy woodpecker (*Picoides pubescens*).

The increased leaf litter, moisture content, and, in some areas, understory vegetation of woodland habitats provides increased foraging opportunities and cover for amphibians and reptiles. Many of the same species that occur in the developed and ruderal/non-native annual grassland habitats are also

likely to occur in woodlands, especially species that prefer leaf litter and woody ground cover such as arboreal salamander and California slender salamander.

Most of the same mammal species that occur in developed habitats are expected to use woodland habitats. The linear nature of the woodlands along Highway 101 facilitates movement and dispersal for these species through the urban environment. Larger trees may occasionally support bat species such as hoary bat (*Lasiurus cinereus*) (winter and migration only), and pallid bat (*Antrozous pallidus*).

Tidal Marsh/Mudflat. Tidal marsh and mudflat habitats support a variety of wildlife species specifically adapted to the salt-tolerant vegetation, microhabitats (e.g., channels and sloughs), and tidal regimes that characterize such areas. Along with open water, this habitat type supports the greatest diversity of wildlife within the Plan area, as well as the majority of special-status species known to occur in the region, including California clapper rail (*Rallus longirostris obsoletus*), California black rail (*Laterallus jamaicensis coturniculus*), San Francisco (salt marsh) common yellowthroat (*Geothlypis trichas sinuosa*), Samuels (San Pablo) song sparrow (*Melospiza melodia samuelis*), Bryant's savannah sparrow (*Passerculus sandwichensis alaudinus*), and possibly salt marsh harvest mouse (*Reithrodontomys raviventris*). Tidal marshes also provide foraging habitat for special-status raptors such as white-tailed kite. Tidal mudflats support a diverse benthic macroinvertebrate community which in turn attracts large numbers of migrating and wintering shorebirds such as willet (*Tringa semipalmata*), long-billed curlew (*Numenius americanus*), marbled godwit (*Limosa fedoa*), dowitchers (*Limnodromus* spp.), and various sandpipers (*Calidris* spp.). These species forage on mudflats as they are exposed by receding tides, often concentrating at the water's edge where worms, crustaceans, and bivalves are closer to the mud's surface. Vegetated portions of tidal marshes are not heavily used by shorebirds, although willets tend to forage next to pools created on the marsh plain during extremely high tides. Wading birds such as snowy egret (*Egretta thula*), great egret (*Ardea alba*), and great blue heron (*Ardea herodias*) forage along the margins of tidal channels and marsh edges. Dabbling (i.e., surface-feeding) ducks, such as mallard (*Anas platyrhynchos*), forage over inundated mudflats and tidal channels.

When inundated by high tides, tidal channels and mudflats provide important foraging habitat for a variety of estuarine species, including bat ray (*Myliobatis californica*), leopard shark (*Triakis semifasciata*), and various fish species.

Amphibian or reptile use of tidal marshes and mudflats is limited due to high salinity and risk of drowning. Western fence lizards and southern alligator lizards have been observed on levees and berms adjacent to marsh habitats, but are not expected to use portions of the marsh subject to tidal influence.

Other mammal species known to use tidal marshes, in addition to the special-status species mentioned above, include black-tailed jackrabbit, deer mouse, California vole, coyote, northern raccoon, and striped skunk.

Freshwater/Brackish Marsh. Freshwater and brackish marsh within the Plan area provides foraging and nesting habitat for many of the species that occur in tidal marsh/mudflat habitat, as well as a few bird species specifically adapted to the dense vegetation (i.e., cattails and tules) and wet soils that characterize such habitats. Species that inhabit this category include Virginia rail (*Rallus limicola*), sora (*Porzana carolina*), Wilson's snipe (*Gallinago delicata*), marsh wren (*Cistothorus*

palustris), Samuels song sparrow, and red-winged blackbird. Linear channels supporting marsh vegetation within the Plan area provide foraging habitat for egrets and great blue herons, as well as mammalian predators such as northern raccoon, striped skunk, and coyote. Wildlife species observed in the freshwater pond in Sub-area 1A during LSA's June 7, 2012, site visit consist of western mosquitofish (*Gambusia affinis*) and Sierran treefrog larvae. Other fish species that may occupy Tubb Lake include green sunfish (*Lepomis cyanellus*), bluegill (*Lepomis macrochirus*), and largemouth bass (*Micropterus salmoides*).

Creek/Open Water. Open water habitats within the Plan area include the tidal influenced mouth of the Corte Madera Creek and Corte Madera Channel that flow into San Francisco Bay. In addition to providing foraging and roosting habitat for wintering and migrating shorebirds and waterfowl, these areas provide habitat for American avocet (*Recurvirostra americana*), black-necked stilt (*Himantopus mexicanus*), California gull (*Larus californicus*), western gull (*Larus occidentalis*), Caspian tern (*Hydropogne caspia*), and Forster's tern (*Sterna forsteri*). Diving ducks such as canvas-back (*Aythya valisineria*), greater scaup (*Aythya marila*), lesser scaup (*Aythya affinis*), bufflehead (*Bucephala albeola*), and ruddy duck (*Oxyura jamaicensis*) winter in large numbers in the open waters connected to the San Francisco Bay. Other waterbird species expected to use open water habitats within the Plan area include American coot (*Fulica americana*), Canada goose pied-billed grebe (*Podilymbus podiceps*), horned grebe (*Podiceps auritus*), eared grebe (*Podiceps nigricollis*), western/Clark's grebe (*Aechmophorus* spp.), American white pelican (*Pelecanus erythrorhynchos*), California brown pelican (*Pelecanus occidentalis californicus*), great egret, snowy egret, and great blue heron.

Corte Madera Creek supports a variety of both native and introduced fish species. Native fish species known to occur in the Corte Madera Creek watershed include steelhead (*Oncorhynchus mykiss*), Chinook salmon (*O. tshawytscha*), California roach (*Lavinia symmetricus*), Sacramento pikeminnow (*Ptychocheilus grandis*), Sacramento sucker (*Catostomus occidentalis*), threespine stickleback (*Gasterosteus aculeatus*), longjaw mudsucker (*Gillichthys mirabilis*), staghorn sculpin (*Leptocottus armatus*), prickly sculpin (*Cottus asper*), riffle sculpin (*Cottus gulosus*), starry flounder (*Platichthys stellatus*) and possibly Pacific lamprey (*Entosphenus tridentatus*).[14] Introduced species include common carp (*Cyprinus carpio*), rainwater killifish (*Lucania parva*), western mosquitofish, and possibly black crappie (*Pomoxis nigromaculatus*).[15] Coho salmon (*Oncorhynchus kisutch*), tule perch (*Hysterocarpus traskii),* and tidewater goby (*Eucyclogobius newberryi*) are considered extinct in the Corte Madera watershed.[16]

Although none have been recorded in the vicinity of Corte Madera Creek within the Plan area, this creek also contains suitable habitat for western pond turtles (*Actinemys marmorata*).

[14] Leidy, R.A., 2007. *Ecology, Assemblage Structure, Distribution, and Status of Fishes in Streams Tributary to the San Francisco Estuary, California*. San Francisco Estuary Institute Contribution No. 530. San Francisco Estuary Institute, Oakland, California.

[15] Ibid.

[16] Ibid.

Corte Madera Creek also provides foraging habitat for cliff swallows (*Petrochelidon pyrrhonata*) and barn swallows (*Hirundo rustica*). Cliff swallow, in addition to house finch, nests were observed under the Highway 101 on- and off-ramp bridges over Corte Madera Creek during the June 7, 2012, site visit.

(3) Special-Status Species and Sensitive Habitats. This section outlines special-status species and sensitive habitats within the Plan area.

Special-Status Plants. A total of 32 special-status plant species that occur within a 5-mile radius of the Plan area were evaluated for their potential to occur in the Plan area. These special-status plant species are listed in Table IV.F-2. Marginal habitat is present for 18 of these special-status plants (see Table IV.F-2), but most of these species are unlikely to occur in the Plan area due to the high level of disturbance, dominant cover of non-native plant species, and its urban setting. The CNDDB maps two of these species, marsh microseris (*Microseris paludosa*) and white-rayed pentachaeta (*Pentachaeta bellidiflora*), as occurring the Plan area, but the exact location of these occurrences are unknown.[17] Point Reyes bird's-beak (*Cordylantus maritimus* ssp. *palustris*) is the only one of the 18 plant species that has a moderately high probability of occurring in the Plan area; this species was recorded in the tidal marsh just south of the Plan area along the southern shoreline of Corte Madera Creek, but could also occur along the northern shoreline. Fourteen of the plants in Table IV.F-2 are not likely to occur in the Plan area because they occur in habitats or soils not present in the Plan area such as chaparral, coastal scrub, and serpentine soils.

Special-Status Animals. Based on a review of the CNDDB and other sources identified below, LSA identified 32 special-status animal species known to occur or potentially occurring in the vicinity of Larkspur, which are listed in Table IV.F-3. The following special-status species may occasionally pass through or forage within the Plan area, but are not known or likely to breed in the Plan area: Chinook salmon (*Oncorhynchus tshawytscha*), green sturgeon (*Acipenser medirostris*), redhead (*Aythya americana*), bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), American peregrine falcon (*Falco peregrinus anatum*), long-eared owl (*Asio otus*), olive-sided flycatcher (*Contopus cooperi*), purple martin (*Progne subis*), grasshopper sparrow (*Ammodramus savannarum*), tricolored blackbird (*Agelaius tricolor*), pallid bat (*Antrozous pallidus*), western red bat (*Lasiurus blossevillii*), and American badger (*Taxidea taxus*). American white pelican and California brown pelican are known to regularly forage over or near Corte Madera Creek and Corte Madera Channel, but do not breed in the San Francisco Bay area. Coho salmon (*Oncorhynchus kisutch*) and tidewater goby (*Eucyclogobius newberryi*) are considered extirpated in the Plan area. The Plan area is outside of the known range of Suisun shrew (*Sorex ornatus sinuosus*). The remaining special-status species are discussed in further detail below.

[17] California Department of Fish and Wildlife, 2012, op cit.

Table IV.F-2: Special-Status Plant Species Known to Occur or Potentially Occurring in the Vicinity of Larkspur, Marin County, California

	Species	Status[a]	Habitat/Blooming Period	Potential for Occurrence
1	*Amorpha californica var. napensis* Napa false indigo	1B	Openings in broadleafed upland forest, chaparral, cismontane woodland. April-July	Not likely to occur due to the absence of suitable habitat. Closest CNDDB occurrence is approximately 1.9 miles from the Plan area.
2	*Amsinckia lunaris* Bent-flowered fiddleneck	1B	Coastal bluff scrub, cismontane woodland, valley and foothill grassland. March-June	Not likely to occur in the ruderal/non-native annual grasslands in the Plan area due to the prior disturbance and the introduction of non-native vegetation. The CNDDB does not list any occurrence within 5 miles of the Plan area.
3	*Arctostaphylos hookeri ssp. montana* Mt. Tamalpais Manzanita	1B	Chaparral, valley and foothill grassland/serpentinite, rocky. February-April	Not likely to occur in the Plan area due to the prior disturbance and the introduction of non-native vegetation. Closest CNDDB occurrence is approximately 2.4 miles from the Plan area.
4	*Arctostaphylos virgata* Marin Manzanita	1B	Broadleafed upland forest, closed-cone coniferous forest, chaparral, North Coast coniferous forest on sandstone, or granitic substrates. January-March	Not likely to occur in the Plan area due to the prior disturbance and the introduction of non-native vegetation. Closest CNDDB occurrence is approximately 3.9 miles from the Plan area.
5	*Calochortus tiburonensis* Tiburon mariposa-lily	FT/ST	Open, rocky slopes in serpentine grassland. March-June	Not likely to occur due to the absence of suitable habitat. Closest CNDDB occurrence is approximately 1.6 miles from the Plan area.
6	*Castilleja affinis ssp. neglecta* Tiburon paintbrush	FE/ST	Rocky serpentine sites in grasslands. April-June	Not likely to occur due to the absence of suitable habitat. Closest CNDDB occurrence is approximately 4.8 miles from the Plan area.
7	*Chloropyron maritimum ssp. palustre* Point Reyes bird's-beak	1B	Marshes and swamps (coastal salt), usually in coastal salt marsh with *Salicornia*, *Distichlis*, *Jaumea* and *Spartina*; 0-10 meters. June-October	Suitable habitat present within the tidal marsh habitat of the Plan area. Closest CNDDB occurrence is approximately 0.1 mile from the Plan area along the south bank of Corte Madera Creek, just south of the Greenbrae boardwalk.
8	*Chorizanthe cuspidata var. cuspidate* San Francisco Bay spineflower	1B	Sandy soil on terraces and slopes in coastal bluff, coastal dunes, coastal scrub, and coastal prairie habitat. April-July (August rarely)	Not likely to occur due to the absence of suitable habitat. Closest CNDDB occurrence is approximately 2.9 miles from the Plan area.
9	*Cirsium hydrophilum var. vaseyi* Mt. Tamalpais thistle	1B	Serpentine seeps and streams in chaparral and woodland. May-August	Not likely to occur due to the absence of suitable habitat. Closest CNDDB occurrence is approximately 3.9 miles from the Plan area.
10	*Eriogonum luteolum var. caninum* Tiburon buckwheat	1B	Serpentine soils; sandy to gravelly sites. May-September	Not likely to occur due to the absence of suitable habitat. Closest CNDDB occurrence is approximately 1.6 miles from the Plan area.
11	*Fissidens pauperculus* Minute pocket moss	1B	Moss growing on damp soil in coniferous forests along the coast; in dry streambeds and stream banks.	Not likely to occur due to the absence of suitable habitat. Closest CNDDB record is a record from an unknown location approximately 1.5 miles from the Plan area in Mill Valley.
12	*Fritillaria liliacea* Fragrant fritillary	1B	Coastal scrub, valley and foothill grassland, and coastal prairie; often on serpentine; various soils reported though usually clay. February-April	Not likely to occur in the Plan area due to the prior disturbance and the introduction of non-native vegetation. The CNDDB does not list any occurrence within 5 miles of the Plan area.
13	*Helianthella castanea* Diablo helianthella	1B	Broadleafed upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland. March-June	Not likely to occur in the Plan area due to the prior disturbance and the introduction of non-native vegetation. Closest CNDDB record is a 1938 record from an unknown location in Mill Valley.

Table IV.F-2: Special-Status Plant Species Known to Occur or Potentially Occurring in the Vicinity of Larkspur, Marin County, California

	Species	Status[a]	Habitat/Blooming Period	Potential for Occurrence
14	*Hesperolinon congestum* Marin western flax	FT/ST	Serpentine barrens and serpentine grassland and chaparral. April-July	Not likely to occur due to the absence of suitable habitat. Closest CNDDB record is a 1880s record from an unknown location, approximately 0.4 mile from the Plan area in San Rafael.
15	*Holocarpha macradenia* Santa Cruz tarplant	FT/SE	Light, sandy soil or sandy clay, often with non-natives in coastal prairie and grasslands. June-October	Not likely to occur in the Plan area due to the prior disturbance and the introduction of non-native vegetation. Closest CNDDB record is an 1883 record from an unknown location, approximately 1.4 mile from the Plan area in the vicinity of Ross.
16	*Horkelia tenuiloba* Thin-lobed horkelia	1B	Broadleafed upland forest, chaparral, valley and foothill grassland on sandy soils, mesic openings. May-July	Not likely to occur in the Plan area due to the prior disturbance and the introduction of non-native vegetation. Closest CNDDB record is approximately 3 miles from the Plan area.
17	*Kopsiopsis hookeri* Small groundcone	2	Open woods, shrubby places, generally on *Gaultheria shallon*. April-August	Not likely to occur due to the absence of suitable habitat. Closest CNDDB record is a 1970 record from an unknown location in Mill Valley.
18	*Lessingia micradenia var. micradenia* Tamalpais lessingia	1B	Usually on serpentine, in serpentine grassland or chaparral, often on roadsides. (June rarely) July-October	Not likely to occur due to the absence of suitable habitat. Closest CNDDB record is from a population last observed in 1960 approximately 2.5 miles from the Plan area at Phoenix Lake.
19	*Microseris paludosa* Marsh microseris	1B	Closed-cone coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland. April-June	Not likely to occur in the Plan area due to the prior disturbance and the introduction of non-native vegetation. Closest CNDDB record is from an unknown location in Corte Madera.
20	*Navarretia rosulata* Marin County navarretia	1B	Closed-cone coniferous forest and chaparral on serpentinite. May-July	Not likely to occur due to the absence of suitable habitat. Closest CNDDB occurrence is on Mount Tamalpais, approximately 4.6 miles from the Plan area.
21	*Pentachaeta bellidiflora* White-rayed pentachaeta	FE/SE	Cismontane woodland, valley and foothill grassland on open, dry rocky slopes and grassy areas, often on serpentinite. March-May	Not likely to occur in the Plan area due to the prior disturbance and the introduction of non-native vegetation. Closest extant CNDDB record is from a population last observed in 1912 approximately 1.7 miles from the Plan area in Kentfield.
22	*Plagiobothrys glaber* Hairless popcorn-flower	1A	Coastal salt marshes, alkaline meadows, and seeps. March-May	Not likely to occur in the Plan area due to the small size of suitable tidal marsh habitat and the rarity of the species in the region. Closest CNDDB record is a 1924 record of a possibly extinct population, approximately 2.6 miles from the Plan area.
23	*Pleuropogon hooverianus* North Coast semaphore grass	SE	Wet grassy, usually shady areas, sometimes in freshwater marsh, associated with forest environments. April-June	Not likely to occur in the Plan area due to the prior disturbance and the introduction of non-native vegetation. Closest CNDDB record is a 1940s record of a possibly extirpated population approximately 2.7 miles from the Plan area.
24	*Quercus parvula var. tamalpaisensis* Tamalpais oak	1B	Lower montane coniferous forest. March-April	Not likely to occur in the Plan area due to the prior disturbance and the introduction of non-native vegetation. Closest CNDDB record is from an unknown location approximately 2.1 miles from the Plan area in Mill Valley.

Table IV.F-2: Special-Status Plant Species Known to Occur or Potentially Occurring in the Vicinity of Larkspur, Marin County, California

	Species	Status[a]	Habitat/Blooming Period	Potential for Occurrence
25	*Sidalcea calycosa ssp. rhizomata* Point Reyes checkerbloom	1B	Freshwater marshes near the coast. April-September	Not likely to occur in the Plan area due to the prior disturbance and the introduction of non-native vegetation. Closest CNDDB record is approximately 3.7 miles from the Plan area.
26	*Stebbinsoseris decipiens* Santa Cruz microseris	1B	Broadleafed upland forest, closed-cone coniferous forest, chaparral, coastal prairie, coastal scrub, valley and foothill grassland in open areas, sometimes on serpentinite. April-May	Not likely to occur in the Plan area due to the prior disturbance and the introduction of non-native vegetation within the grasslands in the Plan area. Closest CNDDB record is approximately 4.5 miles from the Plan area.
27	*Streptanthus batrachopus* Tamalpais jewel-flower	1B	Closed-cone coniferous forest, chaparral, Talus serpentine outcrops. April-June	Not likely to occur due to the absence of suitable habitat. Closest CNDDB record is approximately 3.4 miles from the Plan area.
28	*Streptanthus glandulosus ssp. niger* Tiburon jewel-flower	FE/SE	Shallow, rocky serpentine slopes in grasslands. May-June	Not likely to occur due to the absence of suitable habitat. Closest CNDDB record is approximately 3.8 miles from the Plan area.
29	*Streptanthus glandulosus ssp. pulchellus* Mount Tamalpais bristly jewel-flower	1B	Serpentine slopes. May-July (August rarely)	Not likely to occur due to the absence of suitable habitat. Closest CNDDB record is approximately 4.4 miles from the Plan area.
30	*Symphyotrichum lentum* Suisun Marsh aster	1B	Marshes and swamps (brackish and freshwater); most often seen along sloughs with *Phragmites*, *Scirpus*, blackberry, *Typha*, etc. May-November	Not likely to occur in the Plan area due to the small size of suitable habitat, the introduction of non-native plant species, and the rarity of the species in the region. Closest CNDDB record is approximately 4.4 miles from the Plan area.
31	*Trifolium amoenum* Showy Rancheria clover	FE/1B	Coastal bluff scrub, valley and foothill grassland, sometimes on serpentinite. April-June	Not likely to occur in the Plan area due to the prior disturbance and the introduction of non-native vegetation. Closest CNDDB record is approximately 1.5 miles from the Plan area.
32	*Triquetrella californica* Coastal triquetrella	1B	Grows within 30 miles from the coast in coastal scrub, grasslands, and in open gravels on roadsides, hillsides, rocky slopes	Not likely to occur in the Plan area due to the prior disturbance and the introduction of non-native vegetation. Closest CNDDB occurrence is 2.2 miles from the Plan area in an unknown location east of Ring Mountain.

[a] Status:
FE = federally endangered
FT = federally threatened
SE = State endangered
ST = State threatened
1A = CRPR List 1A: Presumed extinct in California
1B = CRPR List 1B: Rare, threatened or endangered in California and elsewhere
2 = CRPR List 2: Rare, threatened, or endangered in California, but more common elsewhere

Source: Compiled by LSA Associates, Inc., 2013. Nearest records are based on CNDDB (2012) occurrences unless otherwise noted.

Table IV.F-3: Special-Status Animal Species Known to Occur or Potentially Occurring in the Vicinity of Larkspur, Marin County, California

	Species	Status[a]	Habitat	Potential for Occurrence within Plan Area
Fish				
1	*Oncorhynchus kisutch* Coho salmon (Central California Coast ESU[b])	FE, SE	Coastal streams from Punta Gorda in northern California down to and including the San Lorenzo River in central California, as well as some tributaries to San Francisco Bay	Not likely to occur. Species historically occurred in Corte Madera Creek but is considered extinct in the watershed.[18] Species last recorded from San Francisco Bay tributary during early-to-mid 1980s.[19] Corte Madera Creek is designated as critical habitat (San Pablo Bay hydrologic unit #18050002) and essential fish habitat for this species.
2	*Oncorhynchus tshawytscha* Chinook salmon (Central Valley Spring-run ESU)	FT, ST	Requires clear, cool streams with pools and riffles, with coarse gravel beds for spawning, Sacramento River and its tributaries	Known to occasionally occur in Corte Madera Creek, but fish may be of hatchery origin. Both native and hatchery fish may occur in the watershed.[20]
3	*Oncorhynchus mykiss* Steelhead (Central California Coast ESU)	FT	Coastal streams from Russian River south to Aptos Creek (Santa Cruz Co.), including streams tributary to San Francisco and San Pablo Bays	Known to occur in Corte Madera Creek.[21] Corte Madera Creek is designated as critical habitat.
4	*Acipenser medirostris* Green sturgeon	FT, CSC	Oceanic waters, bays, and estuaries; spawns in deep pools in large, turbulent freshwater river mainstems; known to forage in estuaries and bays from San Francisco Bay to British Columbia	May occur at the mouth of Corte Madera Creek and in the Corte Madera Channel.
5	*Eucyclogobius newberryi* Tidewater goby	FE, CSC	Brackish shallow lagoons and lower stream reaches where water is fairly still but not stagnant	Closest CNDDB record is of an extirpated population recorded in 1961 approximately 0.3 mile from the Plan area in Corte Madera Creek. Species is considered extirpated in the region.
Amphibians and Reptiles				
6	*Rana draytonii* California red-legged frog	FT, CSC	Ponds, streams, drainages and associated uplands; requires areas of deep, still, and/or slow-moving water for breeding.	Suitable habitat present in Tubb Lake in Sub-area 1A, but the species was not found during surveys conducted at the lake in 1999 for the Monahan Pacific Project.[22] The CNDDB does not list any occurrences within 5 miles of the Plan area.

[18] Leidy, R.A., 2007, op. cit.

[19] Leidy, R.A., 2007, op. cit.

[20] Leidy, R.A., G.S. Becker, and B.N. Harvey, 2005. *Historical distribution and current status of steelhead/rainbow trout (Oncorhynchus mykiss) in streams of the San Francisco Estuary, California*. Center for Ecosystem and Restoration, Oakland, California.

[21] Ibid.

[22] EDAW, Inc., 1999, op. cit.

Table IV.F-3: Special-Status Animal Species Known to Occur or Potentially Occurring in the Vicinity of Larkspur, Marin County, California

	Species	Status[a]	Habitat	Potential for Occurrence within Plan Area
7	*Actinemys marmorata* Western pond turtle	CSC	Ponds, streams with deep pools, drainages and associated uplands for egg laying	May occur in Corte Madera Creek, Tubb Lake, and the freshwater/ brackish channels where suitable basking sites (sandy banks and rocks) are present. Closest CNDDB occurrence is in Phoenix Lake, approximately 2.8 miles from the Plan area.
Birds				
8	*Aythya Americana* Redhead	CSC	Large, deep bodies of water; nests in freshwater emergent wetlands	May winter in small numbers on open water habitats along Corte Madera Creek, but not likely to breed within Plan area.
9	*Pelecanus erythrorhynchos* American white pelican	CSC	Forages over shallow inland waters and coastal marine habitats, nests on isolated islands or peninsulas	May forage and roost in the open water habitat within the Plan area from late summer through spring; does not breed in San Francisco Bay. Observed in Corte Madera Shorebird Marsh, immediately south of Sub-area 2 during LSA's June 2012 site visit.
10	*Pelecanus occidentalis californicus* California brown pelican	CFP	Coastal shorelines and bays; rarely found on fresh water	May forage and roost in the open water habitat within the Plan area from late summer through spring; does not breed in San Francisco Bay.
11	*Elanus leucurus* White-tailed kite	CFP	Open grasslands, meadows, or marshes; require dense-topped trees or shrubs for nesting and perching	Suitable nesting and foraging habitat present in the Plan area.
12	*Haliaeetus leucocephalus* Bald eagle	SE, CFP	Ocean shorelines, lake margins, and rivers for both nesting and wintering; nests in large trees with open branches	Known to occasionally forage along Corte Madera Creek during winter, but not likely to remain for long periods or breed within Plan area. Observed flying over Corte Madera Creek in December 2009 (LSA personal observation).
13	*Circus cyaneus* Northern harrier	CSC	Nests in wet meadows and marshes, forages over open grasslands and agricultural fields	Suitable foraging and nesting habitat present in the grassland habitat within the Plan area.
14	*Aquila chrysaetos* Golden eagle	CFP	Rolling foothills and mountain areas. Nests in cliff-walled canyons or large trees in open areas	May occasionally forage over the Plan area, but not likely to remain for long periods or breed within Plan area due to the lack of high quality nesting and foraging habitat within the Plan area.
15	*Falco peregrinus* American peregrine falcon	CFP	A variety of open habitats including coastlines, mountains, marshes, bay shorelines, and urban areas. Nest on cliffs, bridges, and tall buildings	May forage over the Plan area, but not likely to breed within Plan area. Small rocky crevices and cliff faces along the northern portion of Sub-area 1A are not likely to support nesting peregrine falcons due to the close proximity of the cliff faces to residential development.
16	*Laterallus jamaicensis coturniculus* California black rail	FT, CFP	Salt marshes bordering larger bays, also found in brackish and freshwater marshes	May occur in tidal marsh habitats south of the Larkspur Ferry Terminal parking lot; known to occur at the Corte Madera Marsh State Ecological Reserve approximately 100 feet south of the Plan area.
17	*Rallus longirostris obsoletus* California clapper rail	FE, SE, CFP	Tidal salt marshes with sloughs and substantial cordgrass (*Spartina* sp.) cover	May occur in tidal marsh habitats south of the Larkspur Ferry Terminal parking lot; known to occur at the Corte Madera Marsh State Ecological Reserve approximately 100 feet south of the Plan area.

Table IV.F-3: Special-Status Animal Species Known to Occur or Potentially Occurring in the Vicinity of Larkspur, Marin County, California

	Species	Status[a]	Habitat	Potential for Occurrence within Plan Area
18	*Athene cunicularia* Burrowing owl	CSC	Open, dry grasslands that contain abundant ground squirrel burrows	May winter in the tidal marsh, ruderal/non-native grasslands, and rock rip-rap along Corte Madera Creek. Considered a rare breeder in Marin County.[23]
19	*Asio otus* Long-eared owl	CSC	Conifer, oak, riparian, pinyon-juniper, and desert woodlands adjacent to grasslands, meadows, or shrublands	May pass through or winter in the woodland habitat within the Plan area. Not likely to nest in the Plan area due to the small size of woodland habitat and the Plan area's urban setting.
20	*Contopus cooperi* Olive-sided flycatcher	CSC	Coniferous forests with open canopies	Not likely to occur in the Plan area due to the small number of coniferous trees and the Plan area's urban setting.
21	*Lanius ludovicianus* Loggerhead shrike	CSC	Open grasslands and woodlands with scattered shrubs, fence posts, utility lines, or other perches; nests in dense shrubs and lower branches of trees	Suitable foraging and nesting habitat present within the ruderal/ grassland habitat in the Plan area.
22	*Progne subis* Purple martin	CSC	Woodlands; nests in tree snags and abandoned woodpecker cavities and human-made structures	May forage over the Plan area, but not likely to nest due to the lack of suitable habitat.
23	*Geothlypis trichas sinuosa* San Francisco (salt marsh) common yellowthroat	CSC	Salt, brackish, and freshwater marshes; and riparian woodlands; nests on or near ground in low vegetation	Suitable breeding and foraging habitat in the tidal marsh and freshwater/brackish marsh habitat within the Plan area.
24	*Passerculus sandwichensis alaudinus* Bryant's savannah sparrow	CSC	Tidal marshes and adjacent ruderal habitat, moist grasslands in the coastal fog belt, and infrequently, drier grasslands further inland; in South Bay, nests primarily on levee tops overgrown with annual grasses and levee banks dominated by pickleweed	May forage and breed in tidal marsh habitat adjacent to Corte Madera Creek.
25	*Ammodramus savannarum* Grasshopper sparrow	CSC	Grasslands with scattered shrubs.	Marginal habitat present in the ruderal/grassland habitat in the northern portion of Sub-area 1A, but the size of the habitat and its isolation from large tracts of open grasslands, likely precludes presence.
26	*Melospiza melodia samuelis* San Pablo (Samuels) song sparrow	CSC	Tidal salt marshes dominated by pickleweed; nests primarily in pickleweed and marsh gumplant	Known to occur in marshes adjacent to the mouth of Corte Madera Creek, likely occurs in other tidal marsh habitats in the Plan area. Detected in the tidal marsh south of the Larkspur Ferry Terminal parking lot, in the riparian woodland habitat in Remillard Park, and in the tidal channels north of Corte Madera Creek during LSA's reconnaissance survey.

[23] Shuford, W.D., 1993, op. cit.

Table IV.F-3: Special-Status Animal Species Known to Occur or Potentially Occurring in the Vicinity of Larkspur, Marin County, California

	Species	Status[a]	Habitat	Potential for Occurrence within Plan Area
27	*Agelaius tricolor* Tricolored blackbird	CSC	Nests in dense vegetation near open water; forages in grasslands and agricultural fields.	May forage in grasslands during nonbreeding season, but not likely to breed within Plan area due to lack of large stands of freshwater marsh.
Mammals				
28	*Reithrodontomys raviventris* Salt marsh harvest mouse	FE, SE, CFP	Tidal salt marshes of San Francisco Bay and its tributaries. Requires tall, dense pickleweed for cover	Suitable habitat present in tidal marshes on and adjacent to the Plan area, but lack of adjacent upland refugia likely precludes presence. Closest CNDDB occurrence is immediately south of the Plan area within the Corte Madera Marsh State Ecological Reserve.
29	*Sorex ornatus sinuosus* Suisun shrew	CSC	Tidal and brackish marshes of the northern shores of San Pablo and Suisun Bays. Requires dense low-lying cover above the mean high tide line.	Although suitable habitat is present within the tidal and brackish marshes, the Plan area is outside of the known range for this species.
30	*Antrozous pallidus* Pallid bat	CSC	A variety of open arid habitats (e.g., chaparral, open woodland, deserts); primary roost sites include bridges, old buildings, and in tree hollows and/or bark; sometimes roost in caves and rock crevices	May forage over open habitats within Plan area (e.g., grasslands, tidal marsh), but no known active roost sites in vicinity. The closest CNDDB occurrences are from 1891 and 1961 specimen records collected at unknown locations in the vicinity of San Rafael and Ross, respectively.
31	*Lasiurus blossevillii* Western red bat	CSC	Forested canyons and riparian woodlands for roosting, a variety of open habitats for foraging; typically roosts in snags and trees with moderately dense canopies	May occasionally forage and/or roost in trees near Corte Madera Creek in winter, but no known roost sites in Plan area vicinity and species' rarity likely precludes occurrence.
32	*Taxidea taxus* American badger	CSC	Open habitats with friable soils	Marginal habitat present in the ruderal/grassland habitat in the northern portion of Sub-area 1A, but the size of the habitat and its isolation from large tracts of open grasslands likely precludes presence.

[a] Status:
FE = federally endangered
FT = federally threatened
SE = State endangered
ST = State threatened
CSC = California Species of Special Concern
CFP = California Fully Protected Species

[b] ESU = Evolutionarily Significant Unit

Source: Compiled by LSA Associates, Inc., 2013. Nearest records are based on CNDDB (2012) occurrences unless otherwise noted.

Steelhead – Central California Coast ESU (Federally Threatened). The steelhead is the anadromous form of rainbow trout, migrating from the ocean to freshwater streams to spawn. Juveniles spend one to three years in their natal streams before going to sea as smolts. Most steelhead return to freshwater streams after spending two to three years at sea. Important factors associated with preferred stream channel conditions include temperature, velocity, depth, gravel substrate, and water quality. Shaded banks with overhanging riparian vegetation (termed "shaded riverine aquatic cover" by the U.S. Fish and Wildlife Service) are also beneficial to salmonids, providing foraging habitat and cover from predators. High water temperatures, low rates of stream flow, low levels of dissolved oxygen, low sediment input, and stream obstructions can be detrimental to steelhead populations.

Corte Madera Creek is known to support a resident steelhead population that appears to produce smolts. As recent as 1999, electrofishing surveys conducted by Friends of Corte Madera Creek found steelhead in the creek.[24] Historic occurrences of steelhead were recorded within Corte Madera Creek as early as 1960.[25] The portion of Corte Madera Creek within the Plan area supports migration habitat to the spawning and rearing habitat within the upper reaches of the Corte Madera Creek watershed. Corte Madera Creek is designated as critical habitat for the Central California Coast ESU of steelhead.

California Red-Legged Frog (Federally Threatened). The California red-legged frog has been extirpated or nearly extirpated from 70 percent of its former range. Population declines of this species have been attributed to a variety of factors, with habitat loss and predation by non-native aquatic predators (e.g., bullfrogs, crayfish, other non-native fishes) typically implicated as the primary threats. California red-legged frogs occur in and along freshwater marshes, streams, ponds, and other semi-permanent water sources. Optimal habitat contains dense emergent or shoreline riparian vegetation closely associated with deep (i.e., greater than 2.3 feet), still, or slow-moving water.[26] Cattails, bulrushes, and willows provide the habitat structure that seems to be most suitable for California red-legged frogs.[27] Although the species can occur in intermittent streams and ponds, they are unlikely to persist in streams in which all surface water disappears.[28] Suitable breeding ponds and pools usually have a minimum depth of 20 inches, but California red-legged frogs do sometimes breed successfully in pools as shallow as 10 inches.[29] Regardless of water depth, suitable breeding habitat must contain water during the entire development period for eggs and tadpoles. Reproduction for red-legged frogs is also sensitive to salinity levels in the water.

The CNDDB does not list any occurrences of California red-legged frogs within 5 miles of the Plan area.[30] Although no red-legged frogs were observed, the Initial Study for the Monahan Pacific Project

[24] Leidy, R.A., G.S. Becker, and B.N. Harvey, 2005, op. cit.

[25] Ibid.

[26] Jennings, M.R., and M.P. Hayes, 1994. *Amphibian and Reptile Species of Special Concern in California*. Final report to California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova.

[27] Ibid.

[28] Ibid.

[29] Fellers, G.M., 2005. *California Red-Legged Frog. In* M. Lannoo, editor. Amphibian Declines: The Conservation Status of Unites States Species. University of California Press, Berkeley.

[30] California Department of Fish and Wildlife, 2012, op. cit.

states that suitable habitat is present in Tubb Lake (shown in Figure IV.F-1).[31] Red-legged frogs are not likely to occur in the Plan area's reach of Corte Madera Creek and the Plan area's tidal channels due to the high salinity of the water, lack of suitable breeding pools, and lack of natural streamside vegetation.

Western Pond Turtle (California Species of Special Concern). Western pond turtles occur in a wide variety of aquatic habitats, including ponds, lakes, marshes, rivers, streams, and irrigation ditches that typically have a rocky or muddy bottom and contain stands of aquatic vegetation.[32] The presence or absence of pond turtles at a given aquatic site is largely dependent on the availability of suitable basking sites and adjacent upland habitat for egg-laying (e.g., sandy banks or grassy open fields) and over-wintering. Nests are typically dug in dry substrate with a high clay or silt fraction since the female moistens the site where she will excavate the nest prior to egg-laying.[33] Hatchlings require shallow water habitat with relatively dense submergent or short emergent vegetation in which to forage.[34]

Western pond turtles have been recorded at Phoenix Lake, approximately 2.8 miles west of Plan area. Corte Madera Creek and the tidal channels within the Plan area may provide habitat for pond turtles, especially where suitable basking sites (sandy banks and/or rocks) are present. However, surrounding residential development has likely resulted in the elimination of suitable upland habitat for egg-laying, reducing the likelihood that the species is present in the Plan area.

White-tailed Kite (California Fully Protected Species). Most white-tailed kites in California occur west of the Sierra Nevada in lowlands and foothills, where they are often seen year-round.[35] This species nests in densely foliaged trees and large shrubs located near suitable foraging habitat (e.g., grasslands, marshes, agricultural fields). Preferred prey items include California voles and mice.

The ruderal/non-native annual grassland and tidal marsh habitats provide foraging habitat for white-tailed kites, and the scattered trees and large shrubs provide suitable nest sites.

Northern Harrier (California Species of Special Concern). Northern harriers are widespread in California, although they have become uncommon in the southern part of the State.[36] Their preferred habitats are freshwater wetlands and salt marshes, although they are also commonly found over grasslands and agricultural fields.[37] Harriers breed from mid-March to September, building their nests on the ground.

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[31] EDAW, Inc., 1999, op. cit.

[32] Stebbins, R.C., 2003. *A Field Guide to Western Amphibians and Reptiles*. Third edition. Houghton Mifflin Company, Boston, Massachusetts.

[33] Holland, D.C., 1991. *Status and Reproductive Dynamics of a Population of Western Pond Turtles (Clemmys marmorata) in Klickitat County, Washington, in 1991*. Unpublished report prepared for the Washington Department of Wildlife, Olympia. Cited in Jennings and Hayes 1994, op. cit.

[34] Jennings, M.R., and M.P. Hayes, 1994, op. cit.

[35] Peeters, H., and P. Peeters, 2005. *Raptors of California*. University of California Press, Berkeley.

[36] Ibid.

[37] Ibid.

Suitable foraging and/or nesting habitat for northern harriers is present in the ruderal/non-native annual grassland and tidal marsh habitats in the Plan area.

California Black Rail (Federally Threatened; California Fully Protected Species). Around the San Francisco Bay Estuary, California black rails primarily inhabit tidal salt marsh dominated by pickleweed, but also occupy brackish marshes dominated by bulrush. California black rails prefer tidal marshes but apparently will use high marshlands during "wet" years.[38] Black rails build nests in tall grasses or marsh vegetation during the spring, with most nests constructed of pickleweed and placed on or slightly above the ground.

California black rails have been detected south of the Plan area within the Corte Madera Marsh State Ecological Reserve and in the tidal marsh habitat along Corte Madera Creek just east of the Plan area.[39] This species may inhabit the tidal marsh habitat south of the Larkspur Ferry Terminal parking lot and in other tidal marsh habitat within the Plan area.

California Clapper Rail (Federally and State Endangered; California Fully Protected Species). This secretive species prefers tidal salt marshes dominated by pickleweed and cordgrass with adjacent areas of high marsh cover dominated by pickleweed, gumplant, saltgrass, alkali heath, and/or fleshy jaumea (*Jaumea carnosa*).[40] Clapper rails also occupy tidal brackish marshes dominated by bulrush. The California subspecies of clapper rail is now restricted to the tidal marshlands around the San Francisco, San Pablo, and Suisun Bays. A Bay-wide survey in the early 1970s estimated a total population of between 4,000 and 6,000 birds.[41] The most recent population estimate for California clapper rails was approximately 1,040 to 1,264 individuals in San Francisco Bay.[42] Although habitat loss is implicated in population declines, predation of rails by the introduced red fox (*Vulpes vulpes*) is another major threat.

Clapper rails have been detected in the tidal marsh habitat along Corte Madera Creek.[43] This species may inhabit the tidal marsh habitat south of the Larkspur Ferry Terminal parking lot and other tidal marsh habitat within the Plan area.

Burrowing Owl (California Species of Special Concern). Burrowing owls have undergone substantial population declines throughout central and coastal California, primarily due to habitat

[38] Trulio, L.A., and J.G. Evens, 2000. *California Black Rail*. Pages 341-345 *in* Goals Project. Baylands Ecosystem Species and Community Profiles: Life histories and environmental requirements of key plants, fish, and wildlife. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P. R. Olofson, ed. San Francisco Bay Regional Water Quality Control Board, Oakland, California.

[39] California Department of Fish and Wildlife, 2012, op. cit.

[40] Albertson, J.D., and J.G. Evens, 2000. *California Clapper Rail*. Pages 332-340 *in* Goals Project. Baylands Ecosystem Species and Community Profiles: Life Histories and Environmental Requirements of Key Plants, Fish, and Wildlife. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P. R. Olofson, ed. San Francisco Bay Regional Water Quality Control Board, Oakland, California.

[41] Gill, Jr., R., 1979. *Status and Distribution of the California Clapper Rail (Rallus longirostris obsoletus).* California Fish and Game 65:36–49.

[42] Albertson, J. D., and J. G. Evens, 2000, op. cit.

[43] California Department of Fish and Wildlife, 2012, op. cit.

loss.[44] This species occurs in open, well-drained grasslands with abundant small mammal burrows, particularly those of California ground squirrels. Burrowing owls also prefer areas with short vegetation so they can easily scan their surroundings and spot potential predators.[45] In human-modified areas, burrowing owls often use burrows under the edges of concrete, asphalt, rubble piles, and riprap.[46]

Burrowing owls may winter in the tidal marsh and associated rock rip-rap along Corte Madera Creek and in the ruderal/non-native annual grasslands within the Plan area. They are considered a very rare breeder in Marin County.[47]

Loggerhead Shrike (California Species of Special Concern). Loggerhead shrikes occur in open habitats with scattered shrubs, trees, posts, fences, utility lines, and other perches. Shrikes primarily nest in the lower branches of dense shrubs and tall trees, although they have also been observed nesting in buildings and debris piles. They feed primarily on large insects, small birds, and mammals.

The ruderal/non-native annual grasslands and scattered trees and shrubs provide suitable habitat conditions for loggerhead shrikes. Shrikes may also occasionally forage over tidal marshes, if suitable perches are nearby.

San Francisco (Salt Marsh) Common Yellowthroat (California Species of Special Concern). The common yellowthroat is a widely distributed warbler in North America, occurring in wetlands, moist thickets, and grasslands. The San Francisco subspecies is restricted to riparian habitat, brackish marsh, freshwater marsh, tidal salt marsh, and adjacent grassland and ruderal vegetation along the margins of San Francisco Bay. Despite the common name, most salt marsh common yellowthroats breed in brackish or freshwater marshes.

Within the Plan area, suitable habitat for salt marsh common yellowthroats is present in the brackish or freshwater marsh vegetation along the northern shoreline of Corte Madera Channel and Corte Madera Creek. In particular the freshwater marsh and riparian woodland habitat at Remillard Park (shown in Figure IV.F-1) provides suitable habitat for this species.

Bryant's Savannah Sparrow (California Species of Special Concern). Bryant's savannah sparrow is a California endemic restricted to a narrow coastal strip between Humboldt Bay south to the Morro Bay area, with its primary center of abundance appearing to be the San Francisco Bay

[44] DeSante, D.F., et al., 2007. *A Census of Burrowing Owls in Central California in 1991*. Pages 38–48 *in* J. L. Lincer and K. Steenhof, eds. The Burrowing Owl, Its Biology and Management: Including the Proceedings of the First International Symposium. Raptor Research Report No. 9.

[45] Zarn, M., 1974. *Burrowing Owl (Spetyto cunicularia hypugaea). Habitat Management Series for Unique or Endangered Species*. Technical Report T-N-250. Bureau of Land Management, Denver, Colorado.

[46] Barclay, J., 2001. *Burrowing Owl Species Summary.* Appendix IV *in* Colonel Allensworth State Historic Park Final Burrowing Owl Mitigation and Management Plan. Albion Environmental, Inc., Santa Cruz, California. March.

[47] Shuford, W.D., 1993, op. cit.

area.[48] This subspecies occupies low, tidally influenced habitats, adjacent ruderal areas, moist grasslands within and just above the fog belt, and infrequently drier grasslands. Around San Francisco Bay, Bryant's savannah sparrows primarily occur in the transition zone between tidal marsh and upland; such habitats are typically dominated by pickleweed or saltgrass.[49]

Within the Plan area, suitable habitat for Bryant's savannah sparrows is present in the brackish or freshwater marsh vegetation along the northern shoreline of Corte Madera Channel and Corte Madera Creek, including the tidal marsh south of the Larkspur Ferry Terminal parking lot.

Samuels (San Pablo) Song Sparrow (California Species of Special Concern). This subspecies of the widely distributed song sparrow is restricted to the tidal marshes and adjacent uplands around the San Pablo Bay portion of the San Francisco Bay. They occur primarily in tidal salt marshes, but may also nest or forage in other shoreline habitats such as seasonal wetlands, intertidal mudflats, and adjacent uplands.[50] Favored nesting substrates include gumplant and cordgrass adjacent to tidal sloughs, although they also occur in perennial pepperweed and bulrush.

During LSA's reconnaissance survey, Samuels song sparrows were detected in the tidal marsh south of the Larkspur Ferry Terminal parking lot, in the riparian woodland habitat in Remillard Park, and in the tidal channels north of Corte Madera Creek.

Salt Marsh Harvest Mouse (Federally and State Endangered; California Fully Protected Species). Salt marsh harvest mouse are endemic to the tidal salt marshes of the San Francisco Bay Estuary. This species primarily occurs in marshes dominated by pickleweed, but also uses adjacent upland habitats during high tides. The presence of adequate peripheral halophyte plant cover adjacent to the pickleweed-dominated marsh plain is an important habitat component for this species, which depends on such cover for refuge from terrestrial predators during extremely high tides.

Within the Plan area, salt marsh harvest mice have been recorded at the Corte Madera Marsh State Ecological Reserve and along the northern shoreline of Corte Madera Creek.[51] The mice recorded along the north bank of the mouth of Corte Madera Creek are from specimens collected in the 1940s and 1960s when upland refugia was more abundant. This species is likely extirpated from the northern shoreline of Corte Madera Creek due to the lack of adjacent upland habitat.

Sensitive Habitats. Special plant communities and jurisdictional waters are described below.

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[48] Fitton, S.D., 2008. *Bryant's Savannah Sparrow* (*Passerculus sandwichensis alaudinus*). Pages 382–387 *in* Shuford, W.D., and T. Gardali, eds. California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

[49] Fitton, S.D., 2008, op. cit.

[50] Cogswell, H., 2000. *Song Sparrow*. Pages 374–385 *in* Goals Project. Baylands Ecosystem Species and Community Profiles: Life Histories and Environmental Requirements of Key Plants, Fish, and Wildlife. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P. R. Olofson, ed. San Francisco Bay Regional Water Quality Control Board, Oakland, California.

[51] California Department of Fish and Wildlife, 2012, op. cit.

Special Plant Communities. The CDFW tracks the occurrences of "special" plant communities that are either known or believed to be of high priority for inventory in the CNDDB. These plant communities are listed in the CDFW publication *List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database*.[52] These communities are sometimes addressed by lead or trustee agencies in CEQA documents, but generally are not afforded the same protection as RPR List 1B and 2 plant species. Many special plant communities support special-status plants and animals and are addressed under CEQA as habitat for those species.

The following special plant communities occur within a 5-mile radius of the Plan area: northern coastal salt marsh, coastal brackish marsh, and coastal terrace prairie. The latter two are known to occur in Marin County and but are unlikely to occur in the Plan area. Northern coastal salt marsh is dominated by native halophytes and usually supports an abundance of native forbs and potentially supports special-status plants. This community occurs along the northern shoreline Corte Madera Creek within the Plan area.

Jurisdictional Waters. Although a formal jurisdictional delineation of wetlands and other waters of the U.S. and State was not conducted for the Plan area, several features can be assumed to fall under U.S. Army Corps of Engineers (Corps) and Regional Water Quality Control Board (RWQCB) jurisdiction pursuant to Sections 401 and 404 of the federal Clean Water Act and the Porter-Cologne Water Quality Control Act.

Features within the Plan area that would likely be considered wetlands or other waters of the U.S. by the Corps include Corte Madera Channel, Corte Madera Creek; Tubb Lake and the associated drainage channel; tidal marshes along the northern shoreline of Corte Madera Creek; and the tidal channels and associated wetlands north of Corte Madera Creek. Additional other waters and wetlands may be present in other undeveloped portions of the Plan area, but would require site-specific evaluations to be fully identified.

Tubb Lake and all the creeks and channels within the Plan area are also expected to fall under CDFW jurisdiction pursuant to Section 1602 of the California Fish and Game Code. Unlike Corps jurisdiction, however, which is limited to the Ordinary High Water Mark, CDFW jurisdiction over these features extends to the top of bank, or the outer dripline of riparian vegetation, whichever is greater.

c. Regulatory Context. Biological resources within the Plan area may be subject to agency jurisdiction or regulations, as described below.

(1) Endangered Species Act. The U.S. Fish and Wildlife Service (USFWS) has jurisdiction over federally listed threatened and endangered plant and animal species. The federal Endangered Species Act (ESA) and its implementing regulations prohibit the take of any fish or wildlife species that is federally listed as threatened or endangered without prior approval pursuant to either Section 7 or Section 10 of the ESA. ESA defines "take" as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Federal regulation 50 CFR §17.3

[52] California Department of Fish and Wildlife, 2003. *List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Data Base*. Wildlife and Habitat Data Analysis Branch, Vegetation Classification and Mapping Program, California Department of Fish and Game, Sacramento.

defines the term "harass" as an intentional or negligent act that creates the likelihood of injuring wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns such as breeding, feeding, or sheltering (50 CFR §17.3). Furthermore, federal regulation 50 CFR §17.3 defines "harm" as an act that either kills or injures a listed species. By definition, "harm" includes habitat modification or degradation that actually kills or injures a listed species by significantly impairing essential behavior patterns such as breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR §217.12).

Section 10(a) of the ESA establishes a process for obtaining an incidental take permit that authorizes nonfederal entities to incidentally take federally listed wildlife or fish. Incidental take is defined by ESA as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." Preparation of a habitat conservation plan, generally referred to as an HCP, is required for all Section 10(a) permit applications. The USFWS and National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries Service) have joint authority under the ESA for administering the incidental take program. NOAA Fisheries Service has jurisdiction over anadromous fish species and USFWS has jurisdiction over all other fish and wildlife species.

Section 7 of the ESA requires all federal agencies to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of any species listed under the ESA, or result in the destruction or adverse modification of its habitat. Federal agencies are also required to minimize impacts to all listed species resulting from their actions, including issuance or permits or funding. Section 7 requires consideration of the indirect effects of a project, effects on federally listed plants, and effects on critical habitat (ESA requires that the USFWS identify critical habitat to the maximum extent that it is prudent and determinable when a species is listed as threatened or endangered). This consultation results in a Biological Opinion prepared by the USFWS stating whether implementation of the action will result in jeopardy to any listed species or will adversely modify critical habitat and the measures necessary to avoid or minimize effects to listed species.

Although federally listed animals are legally protected from harm no matter where they occur, Section 9 of the ESA provides protection for endangered plants by prohibiting the malicious destruction on federal land and other "take" that violates State law. Protection for plants not living on federal lands is provided by the California Endangered Species Act.

(2) Clean Water Act. The Corps is responsible under Section 404 of the Clean Water Act to regulate the discharge of fill material into "waters of the U.S." and their lateral limit are defined in 33 CFR Part 328.3(a) and include streams that are tributaries to navigable waters and their adjacent wetlands. The lateral limits of jurisdiction for a non-tidal stream are measured at the line of the Ordinary High Water Mark (33 CFR Part 328.3[e]) or the limit of adjacent wetlands (33 CFR Part 328.3[b]). Any permanent extension of the limits of an existing water of the U.S., whether natural or man-made, results in a similar extension of Corps jurisdiction (33 CFR Part 328.5).

Waters of the U.S. fall into two broad categories: wetlands and other waters. Other waters include waterbodies and watercourses generally lacking plant cover such as rivers, streams, lakes, springs, ponds, coastal waters, and estuaries. Wetlands are aquatic habitats that support hydrophytic wetland plants and include marshes, wet meadows, seeps, floodplains, basins, and other areas experiencing extended seasonal soil saturation. Seasonally or intermittently inundated features, such as seasonal ponds, ephemeral streams, and tidal marshes, are categorized as wetlands if they have hydric soils and

support wetland plant communities. Seasonally inundated waterbodies or watercourses that do not exhibit wetland characteristics are classified as other waters of the U.S.

Waters and wetlands that cannot trace a continuous hydrologic connection to a navigable water of the U.S. are not tributary to waters of the U.S. These are termed "isolated wetlands." Isolated wetlands are jurisdictional when their destruction or degradation can affect interstate or foreign commerce (33 CFR Part 328.3[a]). The Corps may or may not take jurisdiction over isolated wetlands depending on the specific circumstances.

In general, a project proponent must obtain a Section 404 permit from the Corps before placing fill or grading in wetlands or other waters of the U.S. Prior to issuing the permit, the Corps is required to consult with the USFWS under Section 7 of the ESA if the project may affect federally listed species.

All Corps permits require water quality certification under Section 401 of the Clean Water Act. In the San Francisco Bay Area, this regulatory program is administered by the San Francisco Bay RWQCB. Project proponents who propose to fill wetlands or other waters of the U.S. must apply for Section 401 water quality certification from the RWQCB. The RWQCB has adopted a policy requiring mitigation for any loss of wetland, streambed, or other jurisdictional area.

(3) Migratory Bird Treaty Act. The federal Migratory Bird Treaty Act (MBTA) (Title 16 United States Code, Section 703-712 as amended; 50 Code of Federal Regulations Section 21; and 50 Code of Federal Regulations Section 13) prohibits the taking, hunting, killing, selling, purchasing, etc. of migratory birds, parts of migratory birds, or their eggs and nests. As used in the MBTA, the term "take" is defined as "to pursue, hunt, shoot, capture, collect, kill, or attempt to pursue, hunt, shoot, capture, collect, or kill, unless the context otherwise requires." Most bird species native to North America are covered by this act.

(4) California Endangered Species Act. The CDFW has jurisdiction over State-listed endangered, threatened, and rare plant and animal species under the California Endangered Species Act (CESA) (Fish & Game Code, Section 2050-2098). CESA is similar to the federal ESA both in process and substance; it is intended to provide additional protection to threatened and endangered species in California. Species may be listed as threatened or endangered under both acts (in which case the provisions of both State and federal laws apply) or under only one act. A candidate species is one that the Fish and Game Commission has formally noticed as being under review by CDFW for addition to the State list. Candidate species are protected by the provisions of CESA.

The Habitat Conservation Planning Branch of the CDFW administers the State's rare species program. The CDFW maintains lists of designated Endangered, Threatened and Rare plant and animal species as designated by the California Fish and Game Commission or under the California Native Plant Protection Act (NPPA). Habitat degradation or modification is not expressly included in the definition of "take" under the California Fish and Game Code; however, the CDFW has interpreted "take" to include the "killing of a member of a species which is the proximate result of habitat modification…".

Section 2081(b) and (c) of the CESA allows CDFW to issue an incidental take permit for a state-listed threatened and endangered species only if specific criteria are met. These criteria can be found in Title 14 CCR, Sections 783.4(a) and (b)

(5) California Environmental Quality Act. The California Environmental Quality Act (CEQA) applies to "projects" proposed to be undertaken or requiring approval by State and local government agencies. Projects are defined as having the potential to have physical impact on the environment. Under Section 15380 of CEQA, a species not included on any formal list "shall nevertheless be considered rare or endangered if the species can be shown by a local agency to meet the criteria" for listing. With sufficient documentation, a species could be shown to meet the definition of rare or endangered under CEQA and be considered a "de facto" rare or endangered species.

(6) California Fish and Game Code. The CDFW is also responsible for enforcing the California Fish and Game Code, which contains several provisions potentially relevant to construction projects. For example, Section 1602 of the Fish and Game Code governs the issuance of Lake and Streambed Alteration Agreements by the CDFW. Lake or Streambed Alteration Agreements are required whenever project activities substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated as such by the CDFW.

The Fish and Game Code also lists animal species designated as Fully Protected or Protected, which may not be taken or possessed at any time. The CDFW does not issue licenses or permits for take of these species except for necessary scientific research, habitat restoration/species recovery actions, or live capture and relocation pursuant to a permit for the protection of livestock. Fully Protected species are listed in Sections 3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) of the Fish and Game Code, while Protected amphibians and reptiles are listed in Chapter 5, Sections 41 and 42.

Section 3503 of the Fish and Game Code prohibits the take, possession, or needless destruction of the nest or eggs of any bird. Subsection 3503.5 specifically prohibits the take, possession, or destruction of any birds in the orders Falconiformes (hawks and eagles) or Strigiformes (owls) and their nests. These provisions, along with the federal MBTA, essentially serve to protect nesting native birds. Non-native species, including European starling, house sparrow, and rock pigeon, are not afforded any protection under the MBTA or California Fish and Game Code.

(7) Porter-Cologne Water Quality Control Act. Under this Act (California Water Code Sections 13000–14920), the RWQCB is authorized to regulate the discharge of waste that could affect the quality of the State's waters. The RWQCB asserts jurisdiction over isolated waters and wetlands, as well as waters and wetlands that are regulated by the Corps. Therefore, even if a project does not require a federal permit, it still requires review and approval by the RWQCB. When reviewing applications, the RWQCB focuses on ensuring that projects do not adversely affect the "beneficial uses" associated with waters of the State. In most cases, the RWQCB seeks to protect these beneficial uses by requiring the integration of waste discharge requirements (WDRs) into projects that will require discharge into waters of the State. For most construction projects, the RWQCB requires the use of construction and post-construction Best Management Practices (BMPs).

(8) McAteer-Petris Act. The McAteer-Petris Act and Suisun Marsh Preservation Act were adopted to protect San Francisco Bay and Suisun Marsh as great natural resources for the benefit of the public and to encourage development compatible with this protection. The San Francisco Bay Conservation and Development Commission (BCDC) was established to carry out this Act. The two primary goals of the BCDC are: (1) to prevent the unnecessary filling of San Francisco Bay; and (2) to increase public access to and along the Bay shoreline. BCDC approval is required for all projects

within 100 feet of the Bay shoreline, as well as projects that propose any filling or dredging within Bay waters.

(9) Other Statutes, Codes, and Policies Affording Species Protection. The CDFW maintains an administrative list of Species of Special Concern (SSC), defined as a "species, subspecies, or distinct population of an animal native to California that currently satisfies one or more of the following (not necessarily mutually exclusive) criteria:

- Is extirpated from the State, or, in the case of birds, in its primary seasonal or breeding role;
- Is listed as federally, but not State-, threatened or endangered;
- Meets the State definition of threatened or endangered but has not formally been listed;
- Is experiencing, or formerly experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for State threatened or endangered status;
- Has naturally small populations exhibiting high susceptibility to risk from any factor(s) that, if realized, could lead to declines that would qualify it for State threatened or endangered status."

The CDFW's Nongame Wildlife Program is responsible for producing and updating SSC publications for mammals,[53] birds,[54] and reptiles and amphibians.[55] The Fisheries Branch is responsible for updates to the Fish SSC document and list.[56] Section 15380 of the *CEQA Guidelines* clearly indicates that SSC should be included in an analysis of project impacts if they can be shown to meet the criteria of sensitivity outline therein. In contrast to species listed under the federal ESA or CESA, however, SSC have no formal legal status.

Special-status plants in California are assigned to one of five "California Rare Plant Ranks" by a collaborative group of over 300 botanists in government, academia, non-governmental organizations, and the private sector. This effort is jointly managed by the CDFW and the non-profit California Native Plant Society (CNPS). The five California Rare Plant Ranks currently recognized by the CNDDB include the following:

- Rare Plant Rank 1A: Plants presumed extinct in California;
- Rare Plant Rank 1B: Plants rare, threatened, or endangered in California and elsewhere;

[53] Williams, D. F., 1986. *Mammalian Species of Special Concern in California*. California Department of Fish and Game, Sacramento.

[54] Shuford, W. D., and T. Gardali, editors, 2008. *California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California*. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

[55] Jennings, M. R., and M. P. Hayes, 1994, op. cit.

[56] Moyle, P. B., R. M. Yoshiyama, J. E. Williams, and E. D. Wikramanayake, 1995. *Fish Species of Special Concern in California: Second Edition*. Final report to California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova. Contract No. 2128IF.

- Rare Plant Rank 2: Plants rare, threatened, or endangered in California, but more common elsewhere;
- Rare Plant Rank 3: Plants about which more information is needed - a review list; and
- Rare Plant Rank 4: Plants of limited distribution – a watch list.

Substantial impacts to plants ranked 1A, 1B, and 2 are typically considered significant based on Section 15380 of the *CEQA Guidelines* depending on the policy of the lead agency. Plants ranked 3 and 4 may be evaluated by the lead agency on a case-by-case basis to determine significance thresholds under CEQA.

(10) Larkspur General Plan Policies. The following policies from the 1990 General Plan are related to biological resources:

Environmental Resources Element

Goal 1: Preserve and enhance a variety of open space features including ridgelines, the wetlands along the Bay and the creeks, wildlife habitats, view corridors, and other amenities which contribute to a sense of openness in Larkspur.

Goal 2: Maintain Corte Madera and Southern Heights Ridges as community separators.

- Policy a: Work with local and regional open space agencies and interest groups to develop an open space preservation strategy.
  - Action Program [1]: Map and rank open space features as to their value to the community.
  - Action Program [2]: Support the efforts of the Marin County Open Space District to acquire more open space in the Larkspur Sphere of Influence.
  - Action Program [3]: Identify financing mechanisms to acquire privately held lands designated for future open space.
  - Action Program [4]: Educate school children and the general public about Larkspur's open space resources.
- Policy b: Designate and preserve in open space the areas so shown on the General Plan Land Use map. They include those of the Northridge that are above the 350-foot elevation, Baltimore canyon, the Piedmont and Redwood Avenue areas, Big and Little King Mountains and their saddle area, the Tubb Lake watershed, and the ridge above the old quarries on the San Quentin Peninsula.
- Policy c: Designate and preserve in Shoreline/Marsh Conservation area the wetlands along Corte Madera Creek and at Piper Park, Redwood High School, and the Larkspur Ferry Terminal, and the shoreline between East Sir Francis Drake Boulevard and the Bay waters.
  - Action Program [5]: Designate and preserve in Shoreline/Marsh Conservation area the wetlands along Corte Madera Creek and at Piper Park, Redwood High School, and the Larkspur Ferry Terminal, and the shoreline between East Sir Francis Drake Boulevard and the Bay waters.
- Policy d: Allow low-intensity development on hillsides and near Corte Madera Creek only if the design preserves natural features, such as significant stands of trees, forested hillsides, riparian vegetation, marshlands, wildlife habitats, ridgelines, and buffer zones.
- Policy e: Encourage the use of cluster site plans for large parcels of land provided the design will not be detrimental to the character and scale of the community.
  - Action Program [6]: Require new development to preserve some natural area.

- Action Program [7]: If a development proposal requires the removal of trees or other vegetation of significant resource value or adversely impacts a wetlands area (as defined in implementing ordinances), require the developer to replace the lost resources.
- Action Program [8]: Avoid development in areas which contain rare or endangered species of plants or animals.

Goal 3: Provide reasonable access to open space areas and trails without adversely impacting natural habitats.

- Policy h: Seek a balance between the recreational aspects of open space and the need to protect wildlife and fragile vegetation from intrusion by humans and domestic animals.
  - Action Program [12]: Provide a buffer zone between natural habitats and human use areas (such as paths), and clearly mark the boundaries. Place restrictions on access to these sensitive areas by pets.
  - Action Program [13]: Provide hiking trails to connect Tubb Lake with the ridge top, Larkspur Landing, and Sir Francis Drake Boulevard.
- Policy i: Seek to balance the needs for community safety with the goal for protection of the environment.
  - Action Program [14]: When dredging Corte Madera Creek, protect the wetlands along the creek.
  - Action Program [15]: Plan future development of the ferry terminal so as to minimize impact on nearby creek and marshland habitats.

(11) Larkspur Municipal Code. Heritage trees are defined in Chapter 12.16 of the Larkspur Municipal Code as either of the following: (1) a live tree or grove of live trees of historical significance specifically designated by official action of the City Council; or (2) any live tree that has a trunk with a circumference of 50 inches or more, measured at 24 inches above the natural grade, or at a point 24 inches above the highest grade. The measurement producing the greatest circumference shall be used. In the case of multi-trunk trees, the circumference of each trunk is to be measured in the manner previously described, and the circumference of each trunk is to be added to ascertain the total circumference of the tree.

Any person desiring to remove one or more heritage trees or prune beyond the "best practices" pruning guidelines promulgated by the International Society of Arboriculture or the American National Standards Institute shall apply to the City Manager or his/her designee or Planning Department, as appropriate, for a permit.

2. Impacts and Mitigation Measures

The following section discusses potential impacts to the biological resources that could result from implementation of the Station Area Plan. The section begins with the criteria of significance, establishing the thresholds to determine whether an impact is potentially significant. The latter part of this section presents the impacts and recommends mitigation measures, if required.

a. Criteria of Significance. Implementation of the Station Area Plan would have a significant impact if it were to result in:

- 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 CDFW or USFWS;
- A substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS;
- A substantial adverse effect on federally protected wetlands as defined by Section404 of the Clean Water Act through direct removal, filling, hydrological interruption, or other means;
- Substantial interference with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impediment to the use of native wildlife nursery sites;
- Any conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- Any conflict with the provisions of an adopted HCP, Natural Community Conservation Plan, or other approved local, regional, or state HCP.

b. Impacts Analysis. The following section provides an evaluation and analysis for the potential impacts to biological resources from implementation of the Plan for each of the criteria of significance listed above.

(1) Candidate, Sensitive, or Special-Status Species. Thirty-two special-status plants and 32 special-status animals have the potential to occur in the general vicinity of the Plan area. The Point Reyes bird's-beak, a special-status plant, has a moderately high probability of occurring within the tidal marsh habitat in the Plan area. Thirteen special-status animal species are known to occur or have the potential to occur in the ruderal/non-native annual grassland and/or tidal marsh habitats of the Plan area. Suitable breeding habitat for California red-legged frogs may be present in Tubb Lake, but due to the lake's isolation from other occupied breeding sites, the species' rarity in the region, and the presence of introduced predators such as American bullfrogs (*Lithobates catesbeianus*) and fish, this species is highly unlikely to occur in Tubb Lake or other parts of the Plan area. Western pond turtles could occur in Tubb Lake, Remillard Park, and within the other freshwater/brackish marsh habitat in the Plan area. Corte Madera Creek is known to support steelhead and may also support western pond turtle.

Several policies and action programs within the Larkspur 1990 General Plan specify protection of special-status species that occur in the Plan area. Specifically, Action Program 8 avoids development in areas that contain special-status species, Policy H protects wildlife and fragile habitat from intrusion by humans and domestic animals, and Action Program 12 places restrictions on access to sensitive areas by pets.

<u>Impact BIO-1</u>: Implementation of the Station Area Plan may result in the destruction of nests occupied by special-status bird species. (S)

The riparian woodland, coast live oak woodland, non-native woody vegetation, ruderal/non-native annual grassland, freshwater/brackish marsh, tidal marsh/mudflat habitats, and developed habitat (i.e., landscaped trees) in the Plan area provide nesting habitat for special-status bird species. Grading and

construction activities near nests could cause nest abandonment and/or loss of eggs or young during the breeding season and would represent a significant impact.

Implementation of the following mitigation measure would reduce this impact to less-than-significant level.

> Mitigation Measure BIO-1: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:
>
> - All proposed new development within the Plan area shall protect nesting birds by requiring pre-construction surveys prior to tree removal, ground disturbing, or construction activities on the site to locate and protect active nests on or immediately adjacent to the site. For example, pre-construction surveys shall be conducted no more than 14 days prior to the start of pruning, construction, or ground disturbing activities if the activities occur during the nesting season (February 1 to August 31). Pre-construction surveys shall be repeated at 14-day intervals until construction has been initiated in the area. Locations of active nests shall be described and protective measures implemented. Protective measures shall include establishment of clearly delineated (i.e., orange construction fencing) exclusion zones around each nest site as determined by a qualified wildlife biologist, taking into account the species of bird nesting on-site and their tolerance for disturbance. In general, exclusion zones shall be a minimum of 300 feet from the drip line of the nest tree or nest for raptors and 50 feet for passerines and other species. The active nest sites within an exclusion zone shall be monitored on a weekly basis throughout the nesting season to identify signs of disturbance. The radius of an exclusion zone may be increased by the project biologist if project activities are determined to be adversely affecting the nesting birds. Exclusion zones may be decreased by the project biologist only in consultation with CDFW. The protection measures shall remain in effect until the young have left the nest and are foraging independently or the nest is no longer active. A report shall be submitted to the City and CDFW at the end of the construction season documenting the observations made during monitoring. (LTS)

Impact BIO-2: Implementation of the Station Area Plan may impact western pond turtle or pond turtle habitat in the Plan area. (S)

Suitable western pond turtle habitat is present in Corte Madera Creek and in the freshwater/brackish marsh of the Plan area such as Tubb Lake and Remillard Park (shown in Figure IV.F-1). Construction within or adjacent to these areas could impact pond turtles, if present.

Implementation of the following mitigation measure would reduce this impact to western pond turtles to a less-than-significant level.

> Mitigation Measure BIO-2: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:
>
> - Pre-construction surveys for the western pond turtle shall be conducted in areas of suitable upland and/or aquatic habitat that is within 300 feet of Corte Madera Creek, Tubb Lake, Remillard Park, or other freshwater/brackish marsh in the Plan area. The survey shall be conducted immediately prior to ground disturbance to ensure that no turtles are in the construction area. If turtles are observed in the construction area, they shall be relocated to

suitable habitat outside the construction zone prior to initiation of construction activities. All relocations will be made by a biologist qualified to handle turtles and with approval of the CDFW.

- All construction activities within channels, lakes, ponds, and marshes within the Plan area shall be conducted during the period when pond turtles are active (May through September). Turtles are expected to be more easily observed during this period and able to escape construction activities that may pose a risk of mortality. (LTS)

Impact BIO-3: Implementation of the Station Area Plan may result in impacts to special-status plants. (S)

Potential habitat for special-status plant species is present in the Plan area. Point Reyes bird's-beak, in particular, has a moderately high probability of occurring in the Plan area; this species was recorded in the tidal marsh just south of the Plan area along the southern shoreline of Corte Madera Creek, but could also occur along the northern shoreline. Future development in this area and other parts of the Plan area could impact undocumented occurrences of special-status plant species, if present.

Mitigation Measure BIO-3: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:

- Prior to ground disturbance, focused surveys for special-status plants shall be conducted in the development areas of the Plan area according to the CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Plant Populations and Natural Communities*.[57] Plant surveys shall be conducted throughout the blooming period of those species for which suitable habitat is present. The number of surveys to be conducted shall be determined by a qualified biologist following the CDFW protocol. If populations/stands of a special-status species are identified during the surveys and impacts are unavoidable, compensatory mitigation shall be implemented in one of the following ways: (1) establishment of an off-site mitigation area that supports the species being impacted; (2) purchase of credits in a mitigation bank that is approved to sell credits for the impacted species; or (3) relocation of the affected plants and/or collection and planting of seed of the impacted plants to a location that will be preserved in perpetuity and protected from future development.

  The location of the mitigation sites shall be determined in consultation with, and subject to approval of USFWS and/or CDFW (depending on the federal and/or State status of the plants). Compensatory mitigation shall be acquired at a minimum ratio of 3:1 (acquired:impacted) based on acreage of occupied habitat impacted (i.e., if one acre of occupied habitat is impacted, three acres of occupied habitat will be acquired) or the number of individual plants impacted (i.e., if a population of a 100 plants is impacted, a population of 300 plants must be reestablished at a mitigation site by the end of five years). Implementation of off-site mitigation shall include provisions for the long-term protection of the species through establishment of a conservation easement on the on the mitigation site and an endowment for the maintenance, monitoring, and long-term of management of

[57] California Department of Fish and Wildlife, 2009. *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities*. November 24, 2009. Sacramento, California.

the site. The amount of the endowment shall be determined by the City and appropriate resource agencies. (LTS)

Impact BIO-4: Implementation of the Station Area Plan may impact special-status tidal marsh animal species. (S)

Suitable habitat for California black rail, California clapper rail, and salt marsh harvest mouse is present in the approximately 7 acres of tidal marsh habitat within the Plan area. Construction would not likely extend into existing marsh habitat. Nevertheless, these species are known to use grasslands and other dense vegetation adjacent to marshes as escape cover during high tides. As such, there is a small chance that they may occur within the construction footprint during high tides, if present in the marsh habitat. In addition, construction noise has the potential to disturb nesting tidal marsh rails since suitable habitat may be present within 100 feet of the construction footprint.
Because clapper rails may occur within the tidal marsh/mudflat habitat south of the existing Larkspur Ferry Terminal (shown in Figure IV.F-1), changes in the land-use, such as the residential development, in this area could impact clapper rails and other special-status marsh species, if present. Potential impacts may include increased lighting, noise, and domestic pets.

Several policies and action programs within the Larkspur 1990 General Plan Environmental Resources Element specify protection of the tidal marsh habitat and the wildlife and special-status species that occur there. Policy C calls for the preservation of the wetlands along Corte Madera Creek and the Larkspur Ferry Terminal. Policy D allows low-intensity development near Corte Madera Creek only if the design preserves natural features, such as marshlands and wildlife habitats. Action Program 8 specifies avoiding development in areas that contain special-status species. Policy H protects wildlife and fragile habitat from intrusion by humans and domestic animals. Action Program 12 places restrictions on access to sensitive areas by pets. Action Program 15 calls for designing future development of the ferry terminal so as to minimize impact on the nearby creek and marsh habitat. These policies will reduce impacts of the Station Area Plan, but not to a less-than-significant level.

Implementation of the following mitigation measure would reduce these impacts to a less-than-significant level.

Mitigation Measure BIO-4: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:

- Ground disturbing activities within upland habitat in the vicinity of the tidal marsh shall be conducted only when high tides are not at their winter or summer extremes, to reduce the likelihood that tidal marsh rails and salt marsh harvest mice will be present in the construction footprint. Ground disturbance shall be avoided during the highest tides of June–July and December–January (± one week each month).
- To avoid potential disturbance to nesting tidal marsh rails, construction shall be conducted during the non-breeding season (September 1 through January 31), unless current surveys indicate that marsh habitat within 100 feet of the construction footprint is not part of an active rail breeding territory. Such surveys must be conducted in accordance with a project-specific survey methodology prepared in accordance with the USFWS and CDFW protocols.

- No work shall be permitted within suitable habitat for salt marsh harvest mice (i.e., tidal marsh/mudflat and adjacent ruderal/non-native annual grassland) without the appropriate authorization from the USFWS and CDFW. Prior to ground disturbance within suitable salt marsh harvest mouse habitat, a qualified biologist experienced with salt marsh harvest mouse exclusion procedures shall prepare a site-specific salt marsh harvest mouse avoidance plan. The plan will be subject to approval by USFWS and CDFW and be consistent with the Biological Opinion and Incidental Take Permit issued by the USFWS and CDFW, respectively, for the project. At a minimum, the plan shall include: (1) installation of a barrier fencing around the entire portion of the work area that is within 100 feet of the edge of the marsh to exclude salt marsh harvest mouse from the work area; (2) clearing of all vegetation using hand-tools within the fenced work area prior to the initiation of construction activities; and (3) relocation to the marsh of any salt marsh harvest mouse found during vegetation removal (relocation must be approved by USFWS and CDFW prior to initiation of construction activities). Construction work shall start as soon as possible (and no longer than 3 days) after vegetation has been cleared. All exclusion measures and initial ground disturbance activities shall be monitored by a qualified biologist who is approved by the USFWS and CDFW to implement protection measures for salt marsh harvest mouse.
- To protect sensitive habitats during construction activities, a permanent fence shall be constructed outside of the marsh along the southern edge of the Larkspur Ferry Terminal parking area to restrict access of humans and dogs into the tidal marsh/mudflat habitat. A qualified biologist shall provide advice regarding the location and design of the fence, and BCDC and the City shall approve fence design, dimensions and location. The upland habitat on the project site should be landscaped with native shrub species characteristic of the upper marsh zone such as gumplant, saltgrass, and/or coyote brush to buffer the tidal marsh from activity on the parking area and provide rails and other marsh birds with shelter during extreme high tides. Such vegetation (e.g., gumplant) could also provide potential nesting habitat for various species of birds inhabiting the marsh.
- If any development occurs within the existing Larkspur Ferry Terminal parcel, the City shall require building design features to reduce predators and lighting that would impact tidal marsh species. Such design features may include anti-predator perching devices or building designs to discourage predatory birds from nesting or perching in proximity to the marsh and lights that are shielded and focused away from the marsh and sensitive habitat areas. (LTS)

(2) Riparian Woodland and Other Sensitive Natural Communities. Riparian woodland within the Plan area is limited to the area near Tubb Lake and Remillard Park. Other sensitive natural communities within the Plan area consist of the freshwater/brackish marsh, tidal marsh/mudflat habitat, and the creek/open water habitats near the Corte Madera Creek and Corte Madera Channel (as shown in Figure IV.F-1). These marsh communities are located at several areas near the northern boundaries of the Corte Madera Creek and Corte Madera Channel. This analysis assumes that the current ferry schedule will remain similar to the current schedule. Changes to the schedule could increase disturbance levels to tidal marsh/mudflat habitat and wintering migratory ducks and other waterbirds.

Development within the Plan area could directly and/or indirectly impact the riparian woodland and other sensitive habitats. These impacts may include removal of riparian vegetation and the introduction of invasive plant species.

Impact BIO-5: Invasive plants introduced to the Station Area Plan area may invade the native riparian woodland and tidal marsh mudflat/mudflat and displace native habitat. (S)

Construction within or adjacent to riparian woodland and marsh areas could result in ground disturbance that leaves areas of bare soil susceptible to colonization by non-native invasive plant species. Invasive plants can have a variety of impacts on native plant communities, including alteration of ecosystem processes; displacement of native species; support of non-native animals, fungi, or microbes; and alteration of gene pools through hybridization with native species. Additionally, many ornamental plants used in landscaping can become invasive and spread to adjacent habitats where they can become established and displace native plant species. If not controlled, invasive plants could encroach into native riparian woodland and tidal marsh/mudflats within the Plan area, reducing their habitat value for native plants and wildlife, including special-status species.

The spread of invasive plants is not typically a concern on developed parcels as unwanted plants in the landscaping are typically removed and not allowed to become established. In open spaces, invasive plants can become established in disturbed areas or out of the way areas, at which time they become more difficult to eradicate or control.

The following mitigation measure would reduce this impact to a less-than-significant level.

> Mitigation Measure BIO-5: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:
>
> - Species listed in California Invasive Plant Council's *Invasive Plant Inventory*[58] shall be prohibited from being planted in the Plan area. Plant palettes for individual projects shall be reviewed by a biologist to ensure that the prohibited species are not included in the landscaping plans.
> - During construction activities, the following measures shall be implemented to the extent feasible to reduce the spread of invasive plants:
> - Avoid vehicle travel through weed-infested areas.
> - Avoid the disturbance of soil and vegetation to the extent feasible during construction activities.
> - Use only certified weed-free erosion control materials and native seed mixes. (LTS)

Impact BIO-6: Implementation of the Station Area Plan could impact up to approximately 5 acres of riparian woodland in the Plan area. (S)

[58] California Invasive Plant Council, *Invasive Plant Inventory*. Website: www.cal-ipc.org/ip/inventory/index.php#categories.

Implementation of the Station Area Plan could directly impact up to approximately 5 aces of riparian woodland within the Plan area. Riparian habitat occurs in Remillard Park near the southeastern boundary of the Plan area and in the vicinity of Tubb Lake in the eastern portion of Sub-area 1A (as shown in Figure IV.F-1). Riparian woodland in these areas may be impacted by proposed trails and development.

Implementation of the following mitigation measures would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-6: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:

- A Lake and Streambed Alteration Permit shall be obtained from the CDFW prior to the removal or damage of any riparian trees, shrubs, or other vegetation within CDFW jurisdiction (bed or bank of the lake, pond, river creek, or drainage and the riparian vegetation associated with these features).
- A tree survey shall be conducted within any portion of the riparian woodland that may be impacted by development. Riparian trees and shrubs removed or otherwise permanently impacted (i.e., limbs or trunk severely pruned or roots cut, trenches cut through root zone) as result of implementation of the Station Area Plan shall be replaced either onsite or at an off-site, public open space mitigation area (i.e., park or open space). Riparian trees and shrubs will be replaced at a 3:1 ratio (replaced: impacted). Replacement plant material will be of native, local stock. An endowment or other secure funding source will be established for the long-term maintenance and monitoring of the replacement trees.
- Trees to be avoided or retained shall be enclosed in a tree protection zone (TPZ) to prevent direct damage to the trees and their growing environment during the construction process. A TPZ fence shall be established around the trees at a distance no less than 5 feet outside the dripline. In no case shall the TPZ fence be less than 10 feet from the trunk of the tree. The fencing shall be installed before site preparation, construction activities, or tree trimming begins and shall consist of blaze orange barrier fencing supported by metal "T rail" fence posts.
- Heavy machinery shall not be allowed to operate or park within the Tree Protection Zone, nor shall any excess soil, chemicals, debris, equipment or other materials be dumped or stored within the TPZ or upslope of the protected trees. If it is necessary for heavy machinery to operate within the dripline of the preserved protected trees, then measures to reduce compaction of the soil within the dripline shall be employed as directed by a qualified arborist. (LTS)

(3) Federally and State Protected Wetlands. Wetlands provide valuable habitat for native plant and animal species and contribute to the maintenance of water quality. Known wetlands within the Plan area include the freshwater/brackish marsh, tidal marsh/mudflat, and creek/open water cover types (as shown in Figure IV.F-1). Development may impact wetlands potentially subject to federal jurisdiction. Any such impacts would be subject to federal (Clean Water Act) and State (Porter-Cologne Water Quality Control Act) regulations and would require the appropriate State and federal permits if they were proposed to be filled or impacted.

Impact BIO-7: Implementation of the Station Area Plan may impact waters of the United States and/or waters of the State within the Plan area. (S)

Up to approximately 7 acres of tidal marsh/mudflat, 3 acres of freshwater/brackish marsh, and 36 acres of creek/open water may be impacted by construction within the Plan area.

Implementation of the following mitigation measures would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-7: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:

- For all activities within jurisdictional waters, the applicant shall obtain the appropriate permits from the regulatory agencies (Corps, RWQCB, CDFW, and BCDC). Each activity in jurisdictional areas will likely require a Section 404 Corps permit and Section 401 water quality certification from the Water Board. Creek restoration activities may also require a CDFW Lake or Streambed Alteration Agreement, depending on site-specific conditions.
- Impacts to jurisdictional wetlands shall be mitigated at a minimum replacement ratio of 1:1 (i.e., one acre created [and preserved] for every acre impacted). Replacement habitat will be of the same type (i.e., marsh, channel, seasonal wetland) as the area impacted unless it can be shown that a different habitat type would provide greater value. Mitigation features should be created in the same general area as the original impact. Off-site mitigation may be approved by the City if the amount of required replacement habitat exceeds that which is available in the vicinity of the impact site.

  A wetland mitigation and monitoring plan (MMP) shall be developed for each mitigation site, detailing the mitigation design, wetland planting design, adaptive management, maintenance and monitoring requirements, reporting requirements, and success criteria for the created wetland(s). An endowment or other assured funding mechanism in an amount to be determined by the permitting agencies will be provided by the project applicant for the long-term maintenance, management, and monitoring of the wetland mitigation area.

  As an alternative to establishing an on- or off-site mitigation area, the project applicant may purchase mitigation credits at an agency approved mitigation bank that includes the project site in its service area. Credits equivalent to the mitigation acreage requirement for a mitigation site will be purchased and proof of purchase of the credits will be provided to the City prior to issuance of a building permit. Credits will be for the same type of wetland that is impacted. A mitigation and monitoring plan and endowment will not be required if credits are purchased at a bank to fully cover the mitigation requirement. (LTS)

Implementation of these measures would reduce impacts to federally protected wetlands to a less-than-significant level and no additional mitigation measures are required.

(4) Wildlife Corridors and Nursery Sites. Wildlife movement corridors are usually linear-shaped habitat features (e.g., creeks) that enable organisms to move among patches of their habitat. The primary movement corridors in the Plan area are Corte Madera Creek and Corte Madera Channel, which provide a link between San Francisco Bay and undeveloped areas west and north of the Plan area. These corridors enable both aquatic and terrestrial species to move between these areas and may also provide cover, food, and water for wide-ranging species moving through otherwise

unsuitable developed habitats. Disruption of these corridors by removal of vegetation or placement of permanent structures or active recreational facilities within corridors would constitute significant impacts to wildlife movement or nursery sites. No permanent structures or barriers to movement along the creek channels are proposed in the Plan area.

Impact BIO-8: Implementation of the Station Area Plan could impact bird nests that are protected under the MBTA and California Fish and Game Code. (S)

Nests of native birds protected under the MBTA and Fish and Game Code are considered a nursery site under CEQA. Several protected bird species were observed foraging in the Plan area and have the potential to nest in existing landscaping and riparian habitat. The proposed project could result in the removal of trees and understory vegetation. Several protected bird species could nest in trees and other vegetation on or adjacent to construction areas and therefore, could be impacted by the proposed project.

Implementation of the following mitigation measure would reduce impacts to nesting bird species to a less-than-significant level.

> Mitigation Measure BIO-8: Implement Mitigation Measure BIO-1 to avoid impacts to nesting birds. (LTS)

Impact BIO-9: Implementation of the Station Area Plan may result in the loss of foraging and roosting habitat for the pallid bat and other special-status bat species and may result in injury or mortality to these species and their offspring. (S)

Development associated with implementation of the Station Area Plan could result in both direct and indirect impacts to the pallid bat and other special-status bat species.

Implementation of the following five-part mitigation measure would reduce this impact to bats to a less-than-significant level.

> Mitigation Measure BIO-9: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:
>
> - Pre-construction surveys for bat roosts shall be required for all buildings or trees that will be removed or modified within the Plan area. The survey shall take place no more than 30 days prior to construction/demolition/removal activities. Preconstruction surveys shall be repeated if demolition or construction activities are delayed more than 30 days.
> - If a bat roost is found in a building or tree cavity, the species of bat using the roost shall be identified and methods to encourage the bats to leave the roost or to prevent them from returning to the roost shall be implemented prior to roost removal. A mitigation plan shall be developed by a biologist experienced in working with bats to specify the methods to be used and the timing of the activities. The mitigation plan shall be submitted to the City and CDFW for approval.
> - Materials from roost sites shall be salvaged, when feasible, to be used in the construction of artificial roosts.

- If special-status bats are found on-site, and the roost would be destroyed during development, a replacement roost shall be provided for the bats. The replacement roost shall be constructed and placed on-site prior to removal of the original roost. A mitigation plan specifying the construction details and siting of the replacement roost, performance standards, type of monitoring and maintenance required, remedial actions if the bats were not to use the replacement roost, and annual reports shall be prepared and approved by the City and CDFW prior to removal of the existing roost. If bats do not use the replacement roost, a different type of replacement roost shall be constructed or the replacement roost shall be moved to a different location. The project sponsor shall provide a secure source of funding for the monitoring of the replacement roost, including any relocated or rebuilt replacement, roosts for a period of at least five years to determine whether the bats used the replacement roost. The roost and roost site will be secured as wildlife habitat in perpetuity through placement of a conservation easement on the mitigation site where the roost is constructed. An endowment in an amount to be determined in consultation with CDFW will also be provided for the long-term maintenance and monitoring of the roost site. A report documenting the implementation of the plan shall be provided to the City within one month of completion of the replacement roost. The plan shall be completed and implemented prior to the issuance of the grading permit.

  If placement of the roost on the site is not feasible, the replacement roost may be constructed at an offsite location in the Larkspur area. The off-site mitigation site shall be placed in a conservation easement and an endowment shall be provided for the long-term maintenance and monitoring of the roost. The off-site mitigation site must be approved by CDFW. Conservation easements established for preservation of plant and animal habitat will be in favor of the CDFW or another qualified conservation organization that can legally hold conservation easements. The conservation easement shall be recorded within 6 months of acceptance of the mitigation and monitoring plan by the CDFW.
- Removal of maternity roosts for special-status bats shall be coordinated with CDFW prior to removal. Maternity roosts for any species of bat, either common or special-status, shall not be demolished until the young are able to fly independently of their mothers. (LTS)

<u>Impact BIO-10</u>: New buildings developed as part of implementation of the Station Area Plan could result in bird collisions. (S)

Wide expanses of glazing on new buildings associated with implementation of the Station Area Pan could result in bird collisions and associated bird fatalities. Resident and migratory birds may die or be injured by striking reflective and plate glass windows. Incorporating design features that make it easier for birds to identify buildings and avoid flying into the structures would reduce this impact to a less-than-significant level.

<u>Mitigation Measure BIO-10</u>: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:

- Bird-safe design practices[59,60,61,62] shall be incorporated into the building designs to the degree feasible, as determined by Community Development Department director. Design elements such as building facades that create "visual noise" via cladding, or other design features that make it easier for birds to identify buildings and not mistake windows for open sky or trees, and windows that are not clear or reflective shall be incorporated into the building designs. Examples of suitable materials include windows that incorporate glass types such as UV-A or fritted glass and windows that incorporate UV-absorbing and UV-reflecting stripe and grid patterns in locations with the highest potential for bird-window collisions (e.g., lower levels near trees). (LTS)

Implementation of the above mitigation measures would reduce potential impacts on wildlife corridors and nursery sites to a less-than-significant level.

(5) Local Policies and Ordinances. Implementation of the Station Area Plan may impact Heritage Trees, as defined in Chapter 12.16 of the Larkspur Municipal Code. Any person desiring to remove one or more heritage trees or prune beyond the "best practices" pruning guidelines promulgated by the International Society of Arboriculture or the American National Standards Institute shall apply to the City Manager or his/her designee or Planning Department, as appropriate, for a permit.

In addition to the City's tree protection ordinance, Action Program 7 of the Larkspur General Plan Environmental Resources Element specifies that if a development proposal requires the removal of trees or other vegetation of significant resource value, these significant resources would need to be replaced.

Impact BIO-11: Implementation of the Station Area Plan may result in the removal of trees that are protected under the City of Larkspur's Tree Protection Ordinance. (S)

Implementation of the following mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure BIO-11: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:

- A tree survey shall be required prior to development by a certified arborist to identify trees protected by the City ordinance. Protected trees shall be avoided to the maximum practicable extent. Protected trees that are removed or damaged during project construction shall be replaced at a minimum 1:1 ratio (replaced: impacted) or according to the terms of the permit issued by the City, whichever is greater. (LTS)

[59] San Francisco Planning Department, 2011. *Standards for Bird-Safe Buildings, San Francisco, California*. Adopted July 14, 2011.

[60] Doeker, R., 2005. *Bird-Safe Design Practices*. Website: www.birdsandbuildings.org/docs/birdsafedesign.pdf.

[61] Toronto, City of, 2007. *Bird-Friendly Development Guidelines*. Green Development Standard, City Planning, Toronto, Ontario, Canada.

[62] New York City Audubon Society, 2007. *Bird Safe Building Guidelines*. New York, NY. Website: www.birdsandbuildings.org/docs/BirdSafeBuildingGuidelines.pdf.

(6) Approved Conservation Plans. No portions of the Plan area are subject to approved local, regional, or State conservation plans. The proposed Plan will have no impact on approved conservation plans and no additional mitigation measures are required.

c. Cumulative Impacts of the Station Area Plan. The Plan area contains several regionally important biological resources. The tidal marsh habitats of the Plan area are part of the larger San Francisco Bay ecosystem that supports numerous special-status wildlife species as well as large numbers of migrating and wintering waterbirds (e.g., shorebirds and waterfowl). The Station Area Plan is not expected to contribute to cumulative impacts to these biological resources since they are located in protected areas where no future development will likely occur under the Plan. The remainder of the Plan area is already surrounded by development and sensitive biological resources in these areas are limited. In addition, implementation of Mitigation Measures BIO-1 through BIO-11 will reduce any impacts the Station Area Plan may have to biological resources to ao less-than-significant level and similarly reduce the Station Area Plan's contribution to any cumulative impacts. As such, implementation of the Station Area Plan will not have significant cumulative impacts to biological resources.

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G. GEOLOGY, SOILS, AND SEISMICITY

This chapter describes the existing geologic conditions, including geologic and seismic hazards, for the Larkspur SMART Station Area Plan (Plan) area, summarizes the applicable regulatory framework, identifies potential significant impacts regarding geology, soils, and seismicity for development within the Plan area, and provides mitigation measures to reduce these impacts to a less-than-significant level.

1. Geologic Setting

The geology, topography, soils and mineral resources within the Plan area are described below, as well as potential seismic and geologic hazards. Information for this section is drawn from regional geologic reports and maps from the United States Geological Survey (USGS), the California Geological Survey (CGS), the Natural Resources Conservation Service (NRCS), and other public sources.

a. Geology. The Plan area is located within the Central Coast Ranges geomorphic province, which is characterized by northwest-southeast trending valleys and ridges. The geology underlying most of the Plan area consists of folded, faulted, sheared, and altered sedimentary, igneous, and metamorphic rock (mélange) of the Jurassic-Cretaceous age Franciscan complex.[1] The portion of the Plan area adjacent to and south of Corte Madera Creek consists of man-made fill overlying Bay Mud, marine, and marsh deposits.[2] Typical fill thickness underlying the Ferry Terminal, south of Sir Francis Drake Boulevard, is approximately 6 feet. The fill consists of Creek channel dredging spoils placed in 1924 which were overlaid by dry fill placed intermittently until 1960, with major fill operations occurring in the late 1940s and late 1950s.[3]

b. Topography. The Plan area topography varies, with the area adjacent to and south of Corte Madera Creek relatively level at an elevation of less than 25 feet above NGVD,[4] and the northern portion of the Plan area containing relatively steep hillsides (greater than 15 degrees) and ridges at elevations ranging from approximately 150 to 400 feet above NGVD.[5] The northeastern portion of the Plan area, north of Larkspur Landing Circle, also includes man-made hill slopes created by pre-1948 quarrying. The portions of the Plan area with steep slopes are potentially subject to landslide hazards, triggered by earthquakes or severe storm events, as discussed below.

c. Soils. Soil is generally defined as the unconsolidated mixture of mineral grains and organic material which mantles the land surfaces of the earth. Soils can develop on unconsolidated sediments, such as alluvium, and weathered bedrock. The characteristics of soil reflect the five major influences on their development: topography, climate, biological activity, parent (source) material, and time.

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[1] United States Geological Survey, 2000. *Geologic Map and Map Database of Parts of Marin, San Francisco, Alameda, Contra Costa, and Sonoma Counties, California,* Report MF-2337, Version 1.0.

[2] Ibid.

[3] Larkspur, City of, 1973. *Larkspur Ferry EIR*. Pages 11-12.

[4] National Geodetic Vertical Datum of 1988, which is roughly equivalent to mean sea level.

[5] United States Geological Survey, 2012. San Rafael Quadrangle 7.5' series Topographic Map.

A summary of soil survey data from the NRCS is presented below in Table IV.G-1. This data indicates that slightly more than 40 percent of surface soils consist of man-made fill, and another 9 percent are former quarry pits. Most of the remaining surface soils are mapped as Tocaloma-McMullin and Tocaloma-Saurin complexes (Tocaloma series). Tocaloma series soils consist of moderately deep, well-drained, fine-grained soils. In the Plan area, they are located on relatively steep slopes (from 15 to 50 degrees). These soils present low corrosivity to steel, with low linear extensibility, and generally present minimal potential for shrink-swell damage to structures. The potential geologic hazards associated with the soils within the Plan area are discussed below.

Table IV.G-1: Soils in the Plan Area

Soil Association/Name	Slope (degrees)	Approximate Acreage within the Study Area (percentage)	Linear Extensibility (shrink-swell)	Corrosivity (uncoated steel)
Blucher-Cole complex	2 to 5	1.2	Low	High
Los Osos-Urban land-Bonnydoon	15 to 30	3.0	Moderate	N/A
Pits, quarries	N/A	9.3	N/A	N/A
Saurin-Bonnydoon complex	15 to 30	1.1	Moderate	Moderate
Tocaloma-McMullin	30 to 50	32.8	Low	Low
Tocaloma-Saurin	15 to 30	12.2	Low	Low
Xerothents, fill	0 to 9	40.5	N/A	N/A

Source: United States Department of Agriculture, 2013. *Web Soil Survey*. Website: websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx (accessed January 15).

d. Mineral Resources. Although the northeastern portion of the Plan area was used for aggregate mining prior to 1948, no part of the Plan area is designated as a mineral resource site under the State Mining and Reclamation Act of 1975 (SMARA).[6] Based on the requirements of SMARA, this suggests that there are no mineral deposits present in the Plan area that are suitable as marketable commodities with a threshold gross selling price of at least $5 million in 1978 dollars. There are no natural gas, oil, or geothermal resources identified as being located in or adjacent to the Plan area.[7,8]

e. Seismic Conditions. The Plan area is located in the seismically active San Francisco Bay Area. The main feature generating the seismic activity in the region is the tectonic plate boundary between the North American and Pacific plates. Locally, this boundary is referred to as the San Andreas Fault Zone (SAFZ) and includes numerous active faults found by the CGS under the Alquist-Priolo Earthquake Fault Zoning Act to be "active" (i.e., to have evidence of fault rupture in the past 11,000 years). Some of the major active faults near the Plan area within the SAFZ include the San Andreas, Hayward, San Gregorio, and Rogers Creek faults. In a fact sheet published in 2003, the USGS estimated that there was a 62 percent probability that between 2003 and 2032, a 6.7 or greater magnitude earthquake will occur in the San Francisco Bay Region. The probability of a 6.7 magnitude or greater earthquake occurring along individual faults was estimated to be 21 percent along the San

[6] Marin County, 2005. *Geology, Mineral Resources and Hazardous Materials Technical Background Report*. Appendix K-1 of the Marin Countywide Plan, Updated November.

[7] California Department of Conservation, 2000. *Energy Map of California, Map S-2*, 3rd Edition.

[8] California Department of Conservation, 2001. *Oil, Gas, and Geothermal Fields in California, Map S-1*.

Andreas Fault, 27 percent along the Hayward-Rodgers Creek Fault, and 10 percent along the San Gregorio Fault. Figure IV.G-1 shows the Fault Activity Map for the San Francisco Bay Region.

Geologic and soil conditions in an area can influence the shaking effects of an earthquake. The Association of Bay Area Governments (ABAG) earthquake hazard mapping indicates a Magnitude 7.9 event on the San Andreas Fault (similar to the 1906 earthquake) would result in strong to violent (MMI VI/IX) shaking in the Plan area. Effects of ground shaking could be magnified by seismic-related liquefaction and landslides. Based on ABAG/USGS mapping, the soils in the Plan area range from a low hazard for liquefaction susceptibility in the hills to very highly susceptible in the filled areas adjacent to and south of Corte Madera Creek, as shown in Figure IV.G-1. Earthquake induced slope stability may also be an issue in portions of the Plan area with steep slopes. The Marin County Countywide Plan maps historic landslides, as well as debris zones, that could be sources for landslides in the Plan area.

f. Seismic and Geologic Hazards. This section describes the hazards associated with the geologic conditions and the potential for seismic events in the Plan area.

(1) Fault Rupture Damage. Surface rupture occurs when the ground surface is broken due to fault movement during an earthquake. Faults in the Plan area vicinity identified by the CGS are shown in Figure IV.G-1. The location of surface rupture generally can be assumed to be along an active major fault trace.

The nearest active faults to the Plan area are the San Andreas Fault, located approximately 7 miles to the southwest, and the Hayward fault, located approximately 9 miles to the east (shown in Figure IV.G-1). The maximum expected earthquakes for these faults is estimated to be magnitude (M_w) 7.9 and 7.1, respectively.[9] No known active faults or fault-rupture hazard zones are present within the Plan area, and the fault rupture hazard is therefore considered to be very low.[10]

(2) Seismic Shaking. Seismic shaking (or ground shaking) is a general term referring to all aspects of motion of the earth's surface resulting from an earthquake, and is normally the major cause of damage in seismic events. The extent of ground shaking is controlled by the magnitude and intensity of the earthquake, distance from the epicenter, and local geologic conditions. Magnitude is a measure of the energy released by an earthquake; it is assessed by seismographs that measure the amplitude of seismic waves. Intensity is a subjective measure of the perceptible effects of seismic energy at a given point and varies with distance from the epicenter and local geologic conditions. The Modified Mercalli Intensity Scale (MMI) is the most commonly used scale for measurement of the subjective effects of earthquake intensity and is further described in Table IV.G-2. Intensity can also be quantitatively measured using accelerometers (strong motion seismographs) that record ground acceleration at a specific location, a measure of force applied to a structure under seismic shaking. Acceleration is measured as a fraction or percentage of the acceleration under gravity (g). In addition

[9] California Department of Conservation, 1996. Division of Mines and Geology. *Probabilistic Seismic Hazard Assessment for the State of California, Open-File Report 96-08*.

[10] California Geological Survey, 2010. *Alquist-Priolo Earthquake Fault Zone Maps*. Website: www.quake.ca.gov/gmaps/ap/ap_maps.htm (accessed January 15, 2013). December.

to the San Andreas and Hayward Faults, noted above, other regional faults are capable of producing ground shaking in the Plan area.

Estimates of the peak ground acceleration have been made by the State for the area based on probabilistic models that account for multiple seismic sources. Under these models, consideration of the probability of expected seismic events is incorporated into the determination of the level of ground shaking at a particular location. The expected peak horizontal acceleration (with a 10 percent chance of being exceeded in the next 50 years) generated by any of the seismic sources potentially affecting the Plan area is estimated by the California Geological Survey at about 0.466g on firm rock areas and about 0.482g[11] on fill or alluvium.[12] This level of ground shaking is a potentially significant hazard.

Table IV.G-2: Modified Mercalli Scale

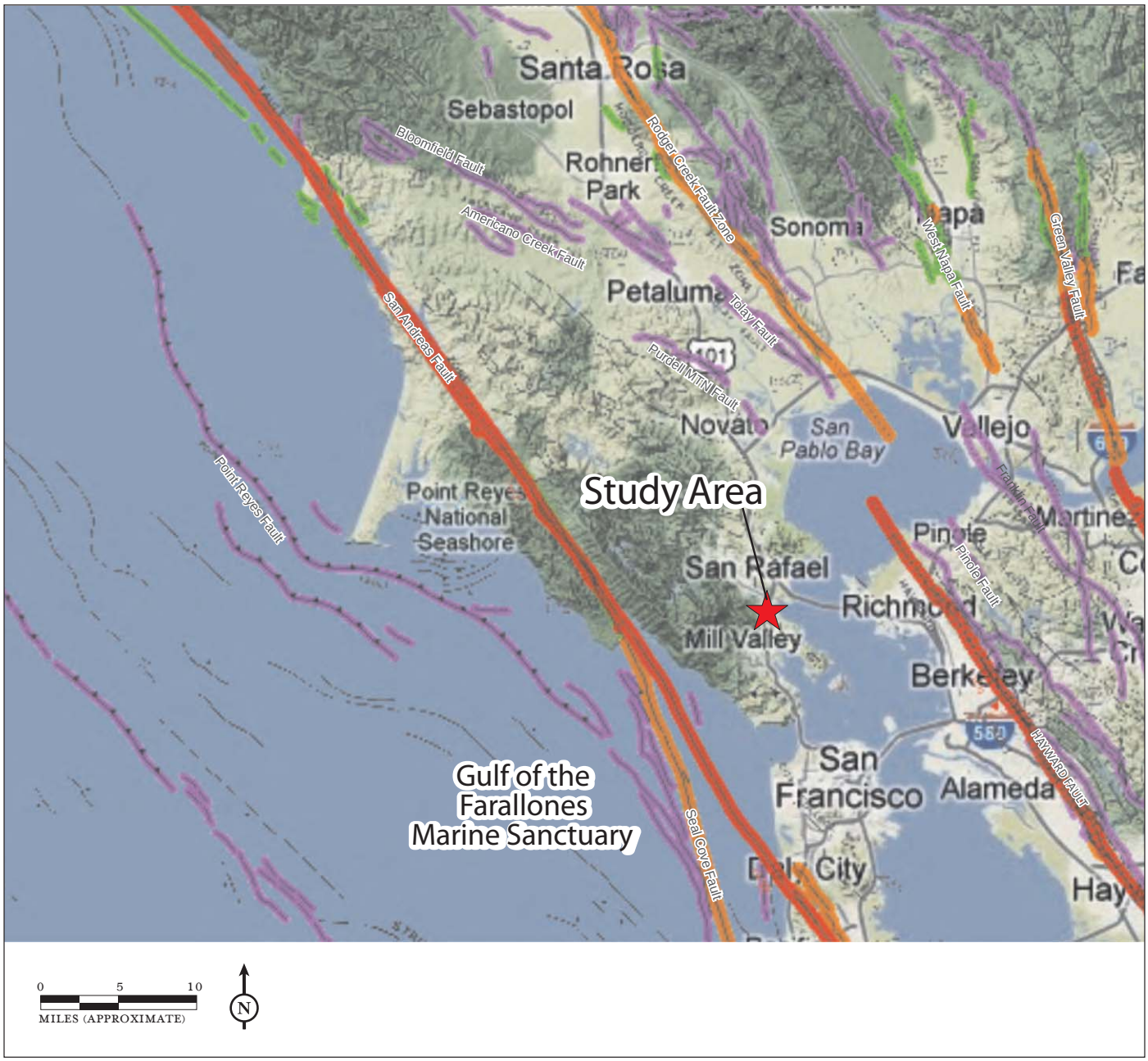
M[a]	Category	Definition
	I	Not felt except by a very few under especially favorable circumstances.
3	II	Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.
	III	Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration like passing of truck. Duration estimated.
4	IV	During the day felt indoors by many, outdoors by few. At night some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
	V	Felt by nearly everyone, many awaken. Some dishes, windows, etc., broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop.
5	VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight.
6	VII	Everybody runs outdoors. Damage negligible in building of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.
	VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed.
7	IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.
8	X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.
	XI	Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.
	XII	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted.

[a] Richter magnitude correlation.

Source: California Geological Survey, 2002. *How Earthquakes and Their Effects are Measured*.

[11] Measured as a fraction or percentage of the acceleration compared to gravity (g).

[12] California Geological Survey, 2012. *Probabilistic Seismic Hazards Mapping Ground Motion Page*. Website: www.consrv.ca.gov/cgs/rghm/pshamap/pshamain.html (accessed January 15, 2013).



LSA

FIGURE IV.G-1

EXPLANATION

Fault traces on land are indicated by solid lines where well located, by dashed lines where approximately located or inferred, and by dotted lines where concealed by younger rocks or by lakes or bays. Fault traced are queried where continuation or existence is uncertain.

City of Larkspur SMART Station Area Plan EIR

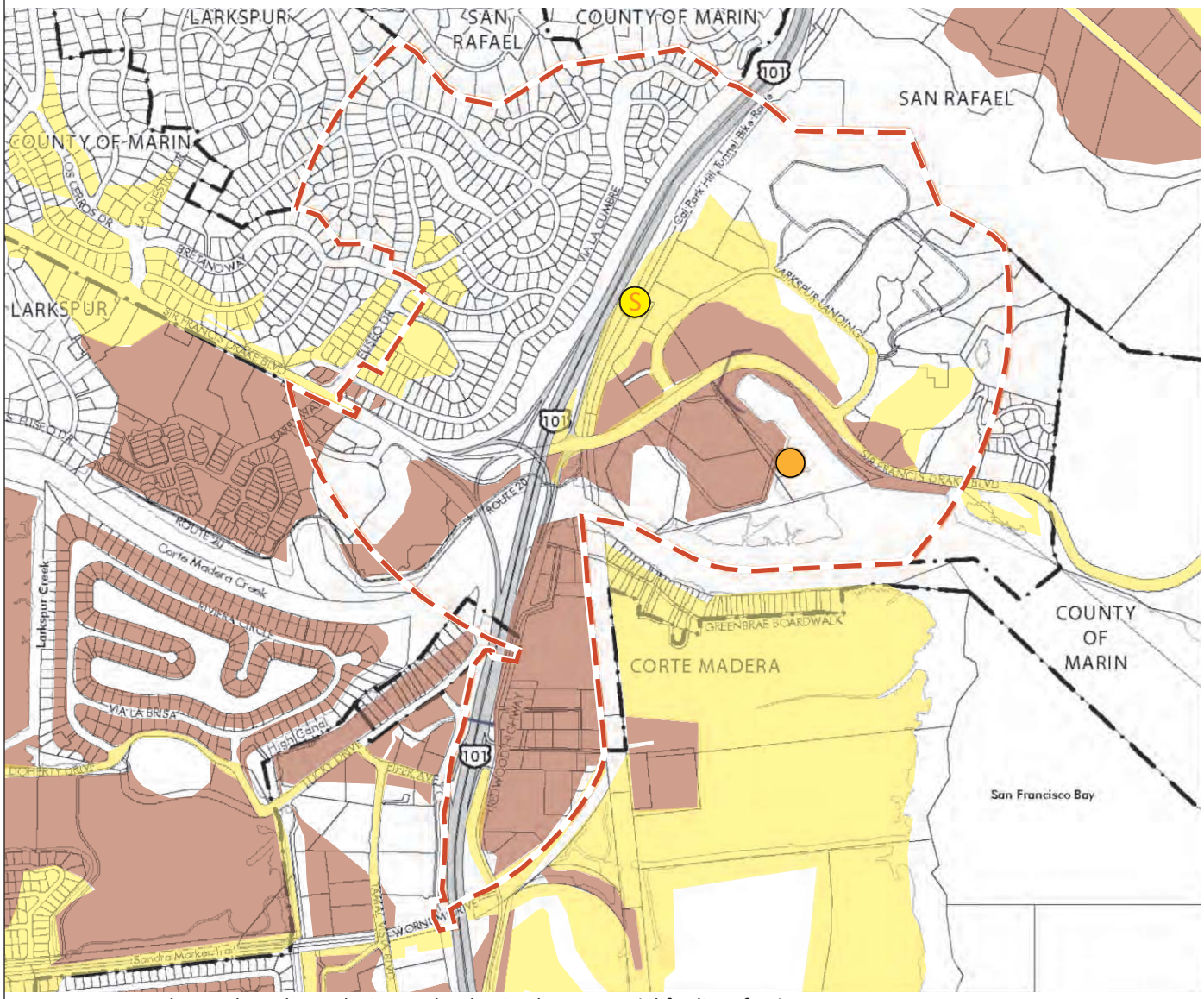
Fault Activity Map

Fault Classification Color Code (Indicating Recency of Movement)

- Fault along which historic (last 200 years) displacement has occurred
- Holocene fault displacement (during past 11,700 years) without historic record
- Late Quaternary fault displacement (during past 700,000 years)
- Quaternary fault (age undifferentiated)
- Pre-Quaternary fault (older than 1.6 million years) or fault without recognized Quaternary displacement

SOURCES: BASELINE, 2013; CALIFORNIA DEPARTMENT OF CONSERVATION, CALIFORNIA GEOLOGICAL SURVEY, 2010, GEOLOGIC DATA MAP NO. 6, 2010 FAULT ACTIVITY MAP OF CALIFORNIA. WEBSITE ACCESSED AT HTTP://WWW.QUAKE.CA.GOV/GMAPS/FAM/FAULTACTIVITYMAP.HTML.

I:\BMD1201 Larkspur SMART\figures\EIR\Fig_IVG1.ai (5/28/13)



Note: Unmapped areas have been designated as having low potential for liquefaction.

LSA

FIGURE IV.G-2

High Liquefaction Susceptibility

Moderate Liquefaction Susceptibility

Study Area Boundary

City Boundary

Smart Station Location

Larkspur Ferry Terminal

City of Larkspur SMART Station Area Plan EIR

Liquefaction Hazard Areas

SOURCES: CITY OF LARKSPUR; ABAG., 2013.

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(3) Liquefaction. Liquefaction is the rapid transformation of saturated, loose, fine-grained sediment to a fluid-like state because of earthquake ground shaking. In the process, the soil undergoes transient loss of strength, which commonly causes ground displacement or ground failure to occur.

Since saturated soils are a necessary condition for liquefaction, soil layers in areas where the groundwater table is near the surface have higher liquefaction potential than those in which the water table is located at greater depths. Liquefaction potential increases in the vicinity of the San Francisco Bay and locally near creeks, such as Corte Madera Creek in the Plan area, where loose granular sediments have accumulated as a result of stream processes. The potential for liquefaction also depends on soil conditions and groundwater levels, which may fluctuate. Liquefaction has resulted in substantial loss of life, injury, and damage to property. In addition, liquefaction increases the hazard of fires because of explosions induced when underground gas lines break, and because the breakage of water mains substantially reduces fire suppression capability. In general, where there is any potential for liquefaction, site-specific studies are needed to determine the extent of the hazard if development were to occur.

Lateral spreading is a form of horizontal displacement of soil toward an open channel or other "free" face, such as an excavation boundary. Ground shaking, especially when inducing liquefaction, may cause lateral spreading toward unsupported slopes. Areas most prone to lateral spreading are those that consist of fill material that has been improperly engineered, that have steep, unstable banks, and that have high groundwater tables. Damage caused by liquefaction and lateral spreading is generally most severe when liquefaction occurs within 15 to 20 feet of the ground surface. Much of the Plan area near and south of Corte Madera Creek has been mapped as having moderate or very high susceptibility to liquefaction, as shown in Figure IV.G-2.[13]

(4) Landsliding. The strong ground motions that occur during earthquakes are capable of inducing landslides, generally where unstable slope conditions already exist. In addition, heavy precipitation events can induce mudflows or debris flows in areas where soils on a hillslope or in a stream channel becomes saturated and unstable.

(5) Slope Stability. Slope failure can occur as either rapid movement of large masses of soil ("landslide") or slow, continuous movement ("creep"). The primary factors influencing the stability of a slope are: 1) the nature of the underlying soil or bedrock; 2) the geometry of the slope (height and steepness); 3) rainfall; and 4) the presence of previous landslide deposits. Landslides are commonly triggered by unusually high rainfall and the resulting soil saturation, by earthquakes, or a combination of these conditions. Slopes greater than 15 degrees are located in the northwest portion of the Plan area, and steep, man-made slopes from historic quarrying operations are located in the northern portion of the Plan area.

(6) Expansive Soils. Expansion and contraction of volume can occur when expansive soils undergo alternating cycles of wetting (swelling) and drying (shrinking). During these cycles, the volume of the soil changes markedly. As a consequence of such volume changes, structural damage to building and infrastructure may occur if the potentially expansive soils were not considered in

[13] Association of Bay Area Governments, 2013. *Liquefaction Susceptibility Map*. Website: gis.abag.ca.gov/website/liquefactionsusceptibility/index.html (accessed January 15, 2013).

building design and during construction. Native soils in the Plan area range from low to moderate shrink-swell potential, as shown in Table IV.G-1. Moderate to high shrink-swell potential soils are classified as expansive soils and construction on these soils may require appropriate engineering to avoid structural damage.

(7) Subsidence. Subsidence is the lowering of the land-surface elevation. The mechanism for subsidence is generally related to groundwater pumping and subsequent consolidation of loose aquifer sediments. The primary hazards associated with subsidence are increased flooding hazards and damage to underground utilities. Other effects of subsidence include changes in the gradients of stormwater and sanitary sewer drainage systems in which the flow is gravity-driven. The Plan area is largely developed and water is provided by the Marin Municipal Water District.[14] There are no significant agricultural or industrial activities that result in the substantial pumping withdrawal of water from the underlying aquifer that would contribute to subsidence in the Plan area.

(8) Settlement and Differential Settlement. Differential settlement or subsidence could occur if buildings or other improvements were built on low-strength foundation materials (including imported fill) or if improvements straddle the boundary between different types of subsurface materials (e.g., a boundary between native material and fill). Although differential settlement generally occurs slowly enough that its effects are not dangerous to inhabitants, it can cause significant building damage over time. Portions of the Plan area that contain loose or uncontrolled (non-engineered) fill may be susceptible to differential settlement.

2. Regulatory Framework

This section describes the applicable federal, State and local regulations that pertain to the Plan area.

a. Federal Regulations – National Earthquake Hazards Reduction Program. The National Earthquake Hazards Reduction Program (NEHRP) was established by the U.S. Congress when it passed the Earthquake Hazards Reduction Act of 1977, Public Law (PL) 95–124. In establishing NEHRP, Congress recognized that earthquake-related losses could be reduced through improved design and construction methods and practices, land use controls and redevelopment, prediction techniques and early-warning systems, coordinated emergency preparedness plans, and public education and involvement programs. The four basic NEHRP goals remain unchanged:

- Develop effective practices and policies for earthquake loss reduction and accelerate their implementation.
- Improve techniques for reducing earthquake vulnerabilities of facilities and systems.
- Improve earthquake hazards identification and risk assessment methods, and their use.
- Improve the understanding of earthquakes and their effects.

Several key federal agencies contribute to earthquake mitigation efforts. There are four primary NEHRP agencies:

[14] Marin Municipal Water District, 2012. *Service Area Boundary Map*. Website: www.marinwater.org/documents/mmwd_service_area.pdf (accessed January 15, 2013). March.

- National Institute of Standards and Technology (NIST) of the Department of Commerce
- National Science Foundation (NSF)
- United States Geological Survey (USGS) of the Department of the Interior
- Federal Emergency Management Agency (FEMA) of the Department of Homeland Security

Implementation of NEHRP priorities is accomplished primarily through original research, publications, and recommendations to assist and guide State, regional, and local agencies in the development of plans and policies to promote safety and emergency planning.

b. State Regulations. State regulations described below include the California Building Code, Alquist-Priolo Earthquake Fault Zoning Act, Seismic Hazards Mapping Act, regulations pertaining to oil, gas, and geothermal wells, and the Surface Mining and Reclamation Act of 1975.

(1) California Building Code. The 2009 International Building Code (IBC) is published by the International Conference of Building Officials (ICBO), and is the widely adopted model building code in the United States. The 2010 California Building Code (CBC) is another name for the body of regulations known as the California Code of Regulations (CCR), Title 24, Part 2, which is a portion of the California Building Standards Code (CBSC). The CBC incorporates by reference the IBC requirements with necessary California amendments. Title 24 is assigned to the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under State law, all building standards must be centralized in Title 24 or they are not enforceable.

Compliance with the 2010 CBC requires that (with very limited exceptions) structures for human occupancy be designed and constructed to resist the effects of earthquake motions. The Seismic Design Category for a structure is determined in accordance with either: CBC Section 1613 – Earthquake Loads; or American Society of Civil Engineers (ASCE) Standard No. 7-05, Minimum Design Loads for Buildings and Other Structures. In brief, based on the engineering properties and soil-type of soils at a proposed site, the site is assigned a Site Class ranging from A to F. The Site Class is then combined with Spectral Response (ground acceleration induced by earthquake) information for the location to arrive at a Seismic Design Category ranging from A to D; D being the most severe conditions. The classification of a specific site and related calculations must be determined by a qualified person and are site-specific.

(2) Alquist-Priolo Earthquake Fault Zoning Act (A-PEFZA). Surface rupture is the most easily avoided seismic hazard. The A-PEFZA was passed in December 1972 to mitigate the hazard of surface faulting to structures for human occupancy. The Plan area is not located within an A-PEFZA designated fault zone.[15]

(3) Seismic Hazards Mapping Act (SHMA). In 1990, following the 1989 Loma Prieta earthquake, the California Legislature enacted the SHMA to protect the public from the effects of strong ground shaking, liquefaction, landslides and other seismic hazards. The SHMA established a state-wide mapping program to identify areas subject to violent shaking and ground failure; the

[15] California Geological Survey, 2010, op. cit.

program is intended to assist cities and counties in protecting public health and safety. The SHMA requires the State Geologist to delineate various seismic hazard zones and requires cities, counties, and other local permitting agencies to regulate certain development projects within these zones. As a result, the CGS is mapping SHMA Zones and has completed seismic hazard mapping for the portions of California most susceptible to liquefaction, ground shaking, and landslides: primarily the San Francisco Bay area and Los Angeles basin. The Plan area and vicinity are not planned to be mapped in conformance with the SHMA.[16]

(4) Oil, Gas, and Geothermal Wells Regulations. The California Department of Conservation's Division of Oil, Gas, and Geothermal Resources oversee the drilling, operation, maintenance, and plugging and abandonment of oil, natural gas, and geothermal wells.[17] The regulatory program emphasizes the development of oil, natural gas, and geothermal resources in the state through sound engineering practices that protect the environment, prevent pollution, and ensure public safety. Available State mapping does not indicate any oil, gas or geothermal resources or exploration in the Plan area.[18,19]

(5) Surface Mining and Reclamation Act of 1975 (SMARA). The principal legislation addressing mineral resources in California is the state Surface Mining and Reclamation Act of 1975 (SMARA) (Public Resources Code Sections 2710–2719), which was enacted in response to land use conflicts between urban growth and essential mineral production. SMARA specifies that lead agencies require financial assurances of each mining operation to ensure reclamation is performed in accordance with the approved reclamation plan. The financial assurances may take the form of surety bonds, irrevocable letters of credit, trust funds, or similar mechanism. No minerals or aggregate resources of statewide importance are located in the vicinity of the Plan area.[20]

c. City of Larkspur General Plan. The City's December 1990 General Plan contains the following applicable policies and action programs regarding geology, soils, and seismicity:

Health and Safety Element

Goal 5: Reduce risks of personal injury and property damage associated with seismic activity.

- Policy j: Establish acceptable levels of risk and life safety standards, and see that buildings are built to, or brought up to, those standards.
  - Action Program [13]: Require that all unreinforced masonry buildings are seismically upgraded to protect against loss of life.
  - Action Program [16]: As soon as legally permissible, adopt new versions of the Uniform Building Code which contain updated seismic requirements.

[16] California Geological Survey, 2013. *Seismic Hazard Zone Mapping, Northern California*. Website: gmw.consrv.ca.gov/shmp/html/pdf_maps_no.html (accessed January 15, 2013).

[17] Resources Agency, 2007. *Publication No. PRC04: California Code of Regulations*, Title 14, Division, 2, Chapters 2-4. Division of Gas, Oil and Geothermal Resources, March.

[18] California Department of Conservation, 2000, op. cit.

[19] California Department of Conservation, 2001, op. cit.

[20] Marin County, 2005, op. cit.

- Action Program [17]: Require geotechnical engineering investigations for (a) buildings proposed to be constructed in "high" seismic hazard areas potentially subject to severe ground shaking and ground failure (Bay mud, stream and landslide deposits) as shown on Figure 7-3 [Seismic Hazards], and (b) critical structures or structures made of materials other than wood frame.

Goal 6: Limit the exposure of existing and future structures to risk from landslides, debris flows and subsidence, and minimize the potential for damage.

- Policy l: Provide property owners with information to assist them in addressing their risk from landslides and debris flows.
  - Action Program [22]: For development in hillside areas, establish, by ordinance, standards for foundations and retaining walls that meet or exceed the current state of the art in structural and civil engineering practice. The standards shall include:
    - (a) A retaining wall that provides support for the footings of a structure must have the same life expectancy as that of the supported structure.
    - (b) A series of stepped or terraced retaining walls should be designed and approved by a qualified engineer even when the height of the individual walls is less than the standard that requires review.
    - (c) A soils engineer or engineering geologist will be required to provide field supervision of the drilling and concrete pouring operations for pier foundations to insure the exclusion of loose debris from the pier holes, insure adequate pier depth, and confirm soil conditions.
    - (d) Foundation plans for hillside structures utilizing pier foundations in soil depths of six feet or greater shall be designed to structural and soils engineering calculations based upon passive pressures and shall demonstrate to the satisfaction of the City that the pier will satisfactorily resist shearing.
- Policy m: Ensure that new development in hillside areas takes place only in areas that are relatively free from the threat of landslide and other forms of ground failure.
  - Action Program [23]: Require approval of a use permit for building additions or new development in areas with an average percent of slope equal to or greater than 25 percent.
  - Action Program [24]: Employ the following standards for assessing the acceptability of new construction in hillside areas and those adjacent areas with a potential risk from landslides and debris flows.
    - (a) Areas subject to recent slope movement or within the paths of debris flows are not suitable for the development of occupied structures. Further disruption of these high risk areas will only be permitted by the City for roads, utilities, and other similar facilities after intensive geologic studies have determined that mitigation measures are practical and their costs warranted.
    - (b) Generally, parcels with an average slope of 65 percent or greater (or that portion of a parcel with a slope of this magnitude) that show evidence of having been formed by landslide processes in the past are not suited for the development of occupied structures.
    - (c) Sites underlain by deep-seated landslides and landslide debris deposits may only be developed with occupied structures if detailed geotechnical investigations demonstrate that any soils creep and future deep seated slide processes will, in the City's opinion, be satisfactorily mitigated.
    - (d) High energy flow paths are not suitable for the development of occupied structures. These flow paths are steep seasonal drainages that have been a path for debris flows in the past.

(e) The development of new occupied structures within debris flow dissipation areas, which are those areas in the vicinity of the mouths of high energy flow paths, will be permitted only if adequate mitigation measures are provided.

- Action Program [25]: Require site-specific geologic and geotechnical reports for new construction in hillside areas and areas subject to settlement or subsidence.
- Action Program [26]: Adopt standards for geologic and geotechnical reports that outline the type and extent of investigation required for various stages of the development process, for various geologic and soils conditions, and for the type of land use and structure proposed.

  (a) Proposed development should include detailed plans for drainage facilities. These plans should incorporate a hydrologic and, where appropriate, a geomorphic evaluation of existing drainage courses and City drainage facilities that will be impacted by the project. The evaluation should demonstrate the adequacy of these systems. After adequacy is demonstrated, the drainage facilities should be connected to City storm drains.

  (b) In hillside areas and at the mouths of seasonal and intermittent streams, a geologic report should be required as a part of the site development review process for all structures proposed for human occupancy and situated where geologic hazards may directly or indirectly influence the design, location, and safety of the structure. A geotechnical report should be required where soil engineering and/or geologic conditions may affect the design, location, and safety of a structure proposed for human habitation.

d. City of Larkspur Municipal Code. Chapter 18.34 of the Larkspur Municipal Code contains regulations designed to reduce potential geologic hazards for slope and hillside development. These regulations apply to properties with an average slope of 10 percent or greater and require grading controls, more restrictive building height and setback requirements, and preservation of at least 35 percent of natural and permeable areas (25 percent plus the average slope percentage). Additional requirements apply if structures are proposed near ridgelines, require greater than 150 cubic yards of cut or fill, or propose greater than 25 cubic yards of cut or fill on properties with an average slope of 25 percent or greater.

3. Impacts and Mitigation Measures

This section provides an assessment of the potential adverse impacts of the Station Area Plan related to geology, soils, and seismicity. It establishes the thresholds of significance for impacts and then evaluates the Plan. Where potentially significant impacts are identified, mitigation measures are recommended.

a. Criteria of Significance. Implementation of the Station Area Plan would have a significant impact on geology and soils if it results in:

- Exposure of a significant number 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;
  - strong seismic ground shaking;
  - seismic-related ground failure, including liquefaction; and/or
  - landslides;

- Substantial soil erosion or the loss of topsoil;
- 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 offsite landslide, lateral spreading, subsidence, liquefaction, or collapse;
- Development located on expansive soil, creating substantial risks to life and property; or
- 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.

b. Impacts Analysis. The growth and changes to land use (commercial, industrial and residential) resulting from implementation of the Station Area Plan could result in increased development and population in the Plan area. Implementation of the Station Area Plan would therefore result in additional people and structures being exposed to geohazards, including seismic risks, liquefaction, slope instability, soil settlement or compaction, and adverse soil conditions (e.g., expansive soils, corrosive soils). Some of these geohazards, particularly those related to seismic shaking, could result in injuries and/or fatalities; all of the geohazards discussed could result in damage to structures and property. The following section provides an evaluation and analysis for the potential impacts of the Station Area Plan for each of the criteria of significance listed above.

(1) Seismic Hazards. Major regional faults located in the Plan vicinity are capable of producing very strong to violent ground shaking in the Plan area, and a major seismic event is likely during the operational lifetime of development and redevelopment projects implemented under the Station Area Plan. Strong to violent seismic shaking could cause serious structural damage to buildings not engineered and constructed to comply with the current CBC, and could cause extensive non-structural[21] damage to buildings in the Plan area.

<u>Impact GEO-1</u>: Implementation of the Station Area Plan could result in substantial risk related to geologic or seismic hazards. (S)

Existing federal and State programs, including NEHRP, the A-PEFZA, the SHMA and the CBC, are designed to provide current information detailing seismic hazards, impose regulatory requirements regarding geotechnical and soils investigations, provide limitations on the locations of structures for human habitation, impose requirements for hazard notices to potential users, and establish structural standards for requirements for buildings and grading projects. City General Plan policies require geotechnical investigations for areas with high seismic hazards and/or non-wood frame structures (Action Policy 17) and in hillside areas (Action Policies 25 and 26).

These existing programs and policies would serve to reduce risk associated with seismic hazards. However, to address all significant impacts related to seismic hazards within the Plan area, site-specific geotechnical reports should be prepared for all development under the Station Area Plan. Implementation of the following mitigation measure would ensure that impacts related to geologic and seismic impacts from new development would be less than significant.

[21] Nonstructural building elements include, but are not limited to: glass, fixtures, furnishings, and other contents, equipment, and utilities (gas, high-temperature water, steam, fire-protection water, etc.).

Mitigation Measure GEO-1: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:

- Prior to the issuance of any grading or construction permits for development projects under the Plan, a design-level geotechnical investigation shall be prepared by a licensed professional and will be included in permit applications to the City Building Department for review and approval. The investigation shall determine the development's geotechnical conditions, including seismic shaking hazard and measures to address these hazards. In addition, the following guidance for the design-level geotechnical investigation shall be addressed:
    - Analysis presented in the geotechnical investigation shall conform to the California Division of Mines and Geology recommendations presented in the Guidelines for Evaluating Seismic Hazards in California. Briefly, the guidelines recommend that the investigation include: a site screening evaluation; evaluation of on- and off-site geologic hazards; quantitative evaluation of hazard potential; detailed field investigation; estimation of ground-motion parameters; evaluation of landslide, liquefaction, lateral-spreading and ground-displacement hazards; and recommendations to reduce identified hazards.
    - Design review for the project shall include evaluation of fixtures, furnishings, and fasteners with the intent of minimizing collateral injuries to building occupants from falling fixtures or furnishings during the course of a violent seismic event.
    - The investigation shall describe the proposed project's geotechnical conditions and address potential geohazards, including subsidence, collapse, soil expansion, corrosion, and differential settlement. The investigation shall identify engineering techniques appropriate to minimize potential geohazard damage.

  All design measures, recommendations, design criteria, and specifications set forth in the design-level geotechnical investigation shall be implemented as a condition of permit approval. (LTS)

(2) Substantial Soil Erosion or the Loss of Top Soil. Development or redevelopment under the Plan would include construction activities that would expose soils and could potentially result in substantial erosion. Soil erosion could result in effects to stormwater quality and affect the quality of receiving waters. Following development, no exposure of soils or erosion would be anticipated.

As discussed in Section IV.H, Hydrology and Water Quality, the State Board adopted an NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ, NPDES No. CAS000002, as amended in 2011 (Construction General Permit). To obtain coverage under the Construction General Permit, a project applicant must submit various documents, including a Notice of Intent and a SWPPP. Activities subject to the Construction General Permit include clearing, grading, and disturbances to the ground, such as grubbing or excavation.

The purpose of the SWPPP is to identify the sources of sediment and other pollutants that could affect the quality of stormwater discharges and to describe and ensure the implementation of BMPs to reduce or eliminate sediment and other pollutants in stormwater as well as non-stormwater discharges resulting from construction activity.

Compliance with the Construction General Permit would reduce erosion and topsoil impacts from the Plan to a less-than significant impact and no further mitigation would be required.

(3) Unstable Geologic Unit or Soil. This section discusses potential impacts of the Station Area Plan related to landslides, lateral spreading, subsidence, liquefaction, or collapse.

Landslide. Landslides induced by earthquakes or heavy precipitation events have the potential to occur in development and redevelopment sites within the Plan area. As shown on Table IV.G-1, approximately half of the Plan area is in areas with slopes greater than 15 degrees, and over 30 percent of the Plan area has slopes greater than 30 degrees. Implementation of Mitigation Measure GEO-1 would reduce the potential impacts related to landslides to a less-than-significant level through the requirement for geotechnical investigations; these investigations must include recommendations from a licensed professional regarding mitigating potential landslide hazards. No further mitigation would be required.

Lateral Spreading and Liquefaction. The Plan area is underlain by materials that have low to very high liquefaction potential. Lateral spreading toward unsupported slopes can be caused by ground shaking and resulting liquefaction. Implementation of Mitigation Measure GEO-1 would reduce this potential impact related to liquefaction and lateral spreading to a less-than-significant level by requiring geotechnical investigations to identify geological hazards for new development and by requiring that the recommendations from a licensed professional be implemented to reduce the identified geological hazard; therefore, no further mitigation would be required.

Subsidence. The Marin Municipal Water District provides water to the project area, so groundwater extraction would not be expected as part of development under the Station Area Plan. Therefore, subsidence would be a less-than-significant impact and no further mitigation would be required.

Collapse. Collapse of soil or rock can occur either at former (or active) mine sites (where mining tunnels can collapse), when soils are subject to addition of water or excessive loading, or failure of trench walls (due to steep slopes). There are no current mining sites in the Plan area, though some gravel mining has historically taken place in the Plan area. Soil collapse from addition of water or loads generally occurs in areas underlain by young alluvial fan sediments, debris flow (a type of landslide) sediments, or windblown sands. Collapsing soil conditions are identified as a geological hazard and would be evaluated during a geotechnical investigation of new development or redevelopment. Implementation of Mitigation Measure GEO-1, which requires geotechnical investigations to identify and mitigate geologic hazards in site design, would reduce this potential impact to a less-than-significant level and no further mitigation would be required.

(4) Expansive Soil. The Plan area includes soils that have been identified as having a low to moderate shrink/swell potential as well as low to high corrosion potential. Structural damage of buildings or rupture of utilities may occur if the potentially expansive and corrosive soils were not considered in the design and construction of development in the Plan area. Implementation of Mitigation Measure GEO-1 would reduce this potential impact related to expansive soils to a less-than-significant level by requiring geotechnical investigations to identify geological hazards for new development and by requiring that the recommendations from a licensed professional be implemented to reduce the identified geological hazard; therefore, no further mitigation would be required.

(5) Septic Tanks. The Plan area is serviced by a sanitary sewer system operated by the Ross Valley Sanitary District. Therefore, there are no impacts related to septic tanks or other alternative wastewater disposal systems and no mitigation is required.

c. Cumulative Impacts of the Station Area Plan. Impacts related to geologic hazards are generally site specific, rather than cumulative in nature, because each project area has unique geologic considerations that would be subject to uniform site development and construction standards. Therefore, the potential for cumulative impacts is limited. Impacts associated with potential geologic hazards related to soil or other conditions occur at individual building sites. These effects are site-specific, and impacts would not be compounded by additional development. The mitigation measure described above would reduce impacts from geologic hazards to a less-than-significant level. Therefore, implementation of the Station Area Plan would not result in a cumulatively considerable contribution to geologic hazards, and the cumulative impact would be less than significant.

H. HYDROLOGY AND WATER QUALITY

This section provides a discussion of existing conditions related to climate, water resources, hydrology, and water quality within the vicinity of the Larkspur SMART Station Area Plan (Plan) area, including the extent and quality of surface water and groundwater, runoff and drainage patterns, and flood conditions. Following the existing conditions discussion is a summary of the regulatory framework related to water resources. The significance criteria, which are used to determine whether development under the Station Area Plan would result in significant impacts to water resources, are listed. Finally, potential impacts to the water resources and hydrology that could result from development under the Station Area Plan are described. Discussions and analysis associated with infrastructure issues associated with the provision of stormwater facilities are also included in Section IV.L, Utilities and Infrastructure.

1. Setting

Existing conditions related to water resources, hydrology, and water quality are described below.

a. Climate. Marin County has a mild Mediterranean climate with long, dry, warm summers and cool, rainy winters. The majority of precipitation occurs between October and May. The mean annual precipitation in the Plan area is about 31 inches.[1] Violent thunderstorms and other extreme weather conditions are rare. The mean annual temperature is about 58ºF.

b. Groundwater Resources. The Plan area is located in the San Francisco Bay Central Hydrologic Planning Area, as defined in the San Francisco Bay Basin Water Quality Control Plan (Basin Plan).[2] The southern portion of the Plan area's groundwater resources (Sub-area 2) is located within the Ross Valley Groundwater Basin (Subbasin No. 2-28). This basin is bounded by San Francisco Bay to the east and Corte Madera Creek to the north, and has a surface area of approximately 2.8 square miles.[3] The northern portion of the Plan area (Sub-areas 1A and 1B) is not in a mapped groundwater basin. Based on a geotechnical investigation conducted at the 2000 Larkspur Landing project site in Sub-Area 1A, groundwater was encountered at approximately 7 to 11 feet below ground surface.[4]

Existing and potential beneficial uses of the Ross Valley Groundwater Basin include municipal and domestic water supply, industrial process water supply, industrial service water supply, and agricultural water supply.[5] Although the Basin Plan lists it as a beneficial use, groundwater resources in the Plan area are apparently not used for drinking water.[6]

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[1] California Department of Water Resources, 2004. *Ross Valley Groundwater Basin, California's Groundwater Bulletin 118*, updated February 27.

[2] California Regional Water Quality Control Board, 2011. San Francisco Bay Region, *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan)*, incorporating all amendments as of December 31.

[3] California Department of Water Resources, 2003. *Bulletin 118, California's Groundwater.* October.

[4] Treadwell & Rollo, 2005. *Geotechnical Investigation, Proposed Development, 2000 Larkspur Landing Circle, Larkspur, California*. December 28.

[5] California Regional Water Quality Control Board, 2011, op. cit.

[6] Transportation Authority of Marin, 2010. *Water Quality Study Report, Central Marin Ferry Connection*. April.

c. Hydrology and Surface Water Resources. The only surface water resource in the Plan area is Corte Madera Creek, which bisects the Plan area from west to east. San Anselmo Creek and Ross Creek to the northwest join to form Corte Madera Creek, which is the largest stream in Marin County. Corte Madera Creek drains the Ross Valley Watershed, which includes 44 miles of stream channels and has an area of 24.7 square miles.[7] Corte Madera Creek drains to San Francisco Bay just east of the Plan area, and water levels in the Creek rise and fall in a predictable manner due to the effects of Bay tides.

The Basin Plan lists beneficial uses for the San Francisco Central Bay Region, which includes Corte Madera Creek and the San Francisco Bay.[8] Existing and potential San Francisco Bay beneficial uses include industrial service supply, industrial process supply, commercial and sport fishing, shellfish harvesting, estuary habitat, fish migration, preservation of rare and endangered species, fish spawning, wildlife habitat, water contact recreation, noncontact water recreation, and navigation.

Corte Madera Creek's existing and potential beneficial uses include cold freshwater habitat, fish migration, preservation of rare and endangered species, fish spawning, warm freshwater habitat, wildlife habitat, water contact recreation, and noncontact water recreation.

d. Stormwater Drainage System. The City of Larkspur storm drainage system is described in the following section. See also Section IV.L, Utilities and Infrastructure.

(1) Existing Conditions. The City of Larkspur has 15 miles of public storm drains, most of which were built in the 1950s and 1960s. They were developed in piecemeal fashion as the City developed and in response to problems as they occurred. As a result, the City's storm drainage system has inconsistent construction quality and varying pipe sizing that has insufficient capacity for current stormwater flows.[9] Some of the system is located on private property with details not recorded with the City's Public Works Department.

As a result, the drainage system has severe flooding and maintenance problems. Two problems are considered especially common:

- Corrugated metal pipe in the system has rusted, causing drainways to collapse.
- Lack of or underdesigned inlets and pipes result in significant volumes of runoff bypassing the inlets, causing flooding and erosion further downstream.

Although deficiencies are present throughout the system, the City has determined that the most critical problems are present in the areas near Corte Madera Creek that are subject to flooding exacerbated by tidal effects, including low lying areas near the intersection of Lucky Drive and

[7] Marin County Watershed Program, 2012. *Watershed Descriptions*. Website: www.marinwatersheds.org/ross_valley.html (accessed June 15).

[8] California Regional Water Quality Control Board, 2011, op. cit.

[9] Larkspur, City of, 2001. *Larkspur 2050 Capital Expenditure Plan*. March. Appendix D: Streets, Bridges, and Drainage.

Industrial Way (within Sub-area 2), the Greenbrae Marina neighborhood (west of Sub-area 2), and the parking lot at Boardwalk #1 (east of Sub-area 2).[10]

An intensive capital improvement program has been proposed to address these deficiencies. The City of Larkspur 2050 Capital Expenditure Plan[11] has designated streets, drainage system, and bridges as its second priority and proposes replacement of approximately 4.5 miles of drain pipe over the next 20 years.

(2) Storm Drain Design Standard. The City uses the 10-year storm event as the basis of its storm drain system design, which is consistent with nearby municipalities and standard practice of the industry. This criterion corresponds to the flow level that would allow minimum standing water but prevent flooding of streets and private properties when runoff is collected and conveyed by ditches, storm drain inlets, and pipes without impediment.

e. Flooding. Flooding, flood zones, sea level rise, and other flooding conditions are described below.

(1) Historic Flood Events. Four historic floods, resulting in significant flood damage, have occurred in Larkspur during the last 60 years. These four floods occurred in December 1955, April 1958, January 1973, and January 1982.[12] During the 1955 and 1982 floods, the area was designated a disaster area and received federal aid. Many streets were flooded and residents had to be evacuated. During the 1982 flood, most of the damage was due to mudslides which were caused by extreme precipitation.

Another significant flood, which began on December 31, 2005, prompted the creation of the Ross Valley Watershed Flood Protection and Watershed Program to develop a comprehensive strategy to address the causes and consequences of flooding in the region. The program is led by the County of Marin Department of Public Works and includes the City of Larkspur and towns of Fairfax, Ross, and San Anselmo.

(2) Localized Flooding. As noted above, localized flooding occurs in many parts of the City due to inadequate drainage systems, with the most significant flooding near Corte Madera Creek, which includes the central portion of the Plan area.

(3) FEMA Flood Zones. Sub-area 2 and the southern portion of Sub-areas 1A and 1B, near Corte Madera Creek, are located in the 100-year flood hazard zone, as determined by FEMA.[13] Flood zones are shown on Figure IV.H-1. Portions of the Plan area near the Bay are also subject to

[10] Ibid.

[11] Ibid.

[12] Transportation Authority of Marin, 2010. *Location Hydraulic Study, Central Marin Ferry Connection.* April.

[13] It should be noted that FEMA is currently updating its flood maps within the Larkspur area.

additional flooding hazards due to storm-induced wave action.[14] The base flood elevation in the Plan area is 9 feet above sea-level.[15]

(4) Tidal Flooding. When heavy rains coincide with unusually high tides, tidal flooding can occur. Low-lying areas close to Corte Madera Creek are particularly susceptible. A combination of low barometric pressure, winds, and rain can raise tide levels by as much as 3 feet. If the tide level exceeds the height of the Creek banks, which is possible during severe events, traditional responses to flooding such as pumping are ineffective until the tide recedes.

As part of the Larkspur 2050 Capital Expenditure Plan, the City plans to implement a system of levees, floodwalls, pumps, and flood control gates that would prevent tidal flooding.

(5) Tsunamis and Seiches. A tsunami is a large ocean wave generated by an earthquake in or near the ocean. A seiche is an earthquake-generated wave within an enclosed body of water, such as a reservoir or lake. According to tsunami information maps produced by the California Emergency Management Agency (CalEMA), in a worst-case scenario, a significant portion of Sub-area 1A, the southwestern portion of Sub-area 1B, and all of Sub-area 2 could be inundated during a tsunami.[16] The inundation map is presented as Figure IV-H-2. This inundation map represents areas that could potentially be affected by the worst-case tsunami, and is intended for local jurisdictions to use to aid evacuation planning. The height of a tsunami wave potentially affecting these areas has not been calculated and would depend on a number of variables, most importantly characteristics of the earthquake triggering the wave. CalEMA plans to prepare more detailed and refined tsunami hazard maps for land use planning purposes sometime in the future. No large enclosed bodies of water, likely to generate a seiche, are located in the Plan area vicinity.

(6) Sea Level Rise. A predicted rise in sea levels will exacerbate already existing coastal flooding hazards. Over the last few decades, the rate of sea level rise has been accelerating. Between 1961 and 2003, global sea level rose by an average of 0.07 inch per year, while from 1993 to 2003 the rate has increased to 0.12 inch per year.[17] The San Francisco Bay Plan from the San Francisco Bay Conservation and Development Commission (BCDC)[18] anticipates a rise in Bay waters of 16 inches by 2050 and 55 inches by 2100. Mapping by BCDC has determined that parts of the Plan area could be inundated by sea level rises of these magnitudes. These areas include areas within the 100-year flood zone and adjoining areas, including the southern portions of Sub-area 1A and 1B and all of Sub-area 2.[19]

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[14] Federal Emergency Management Agency, 2009. *Flood Insurance Rate Map, Marin County, California and Incorporated Areas, Map Number 06051C0459D, Panel 459 of 531*, Effective Date May 4.

[15] Ibid.

[16] California Department of Conservation, Emergency Management Agency, 2009. *Tsunami Inundation Map for Emergency Planning, San Rafael Quadrangle and San Quentin Quadrangle*. July 1.

[17] San Francisco Bay Conservation and Development Commission (BCDC), 2011, *Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on its Shoreline,* October 6.

[18] Ibid.

[19] Ibid.

LSA

FIGURE IV.H-1

N

0 600 1200
FEET

100-Year Flood Zone (approximate location)

Plan Area Boundary

SMART Station Location

Larkspur Ferry Terminal

City Boundary

City of Larkspur SMART Station Area Plan EIR

100 Year Flood Zone

SOURCES: FEMA, 2009; BMS DESIGN GROUP; LSA ASSOCIATES, INC., 2012.

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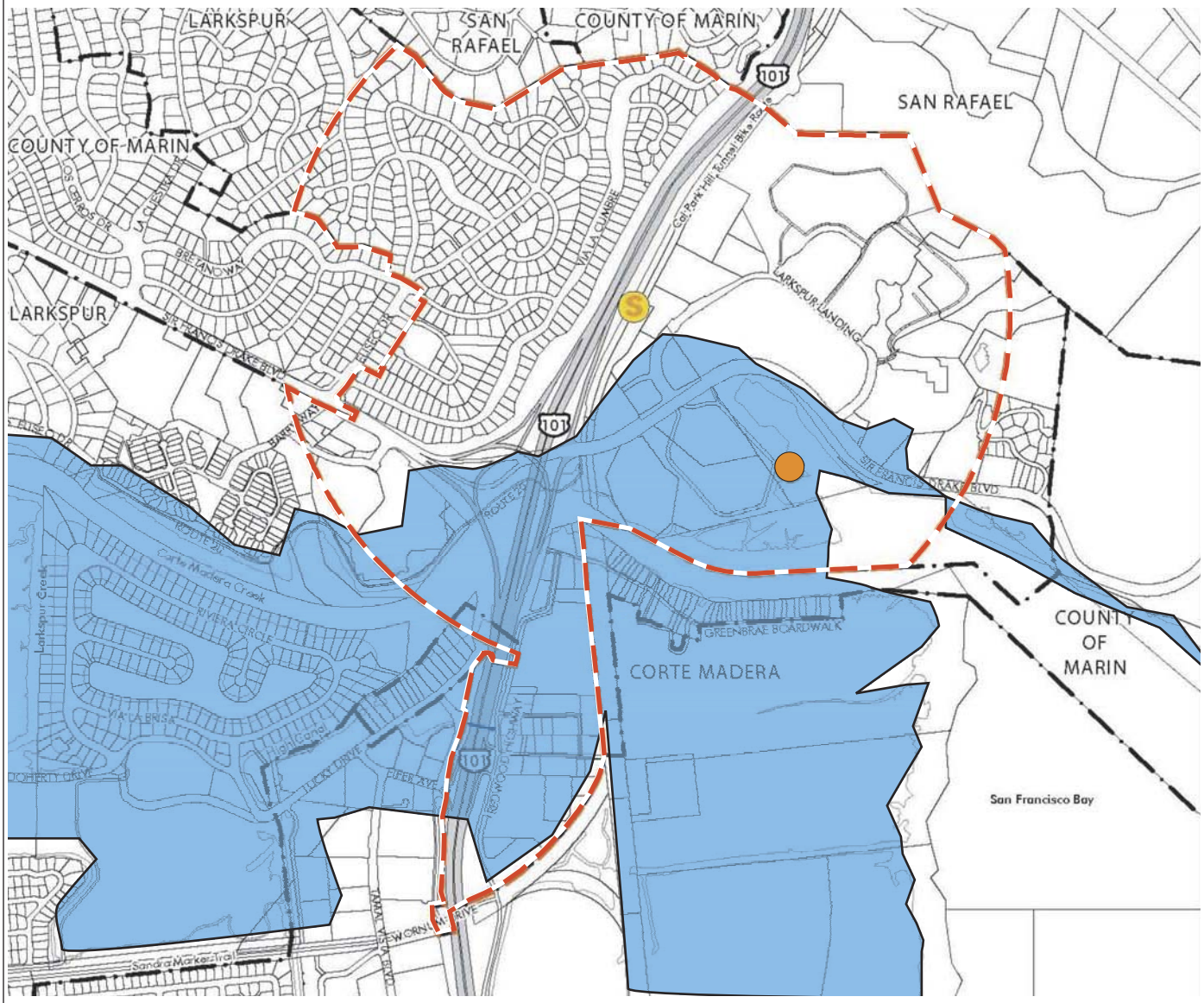

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FIGURE IV.H-2

Tsunami Inundation Areas (approximate location)

Plan Area Boundary

SMART Station Location

Larkspur Ferry Terminal

City Boundary

N

0 600 1200

FEET

[NOTE: Information in this graphic represents the worst-case scenario intended for evacuation planning]

SOURCES: CA DEPT. OF CONSERVATION, EMERGENCY MANAGEMENT AGENCY 2009; BMS DESIGN GROUP; LSA ASSOCIATES, INC., 2012.

City of Larkspur SMART Station Area Plan EIR

Tsunami Inundation Areas

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Sea levels could rise an additional 22 to 35 inches by the end of the century as global climate change continues.[20] Although these projections are on a global scale, the rate of sea level rise along California's coast is relatively consistent with the worldwide average rate observed over the past century. Therefore, it is reasonable to assume that changes in worldwide sea level rise will also be experienced along California's coast.[21]

Sea level rise of this magnitude would increasingly threaten California's coastal regions with more intense coastal storms, accelerated coastal erosion, threats to vital levees, and disruption of inland water systems, wetlands and natural habitats. Rising sea levels and more intense storm surges could increase the risk for coastal flooding.

Because of scientific uncertainties, it is difficult to predict with a high degree of accuracy the sea level rise that will impact Marin County residents. The San Francisco Bay Conservation and Development Commission's (BCDC) most recent assessment assumes a 1.8° to 5.4° F (1° to 3° C) rise in global temperature over the next century and a corresponding sea level rise in San Francisco Bay of 16 inches by mid-century and 55 inches by 2100.[22] Sea level rise of this magnitude would have dramatic impacts on residences, businesses, schools, and public infrastructure located near the shoreline. Inundation maps created by BCDC integrate geographic information system software data from the U.S. Geological Survey and sea level rise projections to assess the vulnerability of Bay Area communities to different level rise scenarios. A 16-inch rise in sea level would result in the flooding of 180,000 acres of shoreline, which is roughly equivalent to today's 100-year floodplain. A 55-inch rise in sea level would flood over 213,000 acres of shoreline, putting billions of dollars of private and public development at risk. Figure IV.H-3 shows shoreline areas vulnerable to sea level rise.

According to the BCDC, changes in climate may cause increased storm activity, which in combination with higher sea level, may cause even greater flooding. It is expected that extreme storm events will cause most of the shoreline damage from flooding. Rising sea levels could impact the delivery of petroleum products, electricity, and drinking water to Bay Area residents and businesses. Residents may also suffer if wastewater treatment is compromised by inundation from rising sea levels, given that a number of treatment plants discharge to the Bay.

The BCDC, in partnership with the federal National Oceanic and Atmospheric Administration (NOAA), is sponsoring the Adapting to Rising Tides (ART) pilot program which aims to aid local governments in planning for sea level rise over the next century. The ART program has developed assessment of existing conditions and vulnerabilities and is currently developing and evaluating adaptation strategies.

A recent BCDC-led study of three marshes in the Corte Madera Baylands (Hearst Marsh, North Muzzi Marsh, and Muzzi Marsh), located east of Sub-area 2, examined strategies for using tidal

[20] California Climate Change Center, 2006, op. cit.

[21] California, State of, 2006. Department of Water Resources. *Progress on Incorporating Climate Change into Management of California's Water Resources*. July.

[22] San Francisco Bay Conservation and Development Commission, 2011. *Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on its Shoreline*. Website: www.bcdc.ca.gov/BPA/LivingWithRisingBay.pdf (accessed June 2012). October.

marshes to protect areas further inland from effects of sea level rise.[23] Tidal marshes and mudflats naturally attenuate wave height and energy. Natural effects have resulted in raising surface elevations in the Corte Madera Baylands approximately 0.1 inch per year, slightly less than current rates of sea level rise. The study concluded that by protecting marshes and tidal mudflats from erosion, improving sediment pathways, and increasing transition zones between the marsh and adjacent uplands, these natural effects can be enhanced and some effects of sea level rise may be ameliorated.[24]

(7) Dam Inundation Areas. The Phoenix Lake Dam is located approximately 3.25 miles west of the Plan area. The California Governor's Office of Emergency Services has indicated that the portions of the Plan area adjacent to Corte Madera Creek could be inundated in the event of the failure of this dam.[25] The dam inundation map is presented as Figure IV.H-4. This failure is not considered likely. Although constructed in 1905, the dam is inspected yearly by the California Division of Dam Safety and is also regularly maintained and improved by the Marin Municipal Water District (MMWD), which owns the dam. A flood-control and seismic safety retrofit of the dam is currently underway and scheduled to be completed in 2015.[26]

Miwok Park contains a manmade reservoir, Tubb Lake, near the northeastern boundary of Sub-area 1A. The dam forming the reservoir was constructed about 100 years ago to provide water for a brick factory. The City of Larkspur, the owner of the dam, is maintaining the dam and its associated components. A CEQA analysis for the 2000 Larkspur Landing Circle Project, located near Tubb Lake, determined that the potential for dam inundation was less-than-significant.[27]

f. Water Quality. A review of published information by the California Department of Water Resources did not identify any information regarding the quality of groundwater in the Ross Valley Groundwater Basin that underlies the Plan area, though limited reports in 1972 suggested that salt-water intrusion may have affected groundwater quality in the lower portions of the basin.[28]

Like many San Francisco Bay Area urban creeks, Corte Madera Creek is on the Clean Water Act (CWA) Section 303(d) list of impaired waters due to diazinon, and is subject to the Total Maximum Daily Load (TMDL) for diazinon and pesticide-related toxicity. The TMDL for all San Francisco Bay Area urban creeks was incorporated as a Basin Plan amendment by the San Francisco Bay Regional Water Quality Control Board (Water Board) in November 2005 through Order R2-2005-0063, which was ultimately approved by EPA in May 2007. As the TDML was being developed by the Water Board, it became clear that replacements for diazinon (such as pyrethroids) would pose similar water quality and sediment concerns as diazinon, so the TDML was designed to address pesticide-related aquatic toxicity in general. Corte Madera Creek has no other listing of impairments.

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[23] BCDC, 2013. *Corte Madera Baylands: Conceptual Sea Level Rise Adaption Strategy*, May 8.

[24] Ibid.

[25] Ibid.

[26] Marin County Watershed Program, 2013. *Phoenix Lake IRWM Retrofit 2012 Project*. Website: www.marinwatersheds.org/documents_and_reports/documents-reports.html (accessed May 16).

[27] Turnstone Consulting, 2004. *Expanded Initial Study, 2000 Larkspur Landing Circle Project*. October 20.

[28] California Department of Water Resources, 2004, op. cit.

Area vulnerable to an approximate 16-inch sea level rise

Area vulnerable to an approximate 55-inch sea level rise

Urbanized Area

Shaded to show topographical relief

Disclaimer: Inundation data does not account for existing shoreline protection or wave activity. This map is for informational purposes only. Users, by their use, agree to hold harmless and blameless the Association of Bay Area Governments along with the State of California and its representatives and its agents for any liability associated with its use in any form. The maps and data shall not be used to assess actual coastal hazards, insurance requirements, or property values or be used in lieu of Flood Insurance Rate Maps issued by the Federal Emergency Management Agency (FEMA).

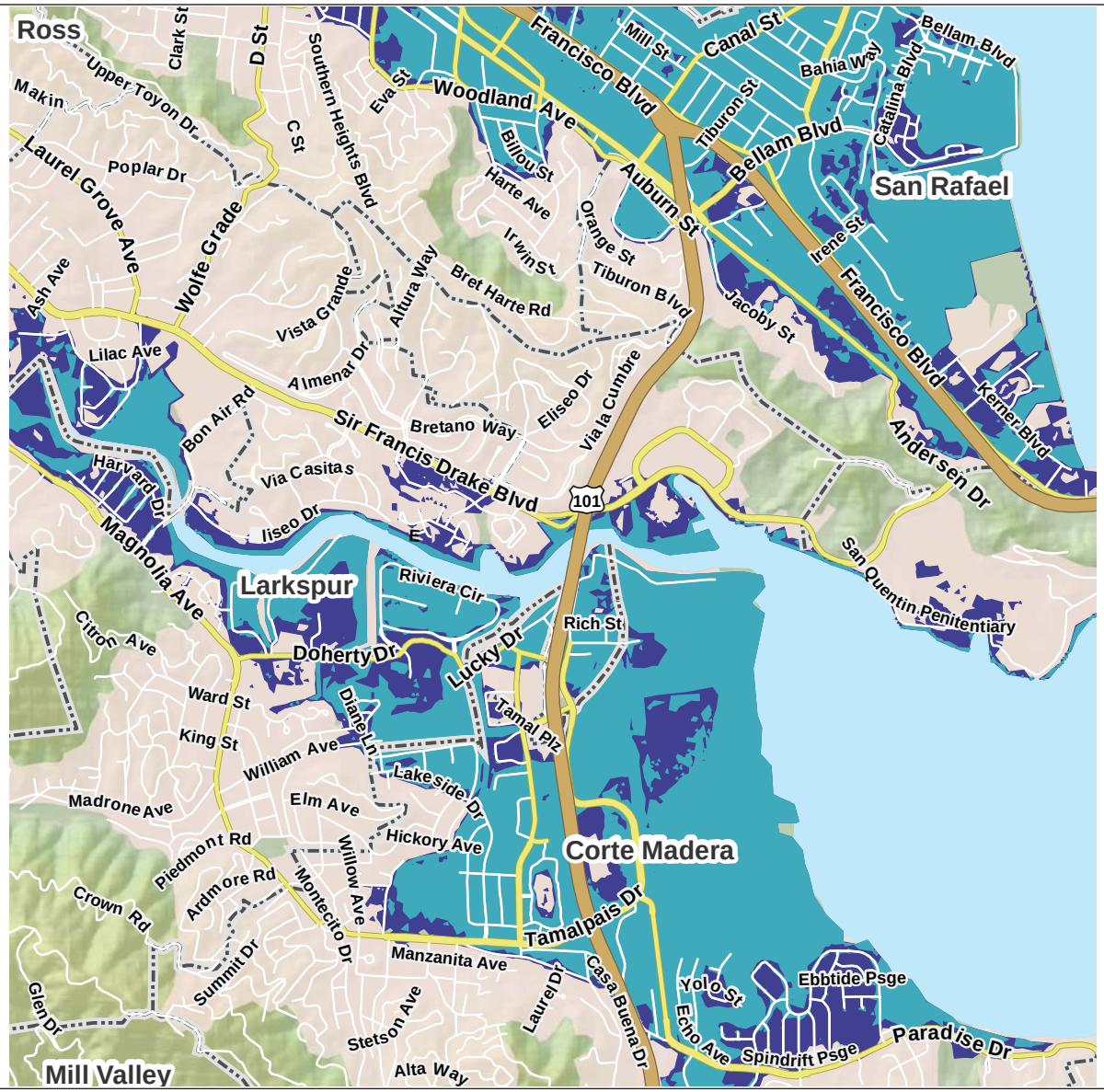

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FIGURE IV.H-3

NOT TO SCALE

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City of Larkspur SMART Station Area Plan EIR

Shoreline Areas Vulnerable to Sea Level Rise in the San Francisco Bay Region

SOURCES: SIEGEL AND BACHARD, 2002; KNOWLES, 2008; ABAG GEOGRAPHIC INFORMATION SYSTEMS, 2013.

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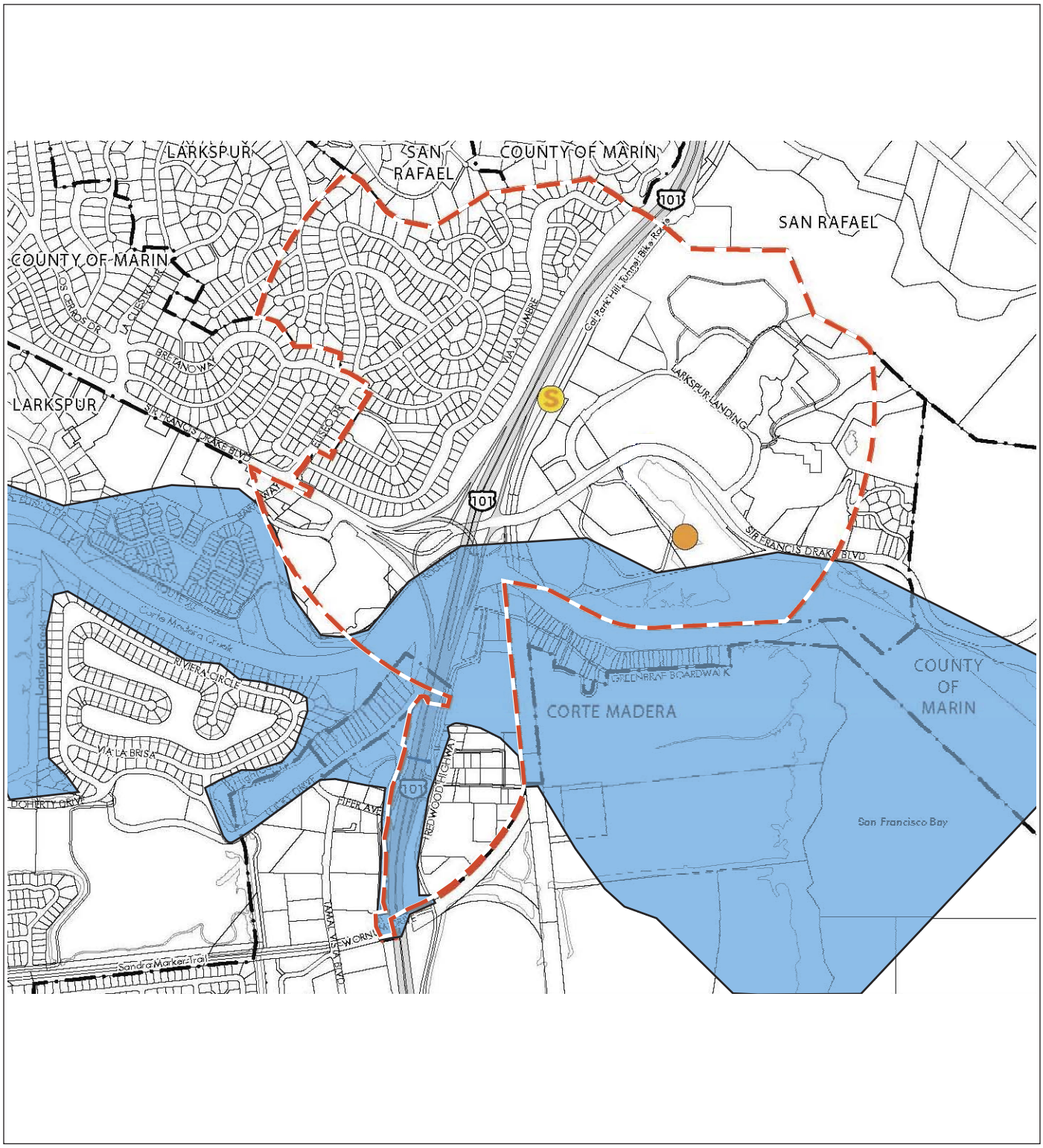

LSA

FIGURE IV.H-4

Water Inundation Area (approximate location)

Plan Area Boundary

SMART Station Location

Larkspur Ferry Terminal

City Boundary

N

0 600 1200

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SOURCES: CALIF. GOVERNOR'S OES; CITY OF LARKSPUR, 2011; BMS DESIGN GROUP; LSA ASSOCIATES, INC., 2012.

City of Larkspur SMART Station Area Plan EIR

Phoenix Dam Inundation Area

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g. Regulatory Framework. Applicable federal, State, and local regulations, and local management programs and plans related to hydrology and water quality in the Plan area are described below.

(1) Municipal Stormwater Program Requirements. Pursuant to Section 402 of the CWA and the Porter-Cologne Water Quality Control Act, municipal stormwater discharges in Marin County are regulated under the statewide National Pollutant Discharge Elimination System (NPDES) General Permit for the Discharge of Storm Water from Small Municipal Separate Storm Sewer Systems (Small MS4 Permit). Prior to being regulated under the Small MS4 Permit, the municipalities in Marin County formed the Marin County Stormwater Pollution Prevention Program (MCSTOPPP) for the purpose of developing a countywide program to satisfy the requirements of the CWA and Basin Plan. The MCSTOPPP also developed a Stormwater Management Plan (Action Plan 2010) to comply with the requirements of the Small MS4 Permit. The Action Plan 2010 includes Performance Standards for the program elements that must be addressed under the Small MS4 Permit: municipal maintenance activities (including road repair and maintenance); illicit discharge controls; new development, redevelopment, and construction site controls; industrial and commercial discharge controls; and public information and participation. Local Small MS4 Permit activities (MCSTOPPP) are overseen by the Water Board.

An updated Small MS4 Permit (Order No. 2013-0001-DWQ) will go into effect July 1, 2013. This updated permit includes a number of post-construction stormwater management criteria for new development and redevelopment projects including Site Design and Low Impact Development (LID) runoff requirements. After June 30, 2015, this will require the use of runoff reduction and treatment measures for development and redevelopment projects that create or replace more than 5,000 square feet of impervious surface. MCSTOPP is currently developing the administrative tools to implement these changes in the MS4 permit.

(2) Construction General Permit. Pursuant to CWA Section 402 and the Porter-Cologne Water Quality Control Act, the SWRCB adopted an *NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit) (Order No. 2009-0009-DWQ, NPDES No. CAR000002) on September 2, 2009. To obtain coverage under the Construction General Permit, the discharger must provide via electronic submittal, a Notice of Intent, a Storm Water Pollution Prevention Plan (SWPPP), and other documents required by Attachment B of the Construction General Permit.

Construction activities subject to the Construction General Permit include clearing, grading, and disturbances to the ground, such as grubbing or excavation, that result in soil disturbances of at least 1.0 acre of total land area (or smaller sites that are part of a common plan of development or sale that disturbs more than 1.0 acre of land surface). A SWPPP must be prepared by a Qualified SWPPP Developer that meets the certification requirements in the Construction General Permit. The purpose of the SWPPP is: (1) to help identify the sources of sediment and other pollutants that could affect the quality of stormwater discharges; and (2) to describe and ensure the implementation of Best Management Practices (BMPs) to reduce or eliminate sediment and other pollutants in stormwater as well as non-stormwater discharges resulting from construction activity. The Construction General Permit mandates certain requirements based on the risk level of the project (Level 1, Level 2, or Level 3), which is based on the risk of sediment discharge and the receiving water risk.

The SWPPP must also include a Construction Site Monitoring Program. The monitoring program includes, depending on the project risk level, visual observations of site discharges, water quality monitoring of site discharges (pH, turbidity, and non-visible pollutants, if applicable), and receiving water monitoring (pH, turbidity, suspended sediment concentration, and bioassessment).

The performance standard in the Construction General Permit is that dischargers shall minimize or prevent pollutants in stormwater discharges and authorized non-stormwater discharges through the use of controls, structures, and management practices that achieve Best Available Technology (BAT) for treatment toxic and non-conventional pollutants and Best Conventional Technology (BCT) for treatment of conventional pollutants.[29] The permit also imposes numeric action levels and numeric effluent limits for pH and turbidity (for Level 2 and Level 3 risk dischargers).

Local General Construction Permit activities are overseen by the Water Board.

(3) City of Larkspur General Plan. The City's 1990 General Plan contains the following policies and action programs regarding hydrology and water quality:

Health and Safety Element

Goal 3: Avoid development in areas prone to natural hazards.

- Policy e: Allow land uses in areas prone to natural hazards only with appropriate mitigation.
  - Action Program [6]: Continue to regulate development to assure the adequate mitigation of safety hazards on sites having a history or threat of slope instability, seismic activity (including liquefaction, subsidence, and differential settlement), flooding, or fire.

Goal 4: Protect Larkspur from the risk of flood damage.

- Policy f: Seek to have the Corte Madera Creek flood control improvements completed upstream from Larkspur.
  - Action Program [7]: Work with the Marin County Flood Control District, the Army Corps of Engineers, and the Town of Ross to develop and implement an improvement plan that protects against flooding.
- Policy g: Work with other cities in the Ross Valley to develop a comprehensive master plan for flood control and management of Corte Madera Creek.
- Policy h: Regulate land uses in flood-prone areas and allow development in those areas only with appropriate mitigation.
  - Action Program [8]: Establish standards for minimum grades and minimum finished floor elevations that take into consideration the rising sea level during the expected life of the project.
- Policy i: Continue to upgrade the City's drainage system.

[29] As defined by the EPA, Best Available Technology (BAT) is a technology-based standard established by the CWA as the most appropriate means available on a national basis for controlling the direct discharge of toxic and non-conventional pollutants to navigable waters. The BAT effluent limitations guidelines, in general, represent the best existing performance of treatment technologies that are economically achievable. Best Conventional Technology (BCT) is a technology-based standard that applies to treatment of conventional pollutants, such as total suspended solids.

- Action Program [9]: Implement the recommendations of the 1988 Storm Drain Master Plan study.
- Action Program [10]: Construct flood walls and a tide gate in the area east of Highway 101.
- Action Program [11]: Balance required protection measures with the need to protect environmental resources, and do so in such a way as to integrate design improvements with the protection of natural resources.
- Action Program [12]: Require site plans to locate structures outside or above the 100-year flood zone wherever possible.
- Action Program [26]: Adopt standards for geologic and geotechnical reports that outline the type and extent of investigation required for various stages of the development process, for various geologic and soils conditions, and for the type of land use and structure proposed.

  (a) Proposed development should include detailed plans for drainage facilities. These plans should incorporate a hydrologic and, where appropriate, a geomorphic evaluation of existing drainage courses and City drainage facilities that will be impacted by the project. The evaluation should demonstrate the adequacy of these systems. After adequacy is demonstrated, the drainage facilities should be connected to City storm drains.

(4) Ross Valley Flood Protection and Watershed Program. The Ross Valley Watershed and Flood Protection Program (RVFPWP), a project of the MCDPW, was established after the 2005 New Years' Eve flood at the request of impacted communities. The RVFPWP includes participation from MCDPW as well as Fairfax, Larkspur, Ross, San Anselmo, and Flood Zone No. 9. In 2011, the RVFPWP completed a Capital Improvement Plan to provide improved flood protection to the watershed. Proposed capital projects would allow Corte Madera Creek to contain the 100-year flood by enlarging the channel, removing or modifying structures within three critical reaches of the Creek, and attenuating flood flows in five large detention basins.[30] These projects are intended to be implemented over the next 10 to 20 years.

2. Impacts and Mitigation Measures

This section provides an assessment of the potential adverse impacts related to hydrology and water quality within the Plan area. It begins with the criteria of significance, which establishes the threshold for determining whether an impact is significant. The latter part of this section identifies potential impacts and evaluates how they relate to development that may take place under the Station Area Plan. Where potentially significant impacts are identified, mitigation measures are recommended.

a. Criteria of Significance. Implementation of the Station Area Plan would have a significant impact on hydrology and water quality if it were to result in:

- Exposure of people or structures to a high risk of loss, injury, or death involving flooding, including flooding as a result of failure of a levee or dam;

[30] Marin County Flood Control and Water Conservation District, 2011. *Capital Improvement Plan Study for Flood Damage Reduction and Creek Management in Flood Zone 9/Ross Valley*. May.

- Placement of structures or improvements within a 100-year flood hazard area as mapped on the FEMA Flood Insurance Rate Map City of Larkspur, Marin County, California (Community Panel #065040 0001B) or any other flood hazard delineation map;[31]
- Creation or contribution of runoff water that would exceed the capacity of an existing or planned stormwater drainage system;
- Substantial alteration of the existing drainage pattern of the site or Plan area, including the alteration of the course of either marine or fresh water, or a substantial increase in the rate or amount of surface runoff in a manner that would result in flooding onsite or offsite;
- The discharge of sediment or contaminants into surface water or wetlands, other adverse changes in surface water quality, or that could result in a violation of water quality standards or waste discharge standards;
- Substantial degradation or depletion of groundwater supplies or substantial interference with groundwater recharge, lowering of the local groundwater table level, or changes in the direction or rate flow of groundwater 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); or
- The contamination of a public water supply or other substantial degradation of water quality.

b. Impacts Analysis. The following sections provide an evaluation and analysis for the potential less-than-significant, significant and cumulative impacts of the Station Area Plan for each of the criteria of significance listed above.

(1) Failure of Levee or Dam. Parts of the Plan area could be inundated by the failure of the Phoenix Lake dam and a small dam forming Tubb Lake. Both dams are currently being maintained by their owners, the MMWD and City of Larkspur, respectively, and therefore the potential for flooding due to a dam failure would be remote, and related impacts would be less than significant.

(2) Housing Within a 100-Year Flood Hazard Area and Other Flooding Hazards. New development under the Plan could place housing and other new construction in flood zones, including within the 100-year flood hazard boundary. Existing federal and State programs address potential flooding impacts. FEMA is responsible for mapping flood hazard zones. State law AB 162, among other provisions, requires the annual review of flood hazard zones.

Existing City provisions for flood hazard reduction (contained in Chapter 15.18.050 of the Larkspur Municipal Code) require additional structural anchoring, use of flood resistant construction materials and methods, and elevation of all residential floors to above the base flood level for all construction in a mapped flood hazard zone. Construction in coastal high hazard zones is subject to additional requirements, including certification of a registered engineer and architect that proposed structures will resist flotation, collapse, and lateral movement from potential wind and water loads during a coastal flooding event.

[31] The City also requires that finished floor elevations be at least 1 foot above the 100-year floor elevation.

While current programs and regulations would adequately mitigate existing flood hazards, they do not address the potential for the exacerbation of these hazards due to projected sea level rise. As noted in the setting section, a sea level rise of 55 inches has been predicted by 2100, within the potential operational lifetime of new development in the Plan area. Mapping shows that several low lying portions of the Plan area, which are currently mapped in 100-year flood hazard zones, could be affected by a sea level rise of this magnitude. This is a potentially significant impact.

Impact HYDRO-1: Implementation of the Station Area Plan could result in substantial risk related to exacerbated flooding hazards as a result of predicted sea level rise. (S)

Implementation of the following mitigation measure would ensure that impacts related to new development flooding hazards would be less than significant.

> Mitigation Measure HYDRO-1: The City shall amend the General Plan to include the following policy in the Health and Safety Element:
>
> > Development projects within a mapped flood hazard zone shall incorporate measures to protect future residents and users from exacerbation of flood hazards due to sea level rise. This shall include certification by a professional engineer or architect that floor elevations and other building requirements for construction in a flood hazard zone shall remain protective of persons and property in the event of a 55-inch sea level rise. (LTS)

(3) Contribute Runoff Water or Polluted Runoff Exceeding Stormwater System Capacity. Development associated with the Station Area Plan may increase and alter the area and location of impervious surfaces, which has the potential to increase stormwater runoff volumes, potentially resulting in hydromodification impacts (degradation of water quality in creeks related to higher erosive flows). Construction activities, operation of new development, and associated changes in runoff patterns also have the potential to introduce contaminants to stormwater. However, existing stormwater permit programs address this potential impact. An infrastructure needs analysis conducted for the Plan[32] concluded that future development in the Plan area would have a negligible impact on the City storm drainage system due to regulatory requirements.[33] Therefore, compliance with existing NPDES permits for construction and post-construction as well as compliance with the updated MS4 permit for development after June 2015 would be expected to reduce stormwater flows and pollutant loads over existing conditions, as projects are developed, and reduce this impact to a less-than-significant level. No additional mitigation is required.

(4) Alter Existing Drainage Patterns Affecting Surface Water Courses or Creating Flooding. As noted in the above section, development associated with the Station Area Plan has the potential to increase and alter impervious surfaces, which could increase stormwater runoff volumes, potentially resulting in hydromodification impacts (degradation of water quality in creeks related to higher erosive flows). However, existing stormwater permits would require new development to ensure that impacts related to stormwater under the Station Area Plan would be less than significant.

[32] BMS Design Group, 2013. *Infrastructure Needs Analysis Technical Report, Larkspur Station Area Plan.* December 10.

[33] Ibid.

Please refer to Section IV.L, Utilities and Infrastructure, for additional discussion regarding the City's stormwater collection system.

(5) Violate Water Quality Standards. New development associated with the Station Area Plan would be subject to existing water quality regulations and programs, as described in the Regulatory Framework section above. These programs establish water quality standards and provide enforcement and specific new development projects would be required to comply with these programs. Compliance with existing regulatory programs would ensure that water quality impacts related to Station Area Plan development would be less than significant and no additional mitigation measures are required.

(6) Degrade or Deplete Groundwater Supplies or Recharge. Changes in impervious surface as part of proposed Station Area Plan development would be minor compared to the 24.7 square miles of the Ross Valley Watershed, and no significant changes in groundwater recharge would be expected as a result of development associated with the Station Area Plan. No groundwater use would be anticipated as a result of development under the Station Area Plan. MMWD provides water supply for the Plan area. MMWD does not rely on groundwater for water supply, as most of MMWD water originates from rainwater within MMWD watershed areas, with a small amount imported from the Russian River.[34] Therefore, groundwater impacts would be less than significant and no additional mitigation measures are required.

(7) Contamination of Water Supply or Degradation of Water Quality. As noted under criteria (5), above, existing regulatory requirements would reduce water quality impacts from development associated with the Station Area Plan to a less-than-significant level and no additional mitigation measures are required.

c. Cumulative Impacts of the Station Area Plan. Some of the impacts discussed in this section, such as flooding, are site-specific. Although development has the potential to increase greenhouse gas emissions which may accelerate sea level rise and increase flooding hazards, development under the Station Area Plan would be subject to local and regional planning efforts such as the City of Larkspur Climate Action Plan that would reduce cumulative impacts related to sea level rise to a less-than-significant level. More detail is provided in Section IV.D, Global Climate Change. However, construction under the Station Area Plan, in combination with construction of other areas within the Ross Valley Watershed, could increase erosion and sedimentation and degrade storm water runoff quality during the construction activities if grading and excavations occur during the wet season. Implementation of existing regulatory requirements, including preparation and implementation of Stormwater Pollution Prevention Plans, are required under current NPDES regulations. These measures would reduce potential construction-period cumulative impacts to a less-than-significant level. Redevelopment of sites, in accordance with existing stormwater requirements, would require the treatment and retention of stormwater during the operational phase of areas developed under the Station Area Plan. Therefore, the project would not make a significant cumulative contribution to adverse hydrology and water quality impacts within the watershed.

[34] Marin Municipal Water District, 2012. *Fact Sheet*. Website: www.marinwater.org/documents/District_Fact_Sheet_2012.pdf (accessed May 20, 2013).

I. HAZARDS AND HAZARDOUS MATERIALS

This chapter describes hazards and hazardous materials[1] within the vicinity of the Larkspur SMART Station Area Plan (Plan) area that could pose a significant threat to human health or the environment. The impacts and mitigation measures section defines the criteria of significance and identifies potential impacts and mitigation measures related to hazards and hazardous materials in the Plan area.

1. Setting

The setting section describes existing conditions in the Plan area, including pertinent federal, State, and local agency laws, regulations, and programs related to hazards and hazardous materials.

a. Hazardous Materials. In other sections of this Draft EIR, the regulatory section follows a description of the existing conditions. However, because the regulatory framework provides a key description of what constitutes hazardous materials, the regulatory framework discussion precedes a description of the existing conditions in this section.

(1) Regulatory Framework. Products as diverse as gasoline, paint, solvents, household cleaning products, refrigerants, and radioactive substances are categorized as hazardous materials. The proper management of hazardous materials is a common concern for all communities. Beginning in the 1970s, governments at the federal, State, and local levels became increasingly concerned about the effects of hazardous materials on human health and the environment. Numerous laws and regulations were developed to investigate and mitigate these effects. As a result, the storage, use, generation, transport, and disposal of hazardous materials are highly regulated by federal, State, and local laws and regulations. These agencies and information about the laws, regulations, and programs they administer are summarized below.

Federal Regulations. The U.S. Environmental Protection Agency (EPA) is the lead agency responsible for enforcing federal laws and regulations governing hazardous materials that affect public health or the environment. The major federal laws and regulations enforced by the EPA include: the Resource Conservation and Recovery Act (RCRA); the Toxic Substances Control Act (TSCA); the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); and the Superfund Amendments and Reauthorization Act (SARA).

In 1976, RCRA was enacted to provide a general framework for the EPA to regulate hazardous waste from the time it is generated until its ultimate disposal. In accordance with RCRA, facilities that generate, treat, store, or dispose of hazardous waste are required to ensure that the wastes are properly managed from "cradle to grave."

[1] The California Health and Safety Code defines a hazardous material as "... any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety, or to the environment. Hazardous materials include, but are not limited to, hazardous substances, hazardous waste, radioactive materials, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment." (Health and Safety Code, Section 25501).

In 1976, TSCA was enacted to provide the EPA authority to regulate the production, importation, use, and disposal of chemicals that pose a risk of adversely impacting public health and the environment, such as polychlorinated biphenyls (PCBs), asbestos-containing materials (ACM), and lead-based paint. TSCA also gives the EPA authority to regulate the cleanup of sites contaminated with specific chemicals, such as PCBs.

In 1980, CERCLA, commonly known as the Superfund, was enacted to ensure that a source of funds was available for the EPA to remediate uncontrolled or abandoned hazardous materials release sites that pose a risk of adversely impacting public health and the environment. Prohibitions and requirements regarding closed or abandoned hazardous waste sites and liability standards for responsible parties were also established by CERCLA. In 1986, SARA amended CERCLA to increase the Superfund budget, modify contaminated site cleanup criteria and schedules, and revise settlement procedures.

While the EPA regulates overall use and cleanup of hazardous materials, the U.S. Department of Transportation (DOT) is the federal administering agency responsible for hazardous materials transportation regulations. The DOT Office of Hazardous Materials Safety oversees a national safety program to minimize the risks related to commercial transportation of hazardous materials. The federal hazardous materials transportation law is the basic statute regulating hazardous materials transportation in the United States.[2] Federal hazardous materials transportation regulations are contained in 49 Code of Federal Regulations (CFR) Parts 171-180. In California, the California Department of Transportation (Caltrans) is the implementing agency for DOT laws and regulations.

Worker health and safety is protected by federal and State laws and regulations. The Occupational Health and Safety Administration (OSHA) is the federal agency responsible for enforcement and implementation of federal laws and regulations pertaining to worker health and safety. Under OSHA jurisdiction, the Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations require training and medical supervision for workers at hazardous waste sites.[3] Additional regulations have been developed for construction workers regarding exposure to lead and asbestos during construction activities.[4] State regulations pertaining to worker health and safety are discussed below.

Other relevant federal laws include the Hazardous and Solid Waste Amendments Act (HSWA) regarding hazardous waste management, the Toxic Substances Control Act (TSCA), pertaining to the tracking and screening of industrial chemicals, and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), which controls pesticide distribution, sale and use. Applicable federal regulations and guidelines are contained primarily in CFR Titles 10, 29, 40, and 49.

State Regulations. In California, the EPA has granted most enforcement authority over federal hazardous materials regulations to the California Environmental Protection Agency (Cal/EPA). The mission of Cal/EPA is to restore, protect, and enhance the environment to ensure public health, environmental quality, and economic vitality. Under the authority of Cal/EPA, the Department of

[2] United States Code of Federal Regulations, Title 49, Section 5101 et seq.

[3] United States Code of Federal Regulations, Title 29, Section 1910.120.

[4] United States Code of Federal Regulations, Title 29, Sections 1926.62 and 1926.1101.

Toxic Substances Control (DTSC) and the San Francisco Bay Regional Water Quality Control Board (Water Board) are responsible for overseeing the cleanup of contaminated soil and groundwater sites in the Plan area. Water Board regulations applicable to hazardous materials are contained in Title 27 of the California Code of Regulations (CCR). Additional State regulations applicable to hazardous materials are contained in CCR Title 22. CCR Title 26 is a compilation of those sections or titles of the CCR that are applicable to hazardous materials.

The California Department of Industrial Relations, Division of Occupational Safety and Health (DOSH), enforces State worker health and safety regulations related to construction activities. Regulations include exposure limits, protective clothing, and training requirements to prevent exposure to hazardous materials. DOSH also enforces occupational health and safety regulations specific to lead and asbestos investigations and abatement, which equal or exceed their federal counterparts.[5]

Local Regulations. The routine management of hazardous materials in California is administered under the Unified Program.[6] The Cal/EPA has granted responsibilities to the Marin County Department of Public Works, Waste Management Division (MCDPW) for implementation and enforcement of hazardous material regulations under the Unified Program as a Certified Unified Program Agency (CUPA). CUPA responsibilities and requirements are codified in the Marin County Municipal Code Title 7 (Health and Sanitation), Chapters 7.80-7.83. In addition, the Larkspur Fire Department (LFD) ensures that businesses in the Plan area maintain required hazardous materials permits through annual business inspections to enforce the City's Fire Code.[7]

The City of Larkspur 1990 General Plan policies related to hazardous materials include the following:

Health and Safety Element

Goal 9: Protect Larkspur from accidental exposure to hazardous materials from spills, leaks, vapor releases, and improper or illegal storage and disposal.

- Policy q: Limit the use and storage of hazardous materials in Larkspur to commercial and industrial areas.
  - Action Program [34]: Designate zone districts where hazardous materials can be used and stored.
  - Action Program [35]: Closely monitor and enforce regulations concerning the use and handling of hazardous materials.
  - Action Program [36]: Require transporters of hazardous materials to notify the City before moving such materials along City streets.

(2) Hazardous Materials Programs. Within the Plan area, most hazardous materials programs are administered and enforced under the Unified Program, described below. These

[5] California Code of Regulations, Title 8, Sections 1529, 1532.1, and 5192.

[6] California Health and Safety Code, Chapter 6.11, Sections 25404-25404.8.

[7] Chapter 14.04 of the Larkspur Municipal Code.

programs address businesses only. Household hazardous waste, generated by residents, is administered separately.

The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of the following hazardous materials programs: Hazardous Materials Business Plan (HMBP) Program, California Accidental Release Prevention (CalARP) Program, Underground Storage Tank (UST) Program, Aboveground Storage Tank (AST) Program, Hazardous Waste Generator Program, and Hazardous Waste Tiered-Permitting Program. The hazardous materials programs administered under the Unified Program are described below.

Hazardous Materials Business Plan Program. Any facility storing aggregate quantities of any hazardous materials equal to or greater than 10 gallons of liquids, 50 pounds of solids, or 200 cubic feet of gases is required to report their chemical inventories to the LFD by preparing a HMBP. An HMBP must include measures for safe storage, transportation, use, and handling of hazardous materials. The HMBP must also include a contingency plan that describes the facility's response procedures in the event of a hazardous materials release. This informs the community on chemical use, storage, handling, and disposal practices. It is also intended to provide essential information to fire fighters, health officials, planners, elected officials, workers, and their representatives so that they can plan for and respond to potential exposures to hazardous materials.

California Accidental Release Prevention Program. Under The CalARP Program, the HMCD requires facilities that handle more than a threshold quantity of a regulated hazardous substance (listed in Tables 1-3, 19 CCR 2770.5), such as federally listed extremely hazardous toxic and flammable substances and state listed acutely hazardous materials, to prepare a risk management plan (RMP). An RMP must analyze the potential for an accidental release and provide measures that can be implemented to reduce this potential. Facilities that are required to prepare an RMP must obtain and keep current a CalARP Program Facility Permit. Based on a review of environmental regulatory databases, no CalARP facilities are located within the Plan area.

Underground Storage Tank Program. Due to fire hazards, flammable liquids, such as gasoline, have historically been stored in USTs, which, over time, may leak, resulting in potential risks for the general public and the environment. The UST Program implemented by the MCDPW requires that USTs be installed, monitored, operated, and maintained in a manner that protects public health and the environment. Tanks must be constructed with primary and secondary levels of containment and be designed to protect public health and the environment for the lifetime of the installation. The USTs must be monitored for leaks and built such that a leak from the primary container into the secondary container will be detected. When a UST is proposed to be removed, a detailed permit application must be submitted to MCDPW. The MCDPW oversees UST removal activities to identify potential evidence of leakage.

Aboveground Storage Tank Program. The Aboveground Petroleum Storage Act (APSA) requires facilities in California storing petroleum products in aboveground tanks greater than or equal to 55 gallons and having an aggregate aboveground storage capacity greater than or equal to 1,320 gallons to prepare and implement a Spill Prevention, Countermeasure, and Control (SPCC) plan (40 CFR 112). An SPCC plan must address prevention, preparation, and response measures to prevent oil discharges into navigable water and adjoining shorelines. Facilities with aggregate aboveground

storage capacity of 1,320 gallons or more of petroleum are required to operate under a Hazardous Materials Permit and submit a tank facility statement annually to the MCDPW. At least once every three years, the MCDPW inspects storage tanks with a storage capacity of 10,000 gallons or more of petroleum to determine if the owner or operator is in compliance with the SPCC plan requirements of the APSA.

Hazardous Waste Generator Program. Once a hazardous material has been used or processed, what remains may be considered a hazardous waste. Facilities that generate more than 100 kilograms of hazardous waste per month, or more than one kilogram of acutely hazardous waste, must be registered with EPA's RCRA program and are subject to extensive regulations regarding storage and disposal. At least once every three years, the MCDPW inspects hazardous waste generators to ensure that they are adhering to RCRA requirements.

(3) Household Hazardous Wastes (HHW). Many residents routinely store and dispose of hazardous materials, such as paints and thinners, cleaning products, motor oil, batteries, electronics, and other such items. Long-term storage of hazardous products in residences poses an unnecessary risk of accidentally poisoning children and/or pets. When residents discard these kinds of hazardous materials, they become HHW. Pouring HHW down the drain, into storm sewers, or on the ground and placing HHW in the trash could potentially contaminate soil, groundwater, or surface water.

In California, it is illegal to dispose of HHW in the trash, down the drain, or by abandonment.[8] The Marin Hazardous and Solid Waste Joint Powers Authority provides recycling and disposal options for HHW. Drop-off services for HHW are available to Plan area residents at the Marin Household Hazardous Waste Facility at 565 Jacoby Street in San Rafael.

(4) Hazardous Materials in Soil, Groundwater, and Surface Water. The following describes reported hazardous materials releases in the Plan area.

Hazardous Materials Release Sites. Releases of hazardous materials may occur during use, storage, transfer, and disposal activities and contaminate soil, groundwater, and surface water. Known or suspected contaminated sites under DTSC or Water Board oversight are identified by Cal/EPA pursuant to Government Code 65962.5. The provisions of Government Code 65962.5, which are commonly referred to as the Cortese List, require the DTSC, the Water Board, the California Department of Health Services, and the California Integrated Waste Management Board to submit information pertaining to sites associated with solid waste disposal, hazardous waste disposal, and/or hazardous materials releases to the Secretary of Cal/EPA. Under the authority of the DTSC and Water Board, the MCDPW oversees the investigation and remediation of leaking UST (LUST) sites in the Plan area.

Redevelopment projects at or near hazardous material release sites have the potential to encounter hazardous materials in soil and groundwater during construction, and, if not remediated, this contamination could result in health risks to future workers or residents. A review of environmental database information identified 11 reported hazardous material release sites at and adjacent to the

[8] California Health and Safety Code, Section 25218-25218.13

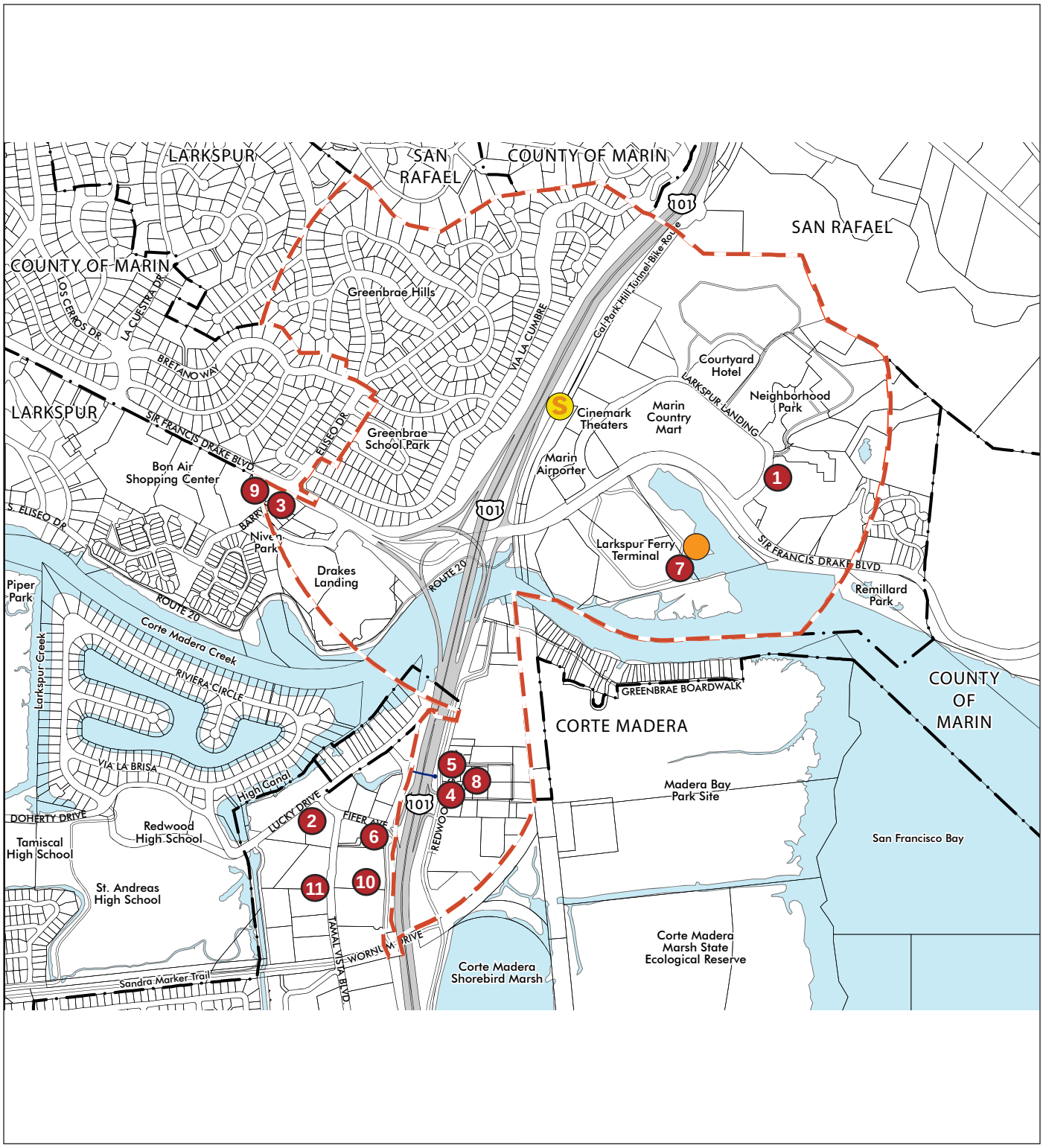
Plan area.[9] These included two sites in Sub-Area 1A, two sites in Sub-Area 1B, three sites in Sub-Area 2, and four sites in the light industrial area west of Sub-Area 2. These sites are listed in Table IV.I-1 and the locations are shown in Figure IV.I-1.

Table IV.I-1: Hazardous Materials Release Sites In and Adjacent to the Plan Area

Figure IV.I-1 Site ID	Site Name/Address	Hazardous Material(s) Involved	Status
1	2000 Larkspur Landing	Lead, Diesel, Motor Oil, PCBs	Investigation and remedial action at this site were completed and certified by DTSC in 2006. Some additional soils with contaminants above remedial action cleanup levels were identified in a subsequent soil investigation. The contamination was believed to be related to imported fill. A remedial plan was prepared in 2007 to remove up to 1,600 cubic yards of fill materials at the site. After completion of this proposed remedial plan, all contamination above residential land use thresholds would be removed from the site.
2	Corte Madera Corporation Yard 81 Lucky Drive	Gasoline	Remediation of release from UST has been completed – case closed.
3	Shell 295 Sir Francis Drake Blvd	Waste Oil	Remediation of release from UST has been completed – case closed.
4	Marin Car Wash 2066 Redwood Highway	Gasoline	Open case – investigation and remediation is ongoing.
5	Super 7 2070 Old Redwood Highway	Gasoline	Remediation of release from UST has been completed – case closed.
6	Exxon 200 Nellen Avenue	Gasoline	Remediation of release from UST has been completed – case closed.
7	Larkspur Ferry Terminal 101 E. Sir Francis Drake Blvd	Oil	Four spills (ranging from approximately one cup to approximately 20 gallons in volume) have been reported at the ferry terminal. Cleanups were performed at the time of the spills.
8	Allen Heating & Sheet Metal 36 Industrial Way	Gasoline	Remediation of release from UST has been completed – case closed.
9	Chevron 301 Sir Francis Drake Boulevard	Gasoline	Remediation of release from UST has been completed – case closed.
10	Marin Municipal Water District 220 Tamal Vista	Waste Oil	Remediation of release from UST has been completed – case closed.
11	Wincup Holdings Inc. 195 Tamal Vista Blvd	Diesel	Remediation of release from UST has been completed – case closed.

Source: Baseline Environmental Consulting, 2012.

[9] Environmental Data Resources, 2012. *EDR Radius Map with GeoCheck, Larkspur SMART Station Area,* Inquiry Number 3345737.1s. June 15.



LSA

FIGURE IV.I-1

Plan Area Boundary

SMART Station Location

Larkspur Ferry Terminal

Hazardous Material Release Site

City Boundary

Water

NOTE: See Table IV.I-1 for site names, addresses and status.

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City of Larkspur SMART Station Area Plan EIR

Hazardous Materials Release Sites In and Adjacent to the Plan Area

SOURCES: BMS DESIGN GROUP; LSA ASSOCIATES, INC., 2012.

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Nine of the reported release sites involve the release of petroleum products from a LUST. As these releases are underground, contamination from LUST release sites may spread to groundwater, through which it can migrate away from the release site. Eight of the nine LUST sites have been closed by MCDPW, indicating that remediation is complete or was not necessary (Table IV.I-1). Only the Marin Car Wash site, at 2066 Redwood Highway (Site 4 on Table IV.I-1 and Figure IV.I-1) remains under active investigation.

The two remaining release sites include the 2000 Larkspur Landing site (Site 1 on Table IV.I-1 and Figure IV.I-1), where contaminated soil is known to be present, and the Larkspur Ferry Terminal (Site 7 on Table IV.I-1 and Figure IV.I-1), where four small releases of oil have been reported.

Aerially-Deposited Lead. Lead alkyl compounds were first added to gasoline in the 1920s. Beginning in 1973, the EPA ordered a gradual phase out of lead from gasoline that significantly reduced the prevalence of lead by the mid-1980s.[10] Soils adjacent to major roadways often contain elevated concentrations of aerially-deposited lead. The lead deposition is the result of airborne particulates and surface water runoff associated with tailpipe emissions prior to the time lead was phased out of vehicle fuels.[11] Lead has commonly been found within 30 feet of the edge of pavement and within the top 6 inches of soil.[12]

In the Plan area, a soil investigation was performed in 2010 for the Central Marin Ferry Connection Project to evaluate the presence of aerially-deposited lead.[13] The investigation included the collection of 12 soil samples from four locations near the intersection of Highway 101 and Sir Francis Drake Boulevard. Total lead in soil was identified at concentrations ranging from 8.0 to 100 milligrams per kilogram (mg/kg, often referred to as parts per million), below the health-risk based threshold of 200 mg/kg for residential land uses established by the Water Board.[14] As Highway 101 and Sir Francis Drake Boulevard are the most heavily trafficked roadways in the Plan area, these findings suggest that aerially-deposited lead is not present in significantly elevated concentrations in the Plan area.

(5) Sensitive Receptors. Some populations, such as children, the elderly, and the infirm, are more susceptible to health effects of hazardous materials than the general population. Hazardous materials use near schools, day care centers, senior housing, and hospitals must consider potential health effects to these populations, often referred to as "sensitive receptors." Construction or redevelopment on contaminated properties that could potentially generate vapors or fugitive dust containing contaminants may potentially pose a health risk to these populations. In addition, commercial and industrial facilities in proximity to sensitive receptors may have hazardous emissions or handle hazardous or acutely hazardous materials that could pose a health risk to these sensitive receptors.

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[10] California Department of Toxic Substances Control, 2004. *Draft Lead Report*. August.

[11] California Department of Toxic Substances Control, 2000a. *Variance No. 00-H-VAR-01*. September 22.

[12] California Department of Toxic Substances Control, 2000b. *Fact Sheet, Variance for Caltrans Districts 4,6,7,8,10,11,12 for Reuse of Lead-Contaminated Soils*.

[13] Transportation Authority of Marin, 2010. *Phase II Soil Investigation, Central Marin Ferry Connection, Larkspur, California*. April.

[14] Ibid.

In the Plan area, residential areas and schools would be considered areas with sensitive receptors. These include the multi-family residential buildings in Sub-Area 1A, the single-family homes in the Sub-Area 1B, and the mobile home communities in Sub-Area 2. Schools in and near the Plan area include the Children's Cooperative Pre-school at 2900 Larkspur Landing Circle in Sub-Area 1B, and the Redwood, San Andreas, and Tamiscal High Schools located west of Sub-Area 2.

(6) Hazardous Building Materials. Hazardous materials are commonly found in the types of building materials that may be affected during demolition and renovation activities in the Plan area. Building materials such as thermal system insulation, surfacing materials, and asphalt and vinyl flooring materials installed in buildings prior to 1981 may contain asbestos according to DOSH.[15] Asbestos is a known human carcinogen.[16] Prior to 1978, lead compounds were commonly used in interior and exterior paints. Demolition or renovation in the Plan area could release asbestos fibers and lead particles into the air from structures constructed prior to 1981 and 1978, respectively, which then may be inhaled by construction workers and the general public. In addition, other common items present in buildings, such as electrical transformers, fluorescent lighting, electrical switches, heating/ cooling equipment, and thermostats could contain hazardous materials, which may pose a health risk if not handled and disposed of properly.

Federal and State regulations govern the removal of asbestos-containing material (ACM) from structures prior to demolition. These requirements are promulgated by the EPA, OSHA, DTSC, and the Bay Area Air Quality Management District (BAAQMD). The BAAQMD, under authority of the California Air Resources Board (CARB), is the lead agency overseeing hazardous air emissions. All friable (crushable by hand) ACMs, or non-friable ACMs subject to damage, must be abated prior to demolition in accordance with applicable requirements. Friable ACM must be disposed of as an asbestos waste at an approved facility. Non-friable ACM may be disposed of as non-hazardous waste at landfills that will accept such wastes. Workers conducting asbestos abatement must be trained in accordance with DOSH and OSHA requirements. The BAAQMD must be notified at least ten working days prior to commencement of renovation or demolition involving the removal of regulated ACM. In addition, Section 19827.5 of the California Health and Safety Code prohibits local agencies from issuing demolition permits until an applicant has demonstrated compliance with asbestos notification requirements pursuant to the National Emissions Standards for Hazardous Air Pollutants (40 CFR Part 61).

Federal and State regulations also govern the renovation or demolition of structures where lead or material containing lead is present. Regulations pertaining to renovation or demolition of structures with lead-based paint are promulgated by the EPA, the U.S. Department of Housing and Urban Development (HUD), DOSH, and DTSC. Federal regulations require that lead-based paint equal to or greater than 1.0 milligram per square centimeter or 0.5 percent by weight be removed prior to renovation or demolition if the paint is loose and peeling (40 CFR 745.227(h)). Loose and peeling paint must be disposed of as a State and/or federal hazardous waste if the concentration of lead equals or exceeds applicable waste thresholds. State and federal construction worker health and safety regula-

[15] California Code of Regulations, Title 8, Section 5208.

[16] Agency for Toxic Substances and Disease Registry, 2001. *ToxFAQs for Asbestos*. September.

tions require air monitoring and other protective measures during demolition activities where lead-based paint is present, and notification to DOSH for abatement activities (8 CCR 1532.1).

Fluorescent lighting tubes and ballasts, mercury thermometers, and several other common items containing hazardous materials are regulated as "universal wastes" by the State of California. Universal waste must be recycled to be managed under the simple, streamlined universal waste handler standards for the State of California.[17]

b. Wildland Fire Hazards. In accordance with California Public Resource Code Section 4201 4204 and Government Code Section 51175-51189, the California Department of Forestry and Fire Protection (CalFire) has mapped areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors. These zones, referred to as Fire Hazard Severity Zones (FHSZ), represent the risks associated with wildland fires. Fire Hazard Severity Zones mapped by CalFire for State and local responsibility areas are classified as either "Medium," "High," or "Very High" based on fire hazards; however, the law only requires identification of Very High Fire Hazard Severity Zones in local responsibility areas. Wildland-Urban Interface Areas designated by local agencies are also classified as Fire Hazard Severity Zones. No Fire Hazard Severity Zones for State responsibility areas[18] or Very High Fire Hazard Severity Zones for local responsibility areas[19] have been identified in the Plan area, though part of the San Quentin peninsula east of Sub-Area 1A, including San Quentin prison and Shoreline Band Park, has been designated as a Medium Fire Hazard Severity Zone.[20]

The Health and Safety Element of the Larkspur 1990 General Plan contains the following policies and action programs related to wildland fire hazards.

Health and Safety Element

Goal 7: Protect Larkspur residents and property from hazards.

Goal 8: Minimize the risk of wildland and structural fires, and ensure adequate fire protection.

- Policy o: Maintain an aggressive fire prevention program.
  - Action Program [28]: Continue to inspect all businesses, public buildings and apartment buildings annually for fire and building code violations.
  - Action Program [29]: Continue to require that all vacant lots annually be cleared of excessive vegetation.
  - Action Program [30]: Continue to require smoke alarms and Class C or better fire retardant roofs for all new construction.

[17] California Code of Regulations, Title 22, Division 4.5.

[18] California Department of Forestry and Fires, 2007. *Fire Hazard Severity Zones in SRA, Marin County*, Adopted by CAL FIRE on November 7.

[19] California Department of Forestry and Fires, 2008. *Very High Fire Hazard Severity Zones in LRA, Marin County*, Recommended for Adoption by CAL FIRE in October.

[20] California Department of Forestry and Fires, 2007, op. cit.

- Policy p: Establish more stringent fire protection standards for private development in high risk fire hazard areas.
  - Action Program [31]: Require that automatic sprinkler systems be installed in new residences in areas with difficult access and/or poor water supply.
  - Action Program [32]: Require that brush be cleared for a distance of 30 feet from residences in high fire-hazard areas.
  - Action Program [33]: Establish landscaping guidelines that encourage the use of fire-resistant plants in high fire-hazard areas.

c. Aviation Hazards. No public airports or private use airfields are located within 2 miles of the Plan area. As a result, no likely sources of aviation hazards are present in the area.

d. Emergency Response. Larkspur's Emergency Management Plan (EMP)[21] is the City's action plan for responding to major disasters, including but not limited to flooding, a major earthquake, landslides, a major transportation accident, wildland fire, and hazardous materials incident. The EMP establishes operation protocols for an Emergency Operations Center (located at the Twin Cities Police Authority station), and addresses the coordination and integration of Larkspur's emergency response operations with other governmental agencies. The LFD participates with other agencies in Marin County's emergency preparedness programs including Get Ready Marin and the County's Community Emergency Response Training program.

The City of Larkspur 1990 General Plan has the following policies and action programs related to emergency response:

Health and Safety Element

Goal 2: Prepare and make a planned, coordinated response to a disaster.

- Policy a: Maintain an updated emergency response plan.
- Policy b: Identify essential emergency facilities and make provisions to ensure that they will function in the event of a disaster.
- Policy c: Strive to educate the community about environmental hazards, measures which can be taken to protect lives and property, and methods for responding to various disasters.
- Policy d: Cooperate with other public agencies to store, organize, distribute, and administer emergency medical equipment, supplies, services, and communications systems.
  - Action Program [1]: Continue to update the City's emergency plan.
  - Action Program [2]: Identify specific facilities and lifelines critical to effective disaster response, and evaluate their abilities to survive and operate efficiently immediately after a major disaster.

[21] San Rafael, City of, 2010. Office of Emergency Services. *City of Larkspur Emergency Management Plan,* October.

2. Impacts and Mitigation Measures

This section provides an assessment of the potential adverse impacts related to hazards and hazardous materials for development within the Plan area. It begins with the criteria of significance, which establishes the threshold for determining whether an impact is significant. The latter part of this section identifies potential impacts and evaluates how they relate to potential development under the Plan. Where potentially significant impacts are identified, mitigation measures are recommended.

a. Criteria of Significance. Implementation of the Station Area Plan would have a significant impact if it were to result in:

- The creation of a significant hazard to the public or the environment through the routine transportation, use, or disposal of hazardous materials;
- The creation of 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;
- Hazardous emissions or the handling of hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school;
- Development located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5 (if such development would create a significant hazard to the public or the environment);
- Development located in an area covered by an airport land use plan (or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport), if it would result in a safety hazard for people residing or working in the project area;
- Development within the vicinity of a private airstrip, if it would result in a safety hazard for people residing or working in the project area;
- Impairment of or physical interference with the implementation of an adopted emergency response plan or emergency evacuation plan; or
- Exposure of people or structures to 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.

b. Impacts Analysis. The following section provides an evaluation and analysis for the potential impacts of the Station Area Plan for each of the criteria of significance listed above and potential cumulative impacts.

(1) Transport, Use, Handling or Disposal of Hazardous Materials. While the SMART train and the Larkspur Ferry would be used solely for passenger transportation, new development or redevelopment in the Plan area would involve the routine management of hazardous materials that could pose a significant threat to human health or the environment if not properly managed or accidently released. During construction, this would include the use of fuels, lubricants, and other hazardous materials associated with heavy construction equipment. During operation, it would be expected that small quantities of cleaning, maintenance, and landscaping chemicals would be used and stored in buildings developed under the Station Area Plan.

The routine storage, use, handling, generation, transport, and disposal of hazardous materials during site construction and operation activities are addressed by federal, State, and local laws, regulations, and programs, including RCRA, TSCA, DOT regulations in 49 CFR, and hazardous materials regulations in CCR Title 26 on the federal and State levels. On the local level, the MCDPW and LFD implement regulatory programs for sites that routinely manage hazardous materials to ensure the safe storage, management, and disposal of hazardous materials in accordance with the Unified Program and City policies (see discussion, above).

Compliance with federal, State, and local requirements would reduce these potential impacts to a level of less-than-significant and no further mitigation would be required.

(2) Release of Hazardous Materials. As shown on Table IV.I-1 and Figure IV.I-1, several hazardous material releases have been reported within and adjacent to the Plan area. There may be a potential for other, previously unreported releases to have occurred in the Plan area as part of historical land uses. Aerially-deposited lead may be present in soils near busy roadways from vehicle exhaust during the period before lead was phased out of gasoline in California. If present, contaminants in soil or groundwater could expose future workers, residents, the nearby public, and the environment to potential hazards. Future construction workers would have direct contact with potentially contaminated soils and groundwater, and contamination could be spread via fugitive dust or improper groundwater dewatering. Future residents and workers could also be exposed to hazardous materials in soils or migrating into indoor air via soil gases.

In addition, some materials in buildings that would be demolished or remodeled under the Station Area Plan likely contain lead, asbestos, and other hazardous materials. Though these materials would not pose a health risk during use, if not abated prior to building demolition, these hazardous materials could be released to the air, posing a potential impact to construction workers and the nearby public.

The potential presence of hazardous materials in soils, groundwater, and building materials is a significant impact.

<u>Impact HAZ-1</u>: Implementation of the Station Area Plan could result in an impact to human health and/or the environment related to hazardous materials present in soil, groundwater, and building materials within the Plan area. (S)

Implementation of the following two mitigation measures would ensure that potential impacts from releases of hazardous materials currently present in soils, groundwater, and building materials within the Plan area would be less than significant.

<u>Mitigation Measure HAZ-1</u>: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:

- A Phase I Environmental Site Assessment (ESA) shall be prepared to American Society for Testing and Materials (ASTM) standards for development and redevelopment projects conducted under the Station Area Plan. If the Phase I identifies the potential for soil or groundwater contamination to be present at the site, a Phase II ESA shall be prepared by a qualified environmental professional.

If contamination is identified during Phase I and II investigations, projects undertaken under the Plan shall incorporate any necessary measures to ensure that any potential added health risks to construction workers, maintenance and utility workers, site users, and the general public as a result of hazardous materials are reduced to a cumulative risk of less than 1 x10-6 (one in one million) for carcinogens and a cumulative hazard index of 1.0 for non-carcinogens, or as otherwise required by a regulatory oversight agency. The risk evaluation and any required response actions would be a condition of approval for construction, demolition, or grading permits and would be subject to review and/or approval by regulatory oversight agencies. These agencies could also require additional site investigation to more fully delineate the extent of contaminants of concern at the site. If extensive on-site excavation and/or soil off-haul is determined to be the appropriate response action, additional CEQA review may be required to evaluate potential impacts for the response related to air quality, noise, and traffic.

- Hazardous building materials surveys shall be conducted by a qualified and licensed professional for all structures, not previously inspected or abated, proposed for demolition or renovation as part of a project associated with the Station Area Plan. All loose and peeling lead-based paint and ACM shall be abated by certified contractor(s) in accordance with local, State, and federal requirements. All other hazardous materials, such as "universal wastes," shall be removed from buildings prior to demolition in accordance with DOSH regulations. The completion of the abatement activities shall be documented by a qualified environmental professional(s) and submitted to the City for review with applications for issuance of construction and demolition permits. (LTS)

(3) Existing and Proposed School Sites. In general, children are more susceptible to health effects from exposure to hazardous materials, substances, and/or waste than adults. Under State law, prospective school sites must be reviewed to determine that such sites are not contaminated by hazardous materials or located within 0.25 mile of land uses that manage substantial quantities of hazardous materials. California Education Code Sections 21151.2, 21151.4, and 21151.8 specifically require investigation of prospective school sites in accordance with DTSC guidance. Existing schools in the Plan vicinity include the Children's Cooperative Pre-school in Sub-Area 1B, and the Redwood, San Andreas, and Tamiscal High Schools west of Sub-Area 2.

No impact would be expected during the operational phase of projects developed under the Station Area Plan. The residential, office, hotel, and retail uses proposed to be developed in the Plan area would not emit hazardous materials potentially affecting school sites. The implementation of Mitigation Measure HAZ-1, addressing existing hazardous materials that may be present in soils, groundwater, and building materials, in conjunction with existing regulatory requirements for hazardous materials would reduce the potential for school children to be exposed to hazardous or acutely hazardous materials during construction to a less-than-significant level. No additional mitigation is required.

(4) Hazardous Material Sites. Hazardous material contamination from hazardous material release sites compiled in accordance with Government Code section 65962.5 can affect human health and the environment. Direct contact, inhalation, or ingestion of hazardous materials could potentially cause adverse health effects to construction workers and future site users. Implementation of Mitigation Measure HAZ-1, which would require a review and evaluation of hazardous materials sites as

part of a Phase I environmental site assessment for projects developed under the Station Area Plan, would reduce this impact to a less-than-significant level. No additional mitigation is required.

(5) Public Airport and Private Airstrip Hazards. No public airports or private use airfields are located within 2 miles of the Plan area, so no aviation hazards would be anticipated.

(6) Emergency Response and Evacuation Plans. The type of development and redevelopment projects associated with the Station Area Plan would not include significantly different land uses or reconfiguration of major roadways that would be likely to affect existing emergency response and evacuation plans. Existing policies and action programs in the City General Plan require that the City's Emergency Response Plan be maintained and updated (Policy d, Action Program 1). No additional mitigation is required.

(7) Wildland Fire Hazards. According to CalFire, there are no Fire Hazard Severity Zones for State responsibility areas or Very High Fire Hazard Severity Zones for local responsibility areas within the Plan area. Based on this mapping, impacts related to wildland fire hazards on new development or redevelopment in the Plan area would be less than significant and no mitigation is required.

c. Cumulative Impacts of the Station Area Plan. Hazardous materials and other public health and safety issues are generally site-specific and would not contribute to impacts associated with other contaminated sites in the Plan vicinity. For example, investigation and possible subsequent remediation of a development or redevelopment site in the Plan area would not affect other investigation and remediation sites within Larkspur or other areas of Marin County. Therefore, the Plan's contribution to cumulative impacts related to hazards and hazardous materials would not be significant.

J. CULTURAL RESOURCES

This section describes existing cultural resources conditions in the Larkspur SMART Station Area Plan (Plan) area, identifies potentially significant impacts on cultural resources that may result from Station Area Plan implementation, and recommends program-level mitigation measures to reduce the severity of significant impacts.

Cultural resources are sites, buildings, structures, objects, and districts that may have traditional or cultural value for their historical significance. Cultural resources include a broad range of resources, examples of which include archaeological sites, historic roadways and railroad tracks, and buildings of architectural significance. For a cultural resource to be considered a historical resource for purposes of the California Environmental Quality Act (CEQA) (CCR Section 15064.5(a)), it generally must be 50 years or older[1] and: (1) listed in, or determined eligible for listing in, the California Register of Historical Resources by the State Historical Resources Commission; (2) listed in a local register of historical resources, as defined in PRC Section 5020.1(k) or identified as significant in a survey meeting the requirements of PRC Section 5024.1(g); or (3) formally recognized by a lead agency as constituting a historical resource.

Under CEQA, paleontological resources are a subset of cultural resources and include fossil plants and animals, and evidence of past life such as trace fossils and tracks. Ancient marine sediments may contain invertebrate fossils representing snails, clam and oyster shells, sponges, and protozoa; and vertebrate fossils such as fish, whale, and sea lion bones. Terrestrial sediments may contain fossils that represent such vertebrate land mammals as mammoth, camel, saber tooth cat, horse, and bison.

1. Setting

This section: (1) describes the methods used to establish the baseline conditions for cultural resources in the Plan area; (2) provides a brief historical overview of the area; (3) includes the State and local legislative regulatory context for cultural resources; and (4) describes the cultural resources identified in the Plan area.

a. Methods. This cultural resources analysis included archival records searches and a literature review. This work was done to establish the baseline conditions for cultural resources in the Plan area.

(1) Records Searches. Records searches were conducted to identify cultural resources within the Plan area. Records searches were conducted on June 11, 2012, at the Northwest Information Center (NWIC) of the California Historical Resources Information System, Sonoma State University, Rohnert Park, California and on June 13, 2012, at the California Native American Heritage Commission (NAHC), Sacramento. The NWIC, an affiliate of the State of California Office of Historic Preservation, is the official state repository of cultural resources records and reports for Marin County. The NAHC maintains the Sacred Lands File, which includes the locations of sites with cultural significance to Native American groups.

[1] California Office of Historic Preservation, 2006.*California Register and National Register: A Comparison (for purposes of determining eligibility for the California Register).*Technical Assistance Series No. 6.California Department of Parks and Recreation, Sacramento.

As part of the records search, LSA also reviewed the following State of California and City inventories:

- *California Inventory of Historic Resources;*[2]
- *Five Views: An Ethnic Historic Sites Survey for California;*[3]
- *Directory of Properties in the Historic Property Data File for Marin County*.[4] The directory includes the listings of the National Register of Historic Places, National Historic Landmarks, the California Register of Historical Resources, California Historical Landmarks, and California Points of Historical Interest;
- *Shipwreck Database*;[5] and
- *City of Larkspur Historic Resources Inventory*.[6]

(2) Literature Review. LSA conducted a literature review of the Plan area for archaeological, ethnographic, historical, and environmental information for cultural resources baseline conditions. This review included previous cultural resource background reports prepared for projects within the Plan area, including the Historic Resources and Archaeological Resources sections of the SMART EIR (2005).[7] The City's General Plan and Municipal Code were also reviewed to identify policies and guidelines pertinent to cultural resources.

LSA also reviewed paleontological and geological maps and literature pertaining to the Plan area to prepare the paleontological setting section.

b. Cultural Resources Overview. This section briefly describes the existing conditions for cultural resources in the Plan area as determined by the records searches and literature review described above.

(1) Prehistory and Ethnography. The Paleo-Archaic-Emergent cultural sequence developed by Fredrickson,[8] and updated by Milliken et al.,[9] is commonly used to interpret the prehistoric

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[2] California Department of Parks and Recreation, 1976. *California Inventory of Historic Resources.* Sacramento.

[3] California Department of Parks and Recreation, Office of Historic Preservation, 1988. *Five Views: An Ethnic Historic Site Survey for California.* Sacramento.

[4] California Department of Parks and Recreation, 2008. Office of Historic Preservation, *Directory of Properties in the Historic Property Data File.* Sacramento. November 10.

[5] California State Lands Commission, 2012. *Shipwreck Database Search Form*. Electronic document: shipwrecks.slc.ca.gov/ShipwrecksDatabase/Shipwrecks_Database.asp (accessed June 7, 2012).

[6] Larkspur, City of, 2008. *Historic Resources Inventory.*

[7] Parsons, Brinckerhoff Quade & Douglas, Inc., 2005. *Sonoma Marin Area Rail Transit Draft EIR, Historic Resources and Archaeological Resources Sections*. November.

[8] Fredrickson, David A., 1974. Cultural Diversity in Early Central California: A View from the North Coast Ranges. *Journal of California Anthropology* 1(1):41-53.

[9] Milliken, Randall et al., 2007. Punctuated Culture Change in the San Francisco Bay Area. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar, pp. 99-123. AltaMira Press, Plymouth, United Kingdom.

occupation of Central California. The recalibrated sequence consists of three broad periods: the Paleoindian Period (11,500-8000 cal B.C.); the three-staged Archaic Period, consisting of the Lower Archaic (8000-3500 cal B.C.), Middle Archaic (3500-500 cal B.C.), and Upper Archaic (500 cal B.C.- cal A.D. 1050); and the Emergent Period (cal A.D. 1050-Historic).

The Paleoindian Period began with the first entry of people into California. These people probably subsisted mainly on big game, minimally processed plant foods, and had few or no trade networks. During the Lower Archaic, milling stones for plant processing are abundant and hunting is less important than obtaining plant foods. Artifacts are predominantly of local materials, suggesting that few if any extensive trade networks were established at this time. During the Middle Archaic, the subsistence base begins to expand and diversify with a developing acorn economy, as evidenced by the mortar and pestle, and the growing importance of hunting. Status and wealth distinctions are evidenced in the Upper Archaic archaeological record, and regional trade networks are well established at this time for the exchange of goods and ideas, such as obsidian and Kuksu ceremonial practices involving spirit impersonations. Increasing social complexity continued during the Lower Emergent. Territorial boundaries were well established by this time with regularized inter-group exchanges involving more and varied goods, people, and ideas. Bow and arrow technology was also introduced. By the Upper Emergent, a monetary system based on the clamshell disk bead had been established. Native population reached its zenith during this time, as evidenced by high site densities and large village sites in the archaeological record.

Excavations at archaeological site CA-MRN-255/H in the Plan area yielded numerous prehistoric artifacts, including stone tool chipping waste; projectile points and bifaces; bone, antler, and shell artifacts, including awls and beads; mortars and pestles; shellfish roasting pits; and Native American graves.[10] The artifacts and dates obtained from CA-MRN-255/H indicate that the site was occupied by groups for much of the year during the Upper Archaic Period. The occupants of CA-MRN-255/H hunted a variety of game, took fish and shellfish from the Bay, and exchanged items (e.g., obsidian) with groups to the north in Napa Valley and near present-day Santa Rosa.

The Plan area is in the ethnographic territory of the Coast Miwok, who occupied what are now Marin and southern Sonoma counties.[11] The Coast Miwok language is subsumed under the Penutian language stock and includes two dialects: Western, or Bodega, and Southern, or Marin, with Southern being further divided into valley and coast.[12,13]

Coast Miwok territories were comprised of one or more land-holding groups that anthropologists refer to as "tribelets." The tribelet, a nearly universal characteristic throughout native California,

[10] Bieling, David G., 2000. *Archaeological Investigations at CA-MRN-255/H, Larkspur, Marin County, California.* Holman & Associates, San Francisco, California.

[11] Kelly, Isabel, 1978. Coast Miwok. In *California*, edited by Robert F. Heizer, pp. 485-495. Handbook of North American Indians, Volume 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

[12] Barrett, Samuel A., 1908. The Ethno-geography of the Pomo and Neighboring Indians. *University of California Publications in American Archaeology and Ethnology* 6(1). Berkeley.

[13] Kelly, Isabel, 1978. Native Languages of California. In *California*, edited by Robert F. Heizer, pp. 80-90. Handbook of North American Indians, Volume 8, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

consists of a principle village occupied year round, and a series of smaller hamlets and resource gathering and processing locations occupied intermittently or seasonally.[14] Populations of tribelets ranged between 50 and 500 persons and were largely determined by the carrying capacity of a tribelet's territory. The closest known tribelet settlements to the Plan area were the Habastos and Huimen.[15] The Habastos and Huimen tribelets were depopulated beginning in the late eighteenth century, with members sent to Mission San Francisco (established 1776) and later, Mission San Rafael, which was established in 1817.

Coast Miwok year-round villages were established along estuaries, bays, and creeks, while seasonal settlements lay in the surrounding hills.[16] Dwellings were constructed from tule grasses and accommodated six to ten individuals related by marriage or blood ties. Semi-subterranean sweathouses provided a gathering place for men and women as well as an opportunity for daily cleansing. Large villages had a ceremonial dance house that was about 15 feet in diameter and set about two-feet deep in the ground.[17] A dance house was constructed for social, ceremonial, and political events and activities.

Subsistence methods were based on the seasonal availability of resources. Deer, various kinds of fish and shellfish, rabbits, and small game were available year-round. Seasonally available foods included migratory birds and salmon in the winter; acorns, buckeye, nuts, greens, and seeds from spring to fall. Acorns were a staple food source for the Coast Miwok as they were for many California natives because they could be stored.

The traditional Coast Miwok lifeway was severely disrupted due to introduced diseases, a declining birth rate, and the impact of the mission system. Coast Miwok were transformed from hunters and gatherers into agricultural laborers who lived at the missions. Later, because of the secularization of the missions by Mexico in 1834, most of the aboriginal population gradually moved to ranchos to work as manual laborers.

Today, many Coast Miwok people still live in their ancestral territory in Marin County and continue to engage in traditional cultural practices. The Federated Indians of Graton Rancheria (FIGR) are a federally recognized tribe consisting of both Coast Miwok and Southern Pomo (whose ancestral tribal territory is in northern Sonoma County). FIGR, established in 1992, provides members with economic and educational opportunities, and seeks to preserve their traditional heritage.

(2) History. San Quentin Peninsula was originally granted to Juan Bautista Roger Cooper in 1840 as the Punta de Quintin Rancho. Shortly thereafter, Cooper entered into an agreement with Captain Joseph Folsom of the San Francisco Presidio to construct a lumber mill on the land grant at present-day Larkspur. The mill was the principal improvement on the peninsula until 1852 when the

[14] Kroeber, Alfred L., 1955. Nature of the Land-Holding Group. *Ethnohistory* 2:303-314.

[15] Milliken, Randall, 1995. *A Time of Little Choice: The Disintegration of Tribal Culture in the San Francisco Bay Area 1769-1810,* 242-244. Ballena Press, Menlo Park, California.

[16] Kelly, Isabel, op. cit.

[17] Ibid.

State began construction of San Quentin Prison. Until the late nineteenth-century, the remaining Rancho saw few improvements, beyond a cattle ranch, the sawmill, and a few residences.

In 1852, the State entered into a contract with General Mariano Vallejo and Major General James Madison Estell to construct San Quentin Prison in exchange for rights to use prison labor.[18] This prison labor was used at Estell's brickyard, one of the earliest documented brickyards in Marin County and sited near the prison.

The history of the Plan area is closely associated with brick making. In addition to Estell's brickyard, other brickyards are reported on San Quentin Peninsula in the 1850s, including Van Arnum's (c. 1854), McCauley-Quinn's (c. 1857), and Sheppard's (1854).[19] In 1890 the Oakland-based Remillard Brick Company purchased 160 acres on the peninsula to expand its holdings and constructed the Green Brae Brickyard. The Green Brae Brickyard operated from 1891 to 1915 and included a small community of laborers who lived nearby. The community included 16 cabins for workmen, a cook-house, stable, blacksmith shop, vegetable gardens, and an orchard. Tubb Lake was also created to provide water for the worker community and brickyard equipment.

The Superintendent's House, a hipped-roof Victorian cottage associated with the Green Brae Brickyard, remains in the Plan area at 2900 Larkspur Landing Circle. A brick kiln and chimney at 125 East Sir Francis Drake Boulevard, also in the Plan area, are the only surviving structures associated with the Remillard Brick Company, once the largest brick manufacturer on the Pacific Coast. The Superintendent's House and the Remillard Brick Kiln are listed in the Larkspur Historic Resource Inventory and the National Register of Historic Places, respectively (see Section IV.J.1.d, Identified Cultural Resources, below).

In 1924, Dwight Hutchinson purchased 75 acres from the Remillard Brick Company. The land acquired by Hutchinson, located in the hills north of the Remillard brick kiln, was used as a quarry where a grinder produced crushed rock. The crushed rock was carried along conveyer belts to barges docked nearby, where they were transported to various public works projects throughout the Bay Area. The Hutchinson Quarry barged crushed rock from the site until the late 1950s and provided fill and base for Treasure Island, access roads for the Golden Gate Bridge, and Marin County highways and roads.[20]

Substantial residential, retail, and transportation-related development occurred in the Plan area during the 1960s-1970s, including the former Hutchinson Quarry site, Larkspur Ferry Terminal, and Marin County Mart. In 1969, the City annexed the former Hutchinson Quarry and would eventually approve development of 478 apartments at the site.[21] The Larkspur Ferry Terminal was constructed at the mouth of Corte Madera Creek and dedicated in December 1976, and two years later construction of Marin County Mart (Larkspur Landing Center) began.

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[18] Dean, Randall L., 1998. *Prehistoric and Historic Context Archaeological Report for the Ross Valley Marin Sanitary District Study Area, Larkspur, California.* Holman & Associates, San Francisco, California.

[19] Ibid.

[20] Larkspur Heritage Preservation Board, 2010. *Larkspur Past and Present: A History and Walking Guide.* Larkspur Heritage Preservation Board.

[21] Ibid.

(3) Paleontology. The Plan area is underlain by Quaternary (1.8 million years before present to present) alluvium and Mesozoic era (251 million to 66 million years before present) Franciscan Complex deposits and bedrock outcrops. Some of these deposits have the potential to contain paleontological resources (fossils) and are discussed below.

Quaternary Deposits. Quaternary deposits of Holocene age (circa 10,000 years B.P. to present) occur in the Plan area. These deposits consist of Holocene Bay Mud (Qhbm), comprising silt, clay, peat, and fine sand deposited at or near sea level along San Francisco Bay, and undifferentiated Holocene alluvium (Qha) that includes sand, silt, and gravels typically deposited in flat, smooth valley bottoms along small to medium-sized streams.[22] Holocene deposits are typically too recent to contain significant fossiliferous deposits.

Franciscan Complex. The exposed bedrock and native rock underlying the alluvial deposits in the Plan area is of the Franciscan Complex. The Franciscan Complex is a group of high pressure and low temperature metamorphic rocks that was formed from the Middle and Upper Jurassic (175,000,000 to 144,000,000 years B.P.) to the Lower Cretaceous (144,000,000 to 100,000,000 years B.P.). It is composed of volcanic and metavolcanic rocks, metamorphosed and unmetamorphosed sandstone, shale, conglomerate, chert, greenstone, and metagraywacke, and is the basement rock of the region. Marine fossils, including *Icthysaurus, Belemnoidea, Buchia*, and *Inoceramus*, occur in the unmetamorphosed rocks of the Franciscan Complex.[23]

c. Regulatory and Legislative Context. The following describes State and City regulatory and policy requirements for cultural resources.

(1) California Environmental Quality Act. The California Environmental Quality Act (CEQA) applies to all discretionary projects undertaken or subject to approval by the State's public agencies (California Code of Regulations [CCR] Title 14(3) §15002(i)). CEQA states that it is the policy of the State of California to "take all action necessary to provide the people of this state with… historic environmental qualities…and preserve for future generations examples of the major periods of California history" (Public Resources Code [PRC] §21001(b), (c)). Under the provisions of CEQA, "A project with an effect that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment" (CCR Title 14(3) §15064.5(b)).

CEQA §15064.5(a) defines a "historical resource" as a resource which meets one or more of the following criteria:

- Listed in, or eligible for listing in, the California Register;
- Listed in a local register of historical resources (as defined at PRC §5020.1(k));

[22] Witter, Robert C., et al., 2006. *Maps of Quaternary Deposits and Liquefaction Susceptibility in the Central San Francisco Bay Region, California.* U.S. Geological Survey Open-File Report 2006-1037. Electronic document: pubs.usgs.gov/of/2006/1037/ (accessed on June 24, 2012).

[23] Berkeley Natural History Museum, 2012. Museum of Paleontology searchable database. Website: bnhm.berkeley.edu/query/index.php (accessed June 21, 2012).

- Identified as significant in a historical resource survey meeting the requirements of §5024.1(g) of the Public Resources Code; or
- Determined to be a historical resource by a project's lead agency (CCR Title 14(3) §15064.5(a)).

A historical resource consists of "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… Generally, a resource shall be considered by the lead agency to be 'historically significant' if the resource meets the criteria for listing in the California Register of Historical Resources" (CCR Title 14(3) §15064.5(a)(3)).

CEQA requires that historical resources and unique archaeological resources be taken into consideration during the CEQA planning process (CCR Title 14(3) §15064.5; PRC §21083.2). If feasible, adverse effects to the significance of historical resources must be avoided, or the effects mitigated (CCR Title 14(3) §15064.5(b)(4)). The significance of an historical resource is impaired when a project demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for the California Register of Historical Resources. If there is a substantial adverse change in the significance of a historical resource, the preparation of an environmental impact report may be required (CCR Title 14(3) §15065(a)).

If the cultural resource in question is an archaeological site, CEQA (CCR Title 14(3) §15064.5(c)(1)) requires that the lead agency first determine if the site is a historical resource as defined in CCR Title 14(3) §15064.5(a). If the site qualifies as a historical resource, potential adverse impacts must be considered in the same manner as a historical resource. If the archaeological site does not qualify as a historical resource but does qualify as a unique archaeological site, then the archaeological site is treated in accordance with PRC §21083.2 (CCR Title 14(3) §15064.5(c)(3)). In practice, most archaeological sites that meet the definition of a unique archaeological resource will also meet the definition of a historical resource.[24] CEQA defines a "unique archaeological resource" as an archaeological artifact, object, or site about which it can be clearly demonstrated that there is a high probability that it meets one or more of the following criteria:

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information; or
- Has a special and particular quality such as being the oldest of its type or the best available example of its type; or
- Is directly associated with a scientifically recognized important prehistoric or historic event or person (PRC §21083.2(g)).

If an impact to a historical or archaeological resource is significant, CEQA requires feasible measures to minimize the impact (CCR Title 14(3) §15126.4 (a)(1)). Mitigation of significant impacts must

[24] Bass, Ronald E., Albert I. Herson, and Kenneth M. Bogdan, 1999. *CEQA Deskbook: A Step-by-Step Guide on how to Comply with the California Environmental Quality Act.* Solano Press Books, p. 105, Point Arena, California.

lessen or eliminate the physical impact that the project will have on the resource. Generally, the use of drawings, photographs, and/or displays does not mitigate the physical impact on the environment caused by demolition or destruction of a historical resource. However, CEQA requires that all feasible mitigation be undertaken even if it does not mitigate impacts to a less-than-significant level (PRC §21002.1(b)).

(2) California Register of Historical Resources (California Register). The California Register is established by California PRC §5024.1. The California Register serves as a guide to cultural resources that must be considered when a government agency undertakes a discretionary action subject to CEQA. The California Register helps government agencies identify and evaluate California's historical resources, and indicates which properties are to be protected, to the extent prudent and feasible, from substantial adverse change (PRC §5024.1(a)). Any resource listed in, or eligible for listing in, the California Register is to be taken into consideration during the CEQA process.

The California Register was modeled after the National Register of Historic Places (National Register) and the California Register significance and integrity criteria for listing historical resources are consistent with those of the National Register. A resource eligible for the National Register is also eligible for the California Register. The National Register criteria, however, have been modified for State use by the California Office of Historic Preservation to include a range of historical resources which better reflect the history of California. There are three instances in which a resource not eligible for the National Register may be eligible for the California Register: moved resources; resources achieving significance in the past fifty years; and reconstructed resources:[25]

- *Moved buildings, structures, or objects.* A moved building, structure, or object that is otherwise eligible may be listed in the California Register if it was: (1) moved to prevent its demolition at its former location; and (2) if the new location is compatible with the original character and use of the historical resource.
- *Reconstructed buildings*. A building less than 50 years old may be eligible if it embodies traditional building methods and techniques that play an important role in a community's historically rooted beliefs, customs, and practices (e.g., a Native American roundhouse).
- *Historical resources achieving significance within the past 50 years*. Resources less than 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.

A cultural resource is evaluated under four California Register criteria to determine its historical significance. A resource must be significant in accordance with one or more of the following criteria:

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

[25] California Office of Historic Preservation, 2006. *California Register and National Register: A Comparison (for purposes of determining eligibility for the California Register).* Technical Assistance Series No. 6. California Department of Parks and Recreation, p. 1, Sacramento.

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

Age. In addition to meeting one or more of the above criteria, the California Register requires that sufficient time must have passed to allow a "scholarly perspective on the events or individuals associated with the resource." Fifty years is used as a general estimate of the time needed to understand the historical importance of a resource (CCR Title 14(11.5) §4852 (d)(2)). The State of California Office of Historic Preservation recommends documenting, and taking into consideration in the planning process, any cultural resource that is 45 years or older.[26]

Period of Significance. The period of significance for a property is "the span of time when a property was associated with important events, activities, persons, cultural groups, and land uses or attained important physical qualities or characteristics."[27] The period of significance begins with the date of the earliest important land use or activity that is reflected by historic characteristics tangible today. The period closes with the date when events having historical importance ended. The period of significance for an archeological property is "the time range (which is usually estimated) during which the property was occupied or used and for which the property is likely to yield important information."[28] Archaeological properties may have more than one period of significance.

Historic Context. The significance of cultural resources is generally evaluated using a historic context, which groups information about related historical resources based on theme, geographic limits, and chronological period.

Integrity. The California Register also requires a resource to possess integrity, which is defined as "the authenticity of a historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance. Integrity is evaluated with regard to the following aspects: retention of location, design, setting, materials, workmanship, feeling, and association."[29]

Archaeologists use the term "integrity" to describe the level of preservation or quality of information contained within a district, site, or excavated assemblage. Integrity is relative to the specific significance which the resource conveys. Although it is possible to correlate the aspects of integrity, listed above, with standard archaeological site characteristics, those aspects are often unclear for evaluating the ability of an archaeological resource to convey significance under California Register criterion 4 (has yielded, or may be likely to yield, information important in prehistory or history). The

[26] California Office of Historic Preservation, 1995. *Instructions for Recording Historical Resources,* p. 2, Sacramento.

[27] National Park Service, 1999. *Guidelines for Evaluating and Documenting Rural Historic Landscapes,* p. 21, Washington, D.C.

[28] National Park Service, 2000:34. *Guidelines for Evaluating and Registering Archeological Properties,* p. 34, Washington, D.C.

[29] California Office of Historic Preservation, 2006, op. cit., p. 2.

integrity of archaeological resources, therefore, is judged according to the ability of the site to yield scientific and cultural information that can be used to address important research questions.

Eligibility. Resources that are significant, meet the age guidelines, and possess integrity will generally be considered eligible for listing in the California Register.

(3) Health and Safety Code: Human Remains. The California Health and Safety Code (HSC) §7050.5 states that 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 remains are discovered has determined whether or not the remains are subject to the coroner's authority. If the human remains are of Native American origin, the Coroner must notify the Native American Heritage Commission within 24 hours of this identification. The Native American Heritage Commission will identify a Native American Most Likely Descendant (MLD) to inspect the site and provide recommendations for the proper treatment of the remains and associated grave goods.

(4) Public Resources Code: Cultural and Paleontological Resources. California PRC §5097.5 provides for the protection of cultural and paleontological resources. This PRC section prohibits the removal, destruction, injury, or defacement of archaeological and paleontological features on any lands under the jurisdiction of State or local authorities.

(5) Larkspur 1990 General Plan. The Community Character Element of the Larkspur 1990 General Plan discusses the City's goals, policies, and action programs for cultural resources. Relevant goals and policies for historical resources and archaeological resources are presented below.

Community Character Element

Goal 3: Assure the survival of Larkspur's "special sense of place."

- Policy i: Identify significant archaeological, historic, and natural resources representing all of the ethnic, cultural, and economic groups that have lived and worked in Larkspur.
  - Action Program [7]: Maintain an up-to-date inventory of existing historic resources, including artifacts, structures, sites, areas, and natural phenomena.
  - Action Program [8]: Maintain a City adopted list of historic, archaeological, and natural resources worthy of preservation.
  - Action Program [9]: Map the location of historic districts and historic and natural resources.
- Policy j: Safeguard and maintain significant historic, archaeological, and natural resources.
  - Action Program [10]: Administer the Heritage Preservation Ordinance so as to provide for the appropriate development and maintenance of historic resources and their environments.
  - Action Program [11]: Maintain and support the Heritage Preservation Board.
- Policy k: Accommodate anticipated development and population growth in ways that will not damage Larkspur's historic, archaeological, and natural resources.
  - Action Program [13]: Provide a quick-response mechanism for saving resources threatened by construction or demolition.

- Action Program [14]: Establish design guidelines for property owners, developers, and public agencies to use with respect to land use and building construction in areas of identified historic, archaeological, or natural significance.
- Action Program [15]: Review all public policies, and modify them as necessary, to support the policies of this chapter to protect and preserve historic, archaeological, and natural resources while protecting the general health, welfare, and safety of the public.
- Action Program [16]: Direct capital improvement programs toward protecting, preserving, rehabilitating, and enhancing archaeological, and natural resources.
- Action Program [17]: Provide local incentives for restoring and maintaining historic, archaeological, and natural resources.
- Action Program [18]: Coordinate City and other public agency programs so that the City's objectives and standards for preserving historic, archaeological, and natural resources are met.
- Action Program [19]: Use the principles and practices of land use planning to promote the preservation of historic, archaeological, and natural resources.

Goal 4: Promote a greater awareness of and sensitivity toward Larkspur's archaeological heritage.

- Policy l: The City shall cooperate with the Northwest Information Center toward the protection and preservation of artifacts in those areas already identified as containing archaeological remains.
- Policy m: The City shall cooperate with the Northwest Information Center in the development of information which will allow the prediction of additional sites likely to contain archaeological remains.
  - Action Program [21]: All development applications and public projects that require EIRs will routinely be sent to the Northwest Information Center…for review and recommendations regarding archaeological findings.
  - Action Program [22]: The City shall promote the preservation of archaeological sites by considering any significant remains in its planning for parks.
  - Action Program [23]: The City may permit land uses other than those designated on the General Plan Land Use and Circulation map on sites with archaeological merit, in order to preserve the archaeological record.
  - Action Program [24]: Where an archaeological site is in proximity to a project under review, City staff in conjunction with the Northwest Information Center will determine the particular qualities to be preserved and the methods of preservation.

(6) Larkspur Municipal Code. The City's Municipal Code includes provisions for protection and preservation of cultural resources in Chapter 15.42 (Archaeological Resources) and Chapter 18.19 (Heritage Preservation). Chapter 15.42 provides "procedures for studying and/or preserving valuable archaeological resources in the City." This chapter requires that an "archaeological investigation permit" be issued prior to the issuance of a building or grading permit in those instances where such entitlements would affect archaeological resources. Chapter 15.42 also requires that "complete and accurate" records of archaeological findings be submitted to appropriate repositories. Chapter 18.19 includes provisions "for the review, evaluation, enhancement, protection and preservation of natural phenomena, structures, sites and areas that possess unique character, special architectural appearance, historical value or which generate special aesthetic or cultural interest." This chapter allows for designation of heritage preservation combining zoning districts (H) and review by the City Heritage Preservation Board of projects that: (1) require discretionary land use permits; (2)

require building permits; (3) require grading or demolition permits for properties listed on City's Historic Resources Inventory; or (4) are located within an "H" district.

d. Identified Cultural Resources. Recorded cultural resources within the Plan area consist of prehistoric and historical archaeological deposits, and built-environment resources associated with the local nineteenth- and early twentieth-century brick-making industry and transportation. Seven cultural resources recorded within the Plan area are listed in Table IV.J-1. These resources include two that are listed in the Larkspur Historic Resources Inventory, one of which is also listed in the National Register of Historic Places and is a California Historical Landmark. The resources in the Plan area are described below.

Table IV.J-1: Cultural Resources within the Station Area Plan Area

Address	Resource Type	Age	Status Code [a]	Comments
– [b]	Archaeological	Prehistoric	–	Midden site
– [b]	Archaeological	Prehistoric/ Historic	–	Midden site; brick-making subsurface features
– [b]	Archaeological	Prehistoric	–	Chert quarry and lithic scatter
– [b]	Archaeological	Prehistoric	–	Unrecorded Midden Site
2900 Larkspur Landing Circle	Residence	1890s	7R	Superintendent's House for the Remillard Brick Kiln
125 E. Sir Francis Drake Blvd.	Industrial	1891	1S/1CL	Remillard Brick Kiln
–	Transportation	1912-1913; 1924	6Z	Northwestern Pacific Railroad segment and trestle

[a] California Office of Historic Preservation (OHP) National Register Status (NRS) Code:
1S = Individual property listed in National Register by the Keeper. Listed in the California Register
1CL = Automatically listed in the California Register
6Z = Found ineligible for National Register, California Register, or Local designation through survey evaluation
7R = Identified in Reconnaissance Level Survey – not evaluated

[b] Specific locational information for archaeological sites in the Plan area has been intentionally omitted from public documents for this project. The legal authority to restrict cultural resource information is in California Government Code Section 6254.10 and 6254(r).

Source: Compiled by LSA Associates, Inc., 2012.

(1) Archaeological Sites. Four archaeological resources have been identified within the Plan area.[30] Additional prehistoric and/or historical archaeological resources may be located within the Plan area, and project-specific reviews would be needed to assess potential impacts to archaeological sites. Prehistoric archaeological deposits can be associated with buried Holocene landforms, and the absence of surface materials or soils indicative of an archaeological deposit does not preclude the possibility of significant subsurface archaeological deposits.

[30] Specific locational information for archaeological sites in the Plan area has been intentionally omitted from public documents for this project. The legal authority to restrict cultural resource information is in California Government Code Section 6254.10 and 6254(r).

Archaeological sites in the Plan area include midden deposits (i.e., soils indicative of human occupation); human remains; and a lithic scatter and prehistoric quarry. Archaeological sites in the Plan area are briefly described below.

- **CA-MRN-78 (Primary #P-21-000108)**. CA-MRN-78 was recorded in 1907 by archaeologist Nels Nelson as a "shellmound." As described by Nelson in 1907, the site had been "leveled out by cultivation. It covers at present an area approximating 200 ft. in diameter, and may be 3-4 ft. deep. The material is . . . rather finely broken up." Nelson did not note any bones or artifacts in his site record but concluded that these "are doubtless present."
- **CA-MRN-255/H (Primary #P-21-000541)**. This site was originally recorded by archaeologist Adan Treganza in 1955 as a shellmound. Treganza estimated the site's area as 300 feet by 300 feet and approximately six-feet deep. Subsequent to Treganza's recordation, several archaeological studies were conducted at the site in the 1970s-1980s.[31] These studies included surface survey, test excavations to determine the site's dimensions and composition, and construction monitoring. These archaeological studies identified a previously unrecorded subsurface historic component CA-MRN-255/H that included the remains of late nineteenth-century batch or "beehive" type kilns associated with the area's brick-making industry. In the late 1990s, Holman & Associates initiated investigations at CA-MRN-255/H that included data recovery of a portion of the site to mitigate effects from a project affecting the resource. These investigations yielded 3,752 cataloged prehistoric and historical artifacts, a prehistoric occupation surface, Native American graves, a prehistoric shellfish roasting pit, a brick kiln floor, and other historic materials associated with brick making.[32]
- **CA-MRN-525 (Primary #P-21-000458)**. This site was recorded in 1982 by the College of Marin as a prehistoric chert quarry. The site's area was recorded as approximately 30 square meters and is of an "undeterminable" depth. Artifacts observed include chert flakes and cores, and an obsidian biface.
- **Unrecorded Site**. Archaeologist Thomas L. Jackson reported a prehistoric midden site in the Plan area in 1976. Mr. Jackson noted the site in a letter report that assessed a proposed development's impacts on the site.[33] The site, which was never formally recorded on California Department of Parks and Recreation forms and has not been assigned a trinomial or primary number by the State, was described by Jackson as "a narrow band of midden defined by fragments of shell and whole shells, fire fractured rock and other lithic debris in a light brown soil matrix."

(2) Historic Built Environment. Based on a review of the Directory of Properties in the Historic Property Data File, the City of Larkspur Historic Resources Inventory, and a Historic Resources Evaluation Report[34] prepared for the Central Marin Ferry Connection Project, there are

[31] Bieling, David G., 2000, op. cit.

[32] Ibid.

[33] Jackson, Thomas, 1976. Written communication to Mr. Dwight Winther, City of Larkspur Planning Director. August 10.

[34] Webb, Toni, 2010. *Historical Resources Evaluation Report, Central Marin Ferry Connection, Marin County, California, Phase I*. JRP Historical Consulting, LLC, Davis, California.

three recorded built-environment resources in the Plan area. These resources are briefly described below.

- **Green Brae Brick Yard of the Remillard Brick Company**. The Green Brae Brick Yard of the Remillard Brick Company (Remillard Brick Kiln) at 125 E. Sir Francis Drake Boulevard was listed in the National Register of Historic Places in 1978, is State Historic Landmark #917, and is listed in the California Register of Historical Resources. It is also listed in the City's Historical Resources Inventory. The Remillard Brick Kiln operated from 1891 to 1915. The Remillard Brick Kiln is the only surviving structure of the Remillard Brick Company and is also one of the few remaining Hoffman Type kilns in the United States. A Hoffman kiln – developed by Friedrich Hoffman in 1865 in Prussia – revolutionized brick making as it allowed for continuous firing of bricks whereas earlier "batch-type" kilns required cooling before new bricks were introduced.

  As described in the National Register nomination,

  "The structure is unusual and complex in that there are double walls filled with earth, an underground flue system, arched ceilings and openings made with wedge bricks and a roof pierced with hundreds of ports. The chimney stack is of exceptional design having a square base and tapered octagonal sides with a corbelled top, freestanding from the kiln itself, an unusual arrangement … The Remillard brick kiln is significant as an historical engineering landmark, representing a manufacturing process that was considered the best of its time in the important industry of brickmaking."

- **Superintendent's House**. The circa 1890s Superintendent's House at 2900 Larkspur Landing Circle is listed in the City's Historic Resources Inventory and has been assigned a California Historical Resource Status Code of "7R" in the Directory of Properties in the Historic Property Data File, indicating that the resource was identified in a reconnaissance-level survey but has not been formally evaluated for its eligibility for listing in either the National Register or California Register. The house was associated with a small community of workers at the Green Brae Brick Yard and is the only residence remaining from that operation. The building is a one-story Victorian Stick style residence with wood shiplap cladding.

- **Northwestern Pacific Railroad**. In 2009, JRP Historical Consulting, LLC (JRP) recorded a 0.5-mile discontinuous segment of the Northwestern Pacific (NWP) Railroad. This abandoned segment of railroad roughly parallels Highway 101 North and extends from a wood trestle at approximately post mile (PM) 14.7 near Corte Madera Creek northward to approximately PM 15.3. The original rail alignment at this location was constructed in 1884 by San Francisco and San Rafael Railroad and was a single-track, standard-gauge line that connected with San Francisco Bay ferry service. After NWP incorporated in 1907, it installed double tracks along its alignments, and this section of railroad was upgraded in 1912-1913. In the 1920s, NWP spent over $800,000 modernizing its holdings in Marin County, and in 1924 the wood trestle near Corte Madera Creek was constructed.[35] JRP evaluated this segment of the NWP Railroad for its eligibility for listing in the National and

[35] Ibid.

California registers and found that the resource does not meet any of the criteria for listing in these registers due to a lack of historical significance.

(3) Native American Sacred Lands. According to the Native American Heritage Commission's review of their Sacred Lands File, no reported Native American sacred sites are within the Plan area. Debbie Pilas-Treadway, NAHC Environmental Specialist III, responded in a faxed letter on June 19, 2012, that a review of the Sacred Lands File did not "indicate the presence of Native American cultural resources in the immediate project area." The potential for Native American sacred sites in the Plan area, however, cannot be discounted, and project-specific reviews should be done with FIGR to verify the presence of sacred sites.

2. Impacts and Mitigation Measures

The following section describes potentially significant project impacts to cultural resources. Mitigation measures are identified to avoid, minimize, or mitigate such impacts, where possible.

a. Criteria of Significance. Implementation of the Station Area Plan would have a significant impact if it were to result in:

- The direct or indirect destruction of a unique paleontological resource or site or a unique geological feature;
- The physical demolition, destruction, relocation, or alteration of a unique archaeological resource;
- A substantial adverse change in the significance of a historical resource that is either listed or eligible for listing in the National Register of Historic Places, the California Register of Historical Resources, a local register of historic resources, or any cultural resource that is not listed in, or not eligible for listing in, a federal, state, or local historical register but is otherwise determined by the City to be historically significant; or
- The disturbance of any human remains, including those interred outside of formal cemeteries.

b. Impacts Analysis. The following sections provide an evaluation and analysis for the potential significant and cumulative impacts of the Station Area Plan for each of the criteria of significance listed above.

(1) Paleontological Resources. Implementation of the Station Area Plan has the potential to significantly impact unique paleontological resources (fossils). Although a review of the University of California Museum of Paleontology online database does not indicate recorded fossils in the Plan area, the presence of Franciscan Formation deposits, which are known to contain fossils, within the Plan area indicates paleontological sensitivity.

Neither the Station Area Plan nor the current General Plan (1990) contain policies that address potential impacts to paleontological resources. Additionally, the City's Code does not include provisions to preserve, or mitigate impacts to, these resources. Therefore, adoption of the Station Area Plan has the potential to have a significant impact on paleontological deposits as a result of new ground-disturbing development or redevelopment that may occur.

Impact CULT-1: Ground-disturbing activities associated with new development and redevelopment allowed under the Station Area Plan could adversely affect significant paleontological deposits. (S)

With implementation of this mitigation measure, this impact would be reduced to a less-than-significant level on a program-level basis.

Mitigation Measure CULT-1: The following language shall be included as a Condition of Approval for projects associated with implementation of the Station Area Plan:

- If paleontological resources are encountered during project subsurface construction, all ground-disturbing activities within 25 feet shall be redirected and a qualified paleontologist contacted to assess the situation, consult with agencies as appropriate, and make recommendations for the treatment of the discovery. Project personnel shall not collect or move any paleontological materials. Paleontological resources include fossil plants and animals, and trace fossil evidence of past life such as tracks. Ancient marine sediments may contain invertebrate fossils such as snails, clam, and oyster shells; sponges; and protozoa; and vertebrate fossils such as fish, whale, and sea lion bones. Vertebrate land mammals may include bones of mammoth, camel, saber tooth cat, horse, and bison. Paleontological resources also include plant imprints, petrified wood, and animal tracks. (LTS)

(2) Archaeological Resources. Implementation of the Station Area Plan has the potential to significantly impact unique archaeological deposits. As discussed previously, the Plan area includes recorded prehistoric archaeological deposits, and there is a potential for significant historic-period archaeological deposits associated with the local nineteenth- and early twentieth-century brick-making industry. New development and redevelopment projects would occur under the Station Area Plan, which have the potential to destroy prehistoric and historical archaeological deposits, including previously unidentified subsurface deposits. Prehistoric archaeological sites, in addition to having the potential to contain important information on the past, may also have cultural and religious importance to FIGR.

The Station Area Plan contains no policies that address potential impacts to archaeological deposits. The City's current General Plan (1990) and Municipal Code, however, include provisions to preserve, or mitigate impacts to, these deposits. These provisions include: (1) Goal 4 (Policies l and m) of the Community Character Element of the General Plan, which encourages cooperation with the NWIC to identify areas of archaeological sensitivity and Action Programs that encourage preservation of the archaeological record; and (2) Chapter 15.42 (Archaeological Resources) of the City's Municipal Code, which provides "procedures for studying and/or preserving valuable archaeological resources in the City." Additional guidance is also included below in Mitigation Measure CULT-2 in the event that archaeological resources are accidently unearthed during implementation of the Station Area Plan.

Impact CULT-2: Ground-disturbing activities associated with new development and redevelopment allowed under the Station Area Plan could adversely affect archaeological resources. (S)

With implementation of this mitigation measure, this impact would be reduced to a less-than-significant level on a program-level basis.

Mitigation Measure CULT-2: The following language shall be included as a Condition of Approval for projects associated with implementation of the Station Area Plan:

- If deposits of prehistoric or historical archaeological materials are encountered during project activities, all work within 25 feet of the discovery should be redirected and a qualified archaeologist contacted to assess the situation, consult with agencies as appropriate, and make recommendations for the treatment of the discovery. Project personnel should not collect or move any archaeological materials. Archaeological materials can include flaked-stone tools (e.g., projectile points, knives, and choppers) or obsidian, chert, basalt, or quartzite toolmaking debris; bone tools; culturally darkened soil (i.e., midden soil often containing heat-affected rock, ash and charcoal, shellfish remains, bones, and other cultural materials); and stone-milling equipment (e.g., mortars, pestles, and handstones). Prehistoric archaeological sites often contain human remains. Historical materials can include wood, stone, concrete, or adobe footings, walls, and other structural remains; debris-filled wells or privies; and deposits of wood, glass, ceramics, metal, and other refuse.
- In the event that archaeological deposits are encountered during implementation of the Station Area Plan, it is recommended that adverse effects be avoided by project activities. If such deposits cannot be avoided, they should be evaluated for their California Register of Historical Resources eligibility. If the deposit is not eligible, a determination shall be made as to whether it qualifies as a "unique archaeological resource" under CEQA. If the deposit is neither an historical nor unique archaeological resource, avoidance is not necessary. If the deposit is eligible to the California Register, or is a unique archaeological resource, it will need to be avoided by adverse effects or such effects must be mitigated. Adverse effects will be mitigated through the implementation of a treatment plan developed in consultation with the City. Mitigation may consist of, but is not necessarily limited to, systematic recovery and analysis of archaeological deposits; recording the resource; preparation of a report of findings; and accessioning recovered archaeological materials at an appropriate curation facility. The report shall be submitted to the City for review and the Northwest Information Center at Sonoma State University.
- If prehistoric archaeological deposits are identified, the City shall consult with FIGR regarding preparation of a Treatment Plan.
- The City shall consult with the Federated Indians of Graton Rancheria (FIGR) prior to development of projects associated with implementation of the Station Area Plan regarding preparation and execution of a Treatment Plan. The Treatment Plan will identify procedures for the use of tribal monitors, and the appropriate treatment of Native American cultural materials and human remains identified during implementation of the Station Area Plan.

Overall, the existing General Plan policies, the City Municipal Code, and Mitigation Measures CULT-2a and CULT-2b would reduce impacts to archaeological resources to a less-than-significant level on a program-level basis. Appropriate application of existing City policies and regulations to avoid impacts to archaeological resources would need to be determined on a project-specific basis. (LTS)

(3) Historical Resources. The Plan area includes two historical resources: the Remillard Brick Kiln at 125 E. Sir Francis Drake Boulevard and the associated Superintendent's House at 2900 Larkspur Landing Circle. Both of these properties qualify as "historical resources" pursuant to *CEQA Guidelines* Section 15064.5(a)(1)-(2). Implementation of the Station Area Plan will allow for new land uses, development, and redevelopment in the Opportunity Sites described in the Project Description of this EIR. Although there are no project-specific proposals to demolish these resources, the potential for indirect effects (i.e., adverse effects to historical setting from adjacent construction, relocation, or inappropriate modifications) cannot be discounted. The City's Heritage Preservation chapter of its Municipal Code, however, contains policies that will mitigate potential adverse impacts to these historical resources. The Heritage Preservation ordinance requires City Heritage Preservation Board (Board) review of projects requiring a discretionary land use permit, a building permit, or a grading or demolition permit for properties listed in the City Historic Resources Inventory. The Board is responsible for determining that: (1) the proposed work will be compatible with the exterior architectural character of the historical resources; (2) the proposed work will maintain the integrity of the historical resources; (3) the proposed work will not significantly diminish public view of the historical resources; (4) the proposed work will not adversely affect the historic, architectural, or aesthetic character of the neighborhood; and (5) the proposed work will comply with Federal, State, and City standards for the rehabilitation or modification of historical resources.

With implementation of these existing policies, therefore, the Station Area Plan would have less-than-significant impacts on built environment historical resources and no additional mitigation measures are required.

Under CEQA, archaeological sites can also qualify as historical resources (*CEQA Guidelines* Section 15064.5(c)). For purposes of this discussion, however, the impacts of the Station Area Plan to archaeological sites is discussed above.

(4) Human Remains. Implementation of the Station Area Plan has the potential to significantly impact human remains interred outside formal cemeteries. Typically, such human remains are associated with prehistoric archaeological habitation sites, (e.g., shell middens). As discussed previously, the Plan area includes recorded prehistoric archaeological deposits, including CA-MRN-255/H, which is known to contain Native American human remains. New development and redevelopment projects would occur under the Station Area Plan, which have the potential to destroy prehistoric archaeological deposits, including associated human remains.

As noted previously in the discussion for Archaeological Resources, the Station Area Plan contains no policies that address potential impacts to archaeological deposits, including those that contain human remains. The City's current General Plan (1990) and Municipal Code, however, include provisions to preserve, or mitigate impacts to, archaeological deposits that include Native American human remains. These provisions include: (1) Goal 4 (Policies l and m) of the Community Character Element of the General Plan, which encourages cooperation with the NWIC to identify areas of archaeological sensitivity and Action Programs that encourage preservation of the archaeological record; and (2) Chapter 15.42 (Archaeological Resources) of the City's Municipal Code, which provides "procedures for studying and/or preserving valuable archaeological resources in the City." Overall these existing General Plan policies; City Municipal Code; application of the appropriate procedures outlined under California Health and Safety Code Section 7050.5 and California Public Resources Code Section 5097.98 regarding the treatment of human remains; and implementation of

Mitigation Measures CULT-2a and CULT-2b would contribute to reducing impacts to human remains to less-than-significant levels. Appropriate application of existing City and State policies and regulations to avoid impacts to human remains would need to be determined on a project-specific basis.

c. Cumulative Impacts of the Station Area Plan. Implementation of the Station Area Plan, in conjunction with other development in the City, has the potential to cumulatively impact cultural resources. For built-environment historical resources, proposed developments could adversely affect such resources due to more intensive land uses and incompatible site designs, which could impact a resource's historical integrity. Development within the Plan area also has the potential to adversely affect archaeological resources, paleontological resources, and human remains through their destruction or disturbance. Before mitigation or application of relevant City guidance or policies, development within the Plan area, as well as other local recent and current developments, has the potential to cause adverse cumulative impacts to cultural resources due to their destruction or loss of historical integrity.

However, it should be noted that each development proposal received by the City will undergo environmental review, as outlined in the actions and policies of the current General Plan and Archaeological Resources and Heritage Preservation chapters of the Municipal Code. Neither implementation of the Station Area Plan, nor other development projects, are expected to cumulatively result in significant impacts to cultural resources, provided that appropriate predevelopment environmental review occurs (i.e., by coordinating with the NWIC, as described in the current General Plan) and appropriate project-specific mitigation measures, including but not limited to preservation in place, capping, data recovery, or compliance with the recommendations of the City's Heritage Preservation Board, are implemented as a condition of development. Therefore, implementation of project-specific mitigation measures and appropriate City policies and actions encouraging environmental review and mitigation reduce any potential cumulative impacts related to cultural resources to a less-than-significant level.

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K. PUBLIC SERVICES

This section evaluates impacts associated with implementation of the Station Area Plan on public services, including fire, police, and school services. The setting section describes the existing conditions for each service provider and also includes a description of applicable regulatory and/or policy documents. The setting section is based on information provided in the Larkspur SMART Station Area Plan,[1] Existing Conditions Report,[2] and related policy documents, and by consultation with public service providers.

The impacts and mitigation measures section discusses potential impacts to public services that could result from implementation of the Station Area Plan. The analysis of potential environmental impacts on public services that could result from implementation of the Station Area Plan is primarily based on the need for new facilities and whether construction of these facilities could result in environmental impacts.

1. Setting

This section describes existing conditions related to Larkspur's fire and emergency medical services, police services, and public schools.

a. Fire and Emergency Medical Services. This section describes fire protection and emergency medical services in the City of Larkspur. It includes a brief discussion of City of Larkspur Fire Department (LFD) staffing levels, facilities, programs, response times, and reported emergencies. Information from this section is based primarily on communication with LFD staff.

(1) Existing Staff and Facilities. The LFD provides fire protection and emergency medical services within the City of Larkspur and the Plan area. The LFD had 17 full-time staff for the 2011-12 fiscal year, which were augmented by a part-time contract staffer and approximately 15 volunteers.[3,4] The LFD operates in three shifts, with two Captains and three firefighters on duty during each shift. The Fire Chief handles administrative functions.[5]

The LFD staff is divided into three divisions: the Administrative Services Division; the Fire Prevention Division; and the Fire Protection and Emergency Medical Services Division. While not part of the LFD, the Building Code Enforcement Division is overseen by the LFD Fire Chief. The Administrative Services Division is staffed by a single Fire Chief.[6] The Fire Prevention Division, which focuses on avoiding or reducing the impact of fires (e.g., plan reviews and inspections), is

[1] Larkspur, City of, 2014. *Larkspur SMART Station Area Plan, Public Review Draft*. February.

[2] BMS Design Group, 2013. *Larkspur SMART Station Area Plan Existing Conditions Report*. July 31.

[3] Volunteers are not involved in fire suppression or emergency response.

[4] Sinnott, Bob, 2012. Fire Chief, Larkspur Fire Department. Personal Communication with LSA Associates, Inc. May 22.

[5] Larkspur, City of, 2011. *Capabilities of Your Fire Department*. Website: www.ci.larkspur.ca.us/DocumentView.aspx?DID=190 (accessed May 21, 2012).

[6] Note that the Fire Chief position is split between the Administrative Services Division (50 percent), the Fire Prevention Division (10 percent), the Emergency Medical Services (30 percent) and the Building Code Enforcement Division (10 percent).

staffed by one part-time Fire Prevention Inspector. The Fire Protection and Emergency Medical Services Division is tasked with the delivery of fire protection and pre-hospital emergency medical care services. It is staffed with six captains and ten firefighters/engineers. The Building Code Enforcement Division employs one part-time Contract Building Inspector.[7]

The LFD operates out of two fire stations. The main fire station – Fire Station 15 – is located at 420 Magnolia Avenue. Originally built in 1939, Fire Station 15 is staffed by three employees per shift: a chief officer, a captain and one engineer/firefighter. One fire engine and one water tender (i.e., water tanker) is housed at Fire Station 15.[8] Fire Station 15 has been identified as needing extensive rehabilitation, including structural repairs and redesign to bring the station up to seismic safety requirements and to better accommodate its use as a fire station; however, no schedule or funding has been identified for this rehabilitation.

Fire Station 16 is located at 15 Barry Way and is staffed by a captain and two engineer/firefighters. Two fire engines (one on-duty and one reserve) and one wildland fire engine are housed at Fire Station 16.[9] Fire Station 16 was demolished and replaced on the same site with a new station in 1990. This new station is designed in two modular sections, one for an engine room, and the other for an office/living unit. Fire Station 16, which is approximately 3 miles (driving distance) from the Plan area, is the closest station, and would be the first responder in an emergency.

(2) Service Calls and Department Goals. The LFD receives approximately 1,500 calls each year, 70 percent of which are related to medical rescue. Cardiac, respiratory and neurological emergencies, falls and vehicle collisions are the most common call types.[10] The target response time for fire protection services is 5 to 7 minutes or less, 90 percent of the time.[11]

(3) Fire Prevention Programs. The LFD administers fire prevention activities designed to reduce fire loss, preserve life and control other hazardous conditions. Additionally, the LFD conducts plan reviews and inspections to ensure that new construction or the remodeling of existing building conforms to applicable codes and safety ordinances.[12] Each of these program components are described in further detail below:

- **Community Emergency Response Training.** The Marin County fire departments, including the LFD, have adopted a citizen training program: Community Emergency Response Training (CERT). CERT is designed to train citizens to care for themselves and neighbors in the event of a disaster, such as an earthquake or wildland fire.

[7] Larkspur, City of, 2011. *City of Larkspur Adopted Budget FY2011-2012*. June.

[8] Larkspur, City of, 2012. Larkspur Fire Department, Fire Stations & Apparatus, website: www.ci.larkspur.ca.us/index.aspx?nid=240 (accessed May 18).

[9] Ibid.

[10] Larkspur, City of, 2011. PowerPoint Presentation: Larkspur Fire Department. Website: ca-larkspur.civicplus.com/DocumentCenter/Home/View/1080 (accessed May 21, 2012).

[11] Sinnott, 2012, op. cit.

[12] Larkspur, City of, 2012. Larkspur Fire Department, Prevention, Education & Preparedness. Website: www.ci.larkspur.ca.us/index.aspx?NID=227 (accessed May 21).

- **Cardiopulmonary Resuscitation Training.** The LFD offers Cardiopulmonary Resuscitation (CPR) training. This approximately three-hour class gives students the skills needed to handle basic emergencies as well as CPR and choke-saving skills, and students are certified through the American Heart Association.
- **Neighborhood Emergency Response Training.** Similar to CERT, the LFD has used the Neighborhood Emergency Response Team (NERT) program to train citizens to be better prepared and provide for themselves, their families, and their neighbors in the event of an emergency.
- **Vegetation Management.** The LFD addresses wildland fire through their Master Fire Ordinance, which designates high-hazard fire zone areas, details specific vegetation problems, provides an abatement policy for the enforcement of fire hazards, addresses the need for chimney spark arrestors, and provides guidelines for vegetation management on properties within the City that are owned by public agencies and utilities.

(4) Emergency Medical Services. The Ross Valley Paramedic Authority (RVPA) is responsible for EMS/paramedic emergency ambulance services for the communities of Corte Madera, Larkspur, Kentfield, Ross, San Anselmo, Sleepy Hollow, Fairfax, and County Service Area 27. While firefighters at the LFD are trained as paramedics and EMTs, and thus can provide medical care in an emergency, the LFD does not maintain any ambulances and thus relies on the RVPA for medical transport. The RVPA contracts with the Marin County Fire Department (MCFD).[13] MCFD administers and staffs Medical Station 18 (Medic 18) at the Ross Valley Fire Station on 33 Sir Francis Drake Boulevard, Ross, CA.[14] Medical Station 18 is approximately 3.1 miles from the Plan area (driving distance). One ambulance is staffed by two MCFD paramedics at all times.[15]

b. Police Services. This section describes polices services within the Plan area. It includes a brief discussion of Central Marin Police Authority (CMPA) staffing levels, facilities, programs, response times, and the most common types of emergencies reported in Larkspur. Information from this section is primarily based on communication with CMPA staff.

(1) Existing Staff. The CMPA provides police services for the Town of Corte Madera, the City of Larkspur, the Town of San Anselmo and portions of Greenbrae. Formed in January 2013, the CMPA was formed under a joint powers agreement between Corte Madera, Larkspur and San Anselmo. Prior to January 2013, Larkspur was served by the Twin Cities Police Authority (TCPA), a joint powers agreement between Corte Madera and Larkspur. Along with automatic response agreements between the surrounding jurisdictions of Tiburon, Belvedere, Larkspur, Mill Valley, and Marin County, the CMPA has a State Mutual Aid Agreement with the County Sheriff to provide services in emergency situations. The CMPA has 58 employees with 45 sworn full-time officers.[16]

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[13] Marin, County of, 2012. Emergency Medical Services. Website: www.co.marin.ca.us/depts/fr/main/fire/services.cfm (accessed May 21). April 25.

[14] Marin County Fire Department, 2011. Fire Stations. Website: www.xmrfire.org/mrn/about/stations.aspx (accessed May 21, 2012).

[15] Sinnott, Bob, 2012. Executive Director, Ross Valley Medical Authority. Personal Communication with LSA Associates, Inc. May 22.

[16] Central Marin Police Authority, 2013. *Central Marin Police Authority*. Website: www.ci.larkspur.ca.us/index.aspx?NID=488 (accessed December 3).

The CMPA is divided into four divisions: Administration, Field Operations, Communications, and Support Services. Administration handles general department management duties and includes the police chief, patrol captain, police lieutenant and the police chief's secretary. Field Operations provides law enforcement services, responds to calls for service, and initiates most investigations. The Traffic Division and Directed Patrol Unit are also included in Field Operations.[17] The Communications Division provides technical and clerical support for all police activities including processing calls for service, dispatching communications, records management, and front counter service.[18] Finally, Support Services investigates felony and misdemeanor crimes, identifies and apprehends offenders, recovers stolen property and contraband, and prepares cases for criminal prosecution.[19] The CMPA calculates the need for new officers based on the number of officers per capita. The County average, which serves as a benchmark, is 2.03 officers per 1,000 people. CMPA is currently at 1.3 officers per 1,000 people.[20]

(2) Facilities and Beat Patrol. CMPA operates two police stations: one is located in Larkspur at 250 Doherty Drive, (approximately 1 mile from the Plan area) and the second is in San Anselmo at 525 San Anselmo Avenue. A sub-station is located at the Corte Madera Fire Station (Station 13) on Paradise Drive in Corte Madera. The CMPA has a fleet of 15 marked and 9 unmarked police vehicles.[21]

The CMPA's jurisdiction is split into five beats: the eastern portion of Corte Madera; a central area encompassing most of Larkspur and the western portion of Corte Madera; the area from North Magnolia Avenue to north of Sir Francis Drake Boulevard; and two in San Anselmo, each encompassing about half of the city. The Plan area falls within the central area beat. When fully staffed, every shift has one Sergeant (in-charge of shift) and one corporal (general patrol – not assigned a beat). Each beat has one officer and one additional general patrol cover officer assigned to the shift. Dayshifts also have one traffic officer assigned to every city/town, with an additional traffic sergeant who oversees supervision of the traffic officers. Two detectives are assigned to swing shifts to assist patrol as needed.[22]

(3) Response Times. While the CMPA has not formally adopted response times, the 2013 response times for priority 1 calls[23] for service was approximately 3 minutes and 30 seconds.[24]

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[17] Central Marin Police Authority, 2013. *Field Operations*. Website: www.ci.larkspur.ca.us/index.aspx?nid=349 (accessed December 3).

[18] Central Marin Police Authority, 2013. *Communications*. Website: www.ci.larkspur.ca.us/index.aspx?nid=352 (accessed December 3).

[19] Central Marin Police Authority, 2013. *Support Services*. Website: www.ci.larkspur.ca.us/index.aspx?nid=353 (accessed December 3).

[20] Cusimano, Todd, 2013. Police Chief, Central Marin Police Authority. Written communication with LSA Associates, Inc. December 10.

[21] Ibid.

[22] Ibid.

[23] Priority 1 calls are defined by in-progress crimes or emergency calls for service.

[24] Cusimano, Todd, 2013. Police Chief, Central Marin Police Authority. Written communication with LSA Associates, Inc. December 19.

(4) Crime Statistics and Issues. For the purposes of crime statistics, the CMPA defines Part I crimes to include: homicide, rape, robbery, assaults, burglary, theft, auto theft and arson. Part II crimes include all other crime categories. As shown in Table IV.K-1, there were 762 Part I crimes within CMPA's jurisdiction in 2011; 280 in the City of Corte Madera, 265 in the City of Larkspur, and 217 in San Anselmo. Part I crimes were down 24 percent from 2010 with drops in robberies, residential and commercial burglaries, and assaults.[25]

Table IV.K-1: Part I Crimes (2009 – 2011)

	2009			2010			2011		
Classification	**Corte Madera**	**Larkspur**	**San Anselmo**	**Corte Madera**	**Larkspur**	**San Anselmo**	**Corte Madera**	**Larkspur**	**San Anselmo**
Criminal Homicide	0	0	0	0	0	0	0	0	0
Forcible Rape	1	1	4	0	1	0	2	2	1
Robbery	4	4	2	7	2	1	7	5	2
Assault	38	47	21	29	40	29	20	32	36
Burglary/Residential	20	45	43	23	70	37	28	34	23
Burglary/Commercial	57	39	11	65	32	28	49	35	16
Thefts	220	176	146	223	191	149	163	138	129
Motor Vehicle Theft	27	51	9	23	41	10	10	19	9
Arson	1	4	1	2	0	1	1	0	1
Total	**368**	**367**	**237**	**372**	**377**	**255**	**280**	**265**	**217**

Source: Cusimano, Todd, 2013. Police Captain, Central Marin Police Authority. Written communication with LSA Associates. December 11.

(5) Public Safety Programs. The CMPA promotes a number of public safety programs, as described below:

- **Alzheimer's Program**. The CMPA developed a community-based program for residents with Alzheimer's. CMPA will, free of charge, come to a person's home and provide a data collection sheet and take a digital photograph of the person. The data sheet will be filled out by a family member and returned to the police. This ensures that the police department has the proper information should a family member go missing.
- **Twin Cities Police Explorers.** The Police Explorers is a youth program for boys and girls between the ages of 14 and 21. Participants get first-hand experience with law enforcement, including training in arrest techniques, report writing, scenarios to improve communication skills, and interviewing techniques.[26]
- **Neighborhood Watch Program**. CMPA supports the National Neighborhood Watch Institute and assists members of the community in establishing local Neighborhood Watch programs. Training materials, window warning decals, work sheets and quality street signs are available.

[25] Central Marin Police Authority, 2013. *Crime Statistics*. Website: www.ci.larkspur.ca.us/index.aspx?nid=479 (accessed December 12, 2013).

[26] Cusimano, 2013, op.cit.

c. Schools. This section describes school services in the Plan area; information in this section is based primarily on communication with the school districts and related district reports.

Financial and administrative support for education services is largely provided by the school districts that manage schools attended by City of Larkspur residents. The City does not have jurisdiction over school programs or facilities. School districts receive the bulk of their funding from the California State Department of Education, and they have the authority to administer programs and develop school site properties without City oversight.

The following section describes school services within the Plan area, which are provided by four school districts: the Larkspur-Corte Madera School District (grades K-8); Kentfield School District (grades K-8); San Rafael City Schools District (which includes San Rafael Elementary School District [grades K-8] and the San Rafael City High School District [grades 9-12]);[27] and the Tamalpais Union High School District (9-12). Figure IV.K-1 shows the boundaries of each district in relation to the Plan area, Table IV.K-2 shows schools that serve the Plan area, and Table IV.K-3 shows 2012-2013 enrollment and capacity at each school.

Table IV.K-2: Public Schools Serving the Plan Area

Larkspur-Corte Madera School District (Grades K-5)	Kentfield School District (Grades K-8)	San Rafael City Schools District		Tamalpais Union High School District (Grades 9-12)
		San Rafael City Elementary District (Grades K-8)	San Rafael City High School District (Grades 9-12)	
Neil Cummins Elementary Henry C. Hall Middle School	Anthony G. Bacich Elementary Adaline E. Kent Middle	Bahia Vista Elementary San Pedro Elementary James B. Davidson Middle	San Rafael High Terra Linda High	Redwood High San Andreas High [a] Tamiscal High [b]

[a] San Andreas High is a continuation school.
[b] Tamiscal High is an alternative high school.

Source: BMS Design Group, 2012. Larkspur SMART Station Area Plan: Schools Summary. San Rafael City Schools District, 2013.

[27] As described in detail in this section, the San Rafael Schools District includes both the San Rafael Elementary School District and the San Rafael City High School District. Because the Elementary and High School District have different boundaries, they are separated.

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FIGURE IV.K-1

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Study Area Boundary
SMART Station Location
Larkspur Ferry Terminal
High School District Boundary
Kentfield School District
San Rafael Elementary School District
Larkspur-Corte Madera School District

City of Larkspur SMART Station Area Plan EIR
School Districts Serving the Plan Area

SOURCES: BMS DESIGN GROUP; LSA ASSOCIATES, INC., 2013.

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Table IV.K-3: School Location, Capacity and Enrollment, 2012-2013

School/District	Location	2012-2013 Enrollment (Students)	Capacity (Students)	Excess Capacity [a] (Students)
Larkspur-Corte Madera School District				
Neil Cummins Elementary School	58 Mohawk Avenue Corte Madera, CA 94925	800	845	45
Henry C. Hall Middle School	200 Doherty Drive Larkspur, CA 94939	602	575	-27
Kentfield School District				
Anthony G. Bacich	699 Sir Francis Drake Blvd. Kentfield, CA 94904	680	640	-40
Adaline E. Kent Middle	800 College Avenue Kentfield, CA 94904	535	600	65
San Rafael City Schools District				
Bahia Vista Elementary	125 Bahia Way San Rafael, CA 94901	559	550	-9
San Pedro Elementary	498 Point San Pedro Road San Rafael, CA 94901	416	416	0 [d]
James B. Davidson Middle	280 Woodland Ave San Rafael, CA 94901	973 [b]	1,110	137
San Rafael High	185 Mission Ave San Rafael, CA 94901	980 [b]	1,400	420
Terra Linda High	320 Nova Albion Way San Rafael, CA 94903	995	1,500 [c]	505
Tamalpais Union High School District				
Redwood High School	395 Doherty Drive Larkspur, CA 94939	1,230	1,900	670

[a] Negative numbers indicate that student enrollment is over capacity.
[b] James B. Davidson Middle and San Rafael High Schools enrollment include special education.
[c] This is an estimated capacity.
[d] For 2012-2013, there was no excess capacity at San Pedro Elementary School. The anticipated 2013-2014 enrollment is projected at 475 students, and the District is in the process of adding portable classrooms to the campus.[28]

Source: BMS Design Group, 2012. Larkspur SMART Station Area Plan: Schools Summary. Larkspur-Corte Madera, Kentfield, San Rafael City Schools, and Tamalpais Union High School Districts, 2013.

(1) Larkspur-Corte Madera School District. The Larkspur-Corte Madera School District (grades K-8) serves families and students in the cities of Corte Madera and Larkspur. This District is comprised of two schools: The Neil Cummins Elementary School (grades K-4), which is approximately 0.6 miles from the Plan area at 58 Mohawk Avenue, Corte Madera; and the Henry C. Hall Middle School (grades 5-8), which is approximately 1 mile from the Plan area at 200 Doherty Drive, Larkspur.[29]

[28] Chris Thomas, Chief Business Official, 2013. Written communication with LSA Associates, Inc, May 30.

[29] Larkspur, City of, 1990. *General Plan*.

The Larkspur-Corte Madera School District employs 80 full- and part-time teachers and maintains a 19.3 pupil-teacher ratio. The District's average class size is 22 students per class.[30] Currently, the District charges developers a school impact fee of $3.94 per square foot of residential development (residential development under 500 square feet is exempt) and $0.51 per square foot of commercial development.[31] The Larkspur-Corte Madera School District uses a student generation rate of 0.367 students for multi-family residential developments.[32, 33]

The 2012-2013 school year enrollment at Neil Cummins Elementary and Henry C. Hall Middle Schools are 800 and 602, respectively. Projected enrollment for the 2013-2014 school year at Neil Cummins Elementary and Henry C. Hall Middle Schools are 830 and 595, respectively.[34] Neil Cummins Elementary and Henry C. Hall Middle Schools would experience an approximately 4 percent increase and 1 percent decrease in enrollment, respectively. The capacities of Neil Cummins Elementary and Henry C. Hall Middle Schools are 845 students and 575 students, respectively. The Neil Cummins Elementary School is currently operating over capacity and Henry C. Hall Middle School is currently operating slightly under capacity.

The Larkspur-Corte Madera School District is studying the potential for expanding existing school sites to accommodate students at Henry C. Hall Middle School and Neil Cummins Elementary School, which are nearing capacity. At a May 12, 2011, meeting, the Facilities Expansion Committee recommended to the District Board that an elementary school be opened at the San Clemente School site, which is located in Corte Madera and is owned by the District and has been leased by Lycée Français La Pérouse (a private school) for several decades.[35] Construction of the school commenced in the summer of 2013.

(2) Kentfield School District. The Kentfield School District (grades K-8) serves families and students in the City of Larkspur and Community of Kentfield (unincorporated). The District is comprised of two schools: The Anthony G. Bacich Elementary School (grades K-5), which is approximately 1 mile from the Plan area at 699 Sir Francis Drake Boulevard, Kentfield; and the Adaline E. Kent Middle School (grades 6-8), which is approximately 2 miles from the Plan area at

[30] Education Data Partnership, 2011. *District Reports: Marin County*. Website: www.ed-data.k12.ca.us (accessed June 20, 2012).

[31] Urrea, Nichole, 2013. Assistant Business Manager, Larkspur-Corte Madera School District. Written communication with LSA Associates. May 20.

[32] White, Becky, 2013. Business Manager. Larkspur-Corte Madera School District. Written communication with LSA Associates. May 14.

[33] This student generation rate is from the District's Facility consultant and is only based on units constructed over a five-year range (2007-2011), as the developer fee code requires a five year span. This rate was not evaluated for facility planning purposes and may not represent the peak student yields from residential units. Student generation rates vary over time and different ranges may produce higher generation rates.

[34] White, Becky, 2013. Business Manager. op. cit.

[35] BMS Design Group, 2012. *Larkspur SMART Station Area Plan: Schools Summary*.

800 College Avenue, Kentfield.[36] The Kentfield School District does not have a student generation rate for residential developments.[37]

Since 1994, the student population at the Kentfield School District has experienced slight growth. Enrollment has risen from 991 students in the 1993-1994 school year to 1,133 students in 2010-2011, representing an overall gain of approximately 14 percent.[38] The 2012-2013 school year enrollment at Anthony G. Bacich Elementary and Adaline E. Kent Middle Schools are 680 and 535, respectively. Projected enrollment for the 2013-2014 school year at Anthony G. Bacich Elementary and Adaline E. Kent Middle Schools is 710 and 541 students, respectively.[39] Anthony G. Bacich Elementary and Adaline E. Kent Middle Schools would experience 4 and 1 percent increases in enrollment, respectively. The capacities of Anthony G. Bacich Elementary and Adaline E. Kent Middle Schools are 640 students and 600 students, respectively. While the Adaline E. Kent Middle is operating at below capacity and can accommodate future student growth, the Anthony G. Bacich Elementary is over capacity.

The Kentfield School District employs 80 full- and part-time teachers and maintains a 16.5 pupil-teacher ratio. The District's average class size is an average 22 students per class.[40] For residential development, the District charges $2.89 per square foot (residential development below 500 square feet is exempt) and for commercial development, the District charges $0.47 per square foot.[41]

(3) San Rafael City Schools District. The San Rafael City Schools Distinct is composed of two separate boundaries: the San Rafael City Elementary School District and the San Rafael City High School District. Both the Elementary School District and the High School District are governed by the same School Board and the same District staff; because their boundaries are different it is necessary to maintain a separate elementary and high school district.

The San Rafael Schools District is comprised of 13 schools; however, only five serve the Plan area: the Bahia Vista Elementary School (grades K-5), which is approximately 1 mile from the Plan area at 125 Bahia Way, San Rafael; the San Pedro Elementary School (grades K-5), which is located approximately 5 miles from the Plan area at 498 Point San Pedro Road, San Rafael; the James B. Davidson Middle School (grades 6-8), which is approximately 2 miles from the Plan area at 280 Woodland Ave, San Rafael; the San Rafael High School (grades 9-12), which is approximately 2 miles from the Plan area at 185 Mission Ave San Rafael; and the Terra Linda High School (grades 9-12), which is approximately 6 miles from the Plan area at 320 Nova Albion Way.[42] The San Rafael

[36] Education Data Partnership, 2011. *School Reports: Marin County*. Website: www.ed-data.k12.ca.us (accessed June 20, 2012).

[37] Pesenti, Sylvia, 2013. Administrative Assistant to Superintendent, Kentfield School District. Written communication with LSA Associates. April 4.

[38] Lucile Packard Foundation for Children's Health, 2011. Kentfield Elementary: Demographics. Website: www.kidsdata.org/Data/Region/Dashboard.aspx?gsa=1&loc=232 (accessed June 19, 2012).

[39] Pesenti, Sylvia, 2013. Administrative Assistant to Superintendent, Kentfield School District, op. cit.

[40] Education Data Partnership, 2011, *School Reports: Marin County*, op. cit.

[41] Higgs, Michelle, 2012. Administrative Assistant, Facilities, San Rafael City Schools District. Written communication with LSA Associates. June 21.

[42] Education Data Partnership, 2011, *School Reports: Marin County*, op. cit.

High School District is an open enrollment district, which means that any student who lives in San Rafael may choose to attend either San Rafael High School or Terra Linda High School.[43]

The 2012-2013 school year enrollment at Bahia Vista Elementary, San Pedro Elementary, and James B. Davidson Middle Schools are 559, 416, and 973, respectively.[44] The 2012-2013 school year enrollment at San Rafael and Terra Linda High Schools are 980 and 995, respectively,[45,46,47] representing approximately 63 percent of current District-wide enrollment (approximately 6,275 students). Projected District-wide enrollment for the 2013-2014 school year is 6,519. The San Rafael Schools District would experience a 4 percent increase in enrollment. The capacities of Bahia Vista Elementary, San Pedro Elementary, and James B. Davidson Middle, are 510, 416, and 1,110, respectively. The estimated capacities of San Rafael and Terra Linda High Schools are 1,400 and 1,500 students, respectively. While James B. Davidson Middle, San Rafael High, and Terra Linda High Schools are operating below capacity, Bahia Vista Elementary School is slightly over capacity. San Pedro Elementary School is currently at capacity, and the San Rafael City Schools District is currently in the process of adding three portable classrooms to San Pedro Elementary School to accommodate some future growth.[48]

The San Rafael City Elementary District employs 213 full- and part-time teachers and maintains a 20.6 pupil-teacher ratio. The Elementary District's average class size during the 2010-11 school year was an average 23 students per class. The San Rafael City High School District employs 111 full- and part-time teachers and maintains a 20.7 pupil-teacher ratio. The High School District's average class size is 26 students per class.[49] Currently, the San Rafael Schools District charges a school fee to residential and commercial developments. For residential development, the High School District charges $0.91 per square foot and the Elementary School charges $2.06 per square foot (residential development below 500 square feet is exempt for both). For commercial development, the High School District charges $0.14 per square foot and the Elementary School District charges $0.33 per square foot.[50] The San Rafael City School Districts does not have a student generation rate of residential developments.[51]

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[43] San Rafael City Schools, 2013. School Attendance Boundary Information. Website: srcs.ca.schoolloop.com/myschool. (accessed May 27).

[44] San Pedro Elementary School currently serves as an overflow school for over-capacity elementary and middle schools in the San Rafael City Schools District.

[45] Higgs, Michelle, 2013. Administrative Assistant, Facilities, San Rafael City Schools District. Written communication with LSA Associates. April 10.

[46] Enrollment for James B. Davidson Middle and San Rafael High Schools include enrollment for special education.

[47] Thomas, Chris, 2013. Chief Business Official. San Rafael City Schools District. Verbal communication with LSA Associates. May 30.

[48] Thomas, Chris, 2013. Chief Business Official. San Rafael City Schools District. Written communication with LSA Associates. May 30.

[49] Education Data Partnership, 2011, *School Reports: Marin County*, op. cit.

[50] Pesenti, Sylvia, 2012. Administrative Assistant to Superintendent, Kentfield School District. Written communication with LSA Associates. June 25.

[51] Higgs, Michelle, 2013. Administrative Assistant, Facilities, San Rafael City Schools District. op. cit.

(4) Tamalpais Union High School District. The Tamalpais Union High School District serves communities in southern Marin County, including the City of Larkspur and 18 other cities and towns. The Tamalpais Union High School District is comprised of five high schools, three of which serve the Plan area: Redwood High (Larkspur); San Andreas High (Larkspur), which is a continuation school; and Tamiscal High (Larkspur), which is an alternative high school. The City of Larkspur is served by Redwood High School, which is less than 0.5 miles from the Plan area at 395 Doherty Drive, Larkspur.

The 2012-2013 school year enrollment at Redwood High School is 1,230, representing approximately 32 percent of current District-wide enrollment.[52] Projected enrollment (2013-2014 school year) at Redwood High School is 1,329, representing an 8 percent increase in enrollment. Redwood High School is operating below their capacity and can accommodate future student growth.

The Redwood High School employs 83 full- and part-time teachers and maintains an 18.2 pupil-teacher ratio. Redwood High School's average class size is 23 students per class.[53] Currently, the Tamalpais Union High School District does not charge a school fee to developers for either residential or commercial construction.[54] The Tamalpais Union High School District uses an average student generation rate of 0.092 students for new residential developments.[55]

(5) Private Schools. There are seven private schools located in Marin, including parochial and independent schools. In the Plan area, these include Marin Primary and Middle School (Pre-8), and Saint Patrick Elementary (K-8).[56]

(6) Institutions of Higher Education. There are no college or university educational institutions located in the City of Larkspur. However, there are a number of accredited colleges and universities in the North Bay that provide educational opportunities to Larkspur residents. Larkspur is in the California Community College District-College of Marin (College of Marin), which has two public community colleges: The Kentfield Campus, which is located approximately 2 miles from the Plan area at 835 College Avenue and serves southern Marin; and the Indian Valley Campus, which is located approximately 12 miles from the Plan area at 1800 Ignacio Boulevard, Novato and serves northern Marin. The closest public university is San Francisco State University, which is part of the California State University system. It offers bachelor's degrees in 113 areas of specialization, and master's degrees in 96 areas. Its main campus is located in San Francisco, and it has a student body of over 28,290.

(7) Regulatory Framework. This section describes applicable State regulations that pertain to public schools.

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[52] Cloney, Kaley, 2013. Administrative Assistant, Finance and Facilities, Tamalpais Union High School District. Written communication with LSA Associates. April 4.

[53] Education Data Partnership, 2011. *School Reports: Redwood High School*. Website: www.ed-data.k12.ca.us (accessed June 19, 2012).

[54] Cloney, Kaley, 2012. Administrative Assistant, Finance and Facilities, Tamalpais Union High School District. Written communication with LSA Associates. June 21.

[55] Jack Schreder & Associates, 2012. *Developer Fee Justification Study*. May.

[56] Marin County Office of Education, 2012. *2011-2012 Directory of Marin County Public & Private Schools*.

State. Local school districts are empowered under State law to impose school impact fees, which are collected by local governments at the time of building permit issuance. In 1998, the California State Legislature enacted Senate Bill 50 (SB 50), which made significant amendments to existing State law governing school fees. SB 50 prohibited State or local agencies from imposing school impact mitigation fees, dedications, or other requirements in excess of those provided in the statute. Government Code Section 65995(e) provides that where payment has been made to a school district in accordance with the school fee program, that payment is considered full mitigation for school impacts. The legislation also prohibits local agencies from denying or conditioning any project (including a General Plan) based on the inadequacy of school facilities.

d. City of Larkspur 1990 General Plan. Policies and actions program that address public services and are applicable to the Station Area Plan are listed below.

Community Facilities and Services Element

Goal 2: Preserve all existing school sites for future public use, with school use having the highest priority.

- Policy h: Encourage school districts not to sell school sites, but to preserve them for community and future school use. Where the opportunity presents itself, the school districts also should be encouraged to consider the development of affordable housing on surplus properties to serve the needs of teachers and other school employees.
- Policy i: Look for ways to ease the financial burden on school districts so that school sites can be retained in public ownership.
    - Action Program [12]: Work with school districts to examine alternatives to school closure and sale early in the process of responding to declining school enrollments.
- Policy j: When school districts apply for interim reuse of surplus facilities, the City encourages that school playing fields, gymnasiums, meeting halls, and auditoriums be retained for public use.

Goal 3: Achieve greater cooperation between the City and the school districts in sharing resources.

- Policy k: Encourage school boards to work with Larkspur and recreation departments of other cities to expand community uses of school facilities (pools, gyms) during non-school hours.
- Policy l: Encourage school districts to make use of public safety and other City staff members to teach students about fire prevention, CPR, drug abuse, bicycle safety, and other subjects.
    - Action Program [13]: Identify City staff, facilities, and programs that can be shared with the school districts for educational purposes.

Goal 6: Renovate and modify public buildings to meet future demands.

- Policy p: Renovate public buildings to conform to seismic safety requirements, space needs, and use of new technology, while respecting historic values.
    - Action Program [16]: Rehabilitate City Hall and Fire Station 1 in accordance with structural design standards.
    - Action Program [17]: Explore the relocation of Fire Station 1 to allow potential future expansion of city services such as planning, library, recreation, etc., in existing historic building.
- Policy q: Coordinate with the Town of Corte Madera to consolidate the two existing police stations of the Twin Cities Police Department at one location.

- Action Program [18]: Survey potential sites, and study the financing and time for development of a single police station.
- Action Program [19]: Consider moving the current police facility to a location other than Piper Park.

Goal 7: Protect Larkspur residents and property from fire hazards.

Goal 8: Minimize the risk of wildland and structural fires, and ensure adequate fire protection.

- Policy n: Provide fast and efficient fire suppression service to Larkspur residents.
  - Action Program [27]: Establish performance standards such as desired response times for police, fire, and other public services.
- Policy o: Maintain an aggressive fire prevention program.
  - Action Program [28]: Continue to inspect all business, public buildings and apartment buildings annually for fire and building code violations.
  - Action Program [29]: Continue to require that all vacant lots annually be cleared of excessive vegetation.
  - Action Program [30]: Continue to require smoke alarms and Class C or better fire retardant roofs for all new construction.
- Policy p: Establish more stringent fire protection standards for private development in high risk fire hazard areas.
  - Action Program [31]: Require that automatic sprinkler systems be installed in new residences in areas with difficult access and/or poor water supply.
  - Action Program [32]: Require that brush be cleared for a distance of 30 feet from residences in high fire-hazard areas.
  - Action Program [33]: Establish landscaping guidelines that encourage the use of fire-resistant plants in high fire-hazard areas.

2. Impacts and Mitigation Measures

This section provides an assessment of the potential impacts related to Larkspur's fire and emergency medical services, police services, and public schools facilities associated with implementation of the Station Area Plan.

a. Criteria of Significance. Implementation of the Station Area Plan would have a significant effect on public services if it would:

- Result in a substantial adverse physical impact associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:
  - Fire protection;
  - Police protection;
  - Schools;

b. Impacts Analysis. The following discussion describes impacts on public services associated with implementation of the Station Area Plan.

(1) Fire Protection. New development associated with the Station Area Plan would be required to meet all LFD, local and State Fire Code requirements for sprinkler systems, alarms, fire flow, access, and fire hydrant spacing. Site specific design plans are required by the Fire Code. The City of Larkspur Building Department would review all construction plans and perform inspection of proposed developments associated with the Station Area Plan to ensure compliance with the Fire Code prior to the issuance of building permits.[57]

The additional residents and employees associated with the implementation of the Station Area Plan would increase demand for fire protection and emergency medical services. LFD does not have a methodology for calculating the need for new officers or facilities (e.g., percentage of population or number of calls). It is anticipated that the population and employment growth resulting from implementation of the Station Area Plan would increase the demand for fire protection services.

Population and employment growth, specifically associated with the proposed residential and hotel uses within the Station Area Plan area, would increase the number of calls to LFD requesting emergency assistance. This increase in the number of calls, combined with increased traffic congestion likely to result from residential and employment growth in the area, could also increase emergency response times. As a result, LFD may be slightly less effective at meeting its target response time (5 to 7 minutes 90 percent of the time) and would not be able to provide an acceptable level of service unless additional staff and fire/paramedical equipment are placed in service.[58]

Impact PS-1: Implementation of the Station Area Plan could result in the need for additional firefighting equipment and personnel in order to meet the potential new demand generated by development within the Plan area. (S)

Staffing levels at the LFD are currently low and one of LFD's two engine companies is staffed below industry and regional standards.[59] According to the LFD, upon preliminary review of development associated with the Station Area Plan, specifically, the proposed residential (920 dwelling units) and hotel uses, the following resources would be required to ensure the current level of fire protection and emergency services is maintained in the City after full implementation of the Station Area Plan:

- One engine company;
- One paramedic ambulance unit; and
- Five staff (three staff would operate the engine company and two would operate the paramedic ambulance unit).[60]

[57] Larkspur, City of, 2013. Building Department. Website: www.ci.larkspur.ca.us/index.aspx?nid=91 (accessed May 20).

[58] Sinnott, Bob, 2013. Fire Chief. City of Larkspur Fire Department. Written communication with LSA Associates, Inc., May 20.

[59] Ibid.

[60] Ibid.

Fire Station 16, which is the first responder to the Plan area, would need to be structurally modified to accommodate the fire-fighting equipment and increase in LFD staff described above.[61] When any potential modification is proposed, the LFD will undertake the appropriate CEQA review to ensure that any environmental impacts associated with the station modification would be reduced to a less-than-significant level. Additionally, Fire Station 16 is located on already urbanized and developed land that does not support sensitive natural habitats, wetlands, wildlife movement corridors, and protected archaeological resources, physical alteration of the facility would not be expected to result in significant unmitigable secondary environmental impacts.

Implementation of the following mitigation measures would reduce the potential impact related to the provision of fire protection services to a less-than-significant level.

> Mitigation Measure PS-1: The City of Larkspur shall identify and implement a formula, which identifies a project applicant's fair share contribution towards station retrofits, staffing, or the purchase of additional firefighting equipment and vehicles in order to serve the additional fire protection services demand generated by new development. The City shall also identify an implementation plan and budget for use of the funds prior to implementing the formula. Payment into this fund shall be a condition of development approval. (LTS)

(2) Police Protection. The additional residents and employees associated with the implementation of the Station Area Plan would increase demand for law enforcement services. As previously described, the CMPA calculates the need for new officers based on the number of officers per capita. The County average, which serves as a benchmark, is 2.03 officers per 1,000 people. CMPA is currently at 1.3 officers per 1,000 people. As previously noted, the CMPA does not have adopted response times, but reported an average response time of approximately 3 minutes and 30 seconds for priority 1 calls in 2013. Potential increased traffic congestion likely to result from future development associated with the Station Area Plan, could increase emergency response times. As a result, CMPA may be less effective at responding to emergency calls.

Development associated with the implementation of the Station Area Plan, and the need for local police to respond to incidents occurring at the SMART station or within the Plan area, would increase the demand for police services. Some of the increased demand in the Larkspur Plan area could be partially alleviated through SMART's proposed system security. System security would be provided by SMART, either in-house or by contract, and fare inspectors and station personnel would also be part of the system security and would provide additional surveillance to deter crime.[62]

According to CMPA, upon preliminary review of development associated with the Station Area Plan, CMPA would require additional police personnel and equipment to ensure that the current level of law enforcement services is maintained in the City.[63] The additional police personnel and equipment would impact CMPA's general fund budget. However, no additional police facilities or structures

[61] Ibid.

[62] Parsons Brinckerhoff Quade & Douglas, Inc., 2005. SMART District Project Environmental Impact Report. November.

[63] Cusimano, op. cit.

would need to be constructed to serve the development associated with the Station Area Plan.[64] Therefore, the proposed project would not result in significant physical environmental impacts related to the need for new or altered police facilities.

(3) Schools. The construction of new housing (920 total dwelling units) in the City as a result of Station Area Plan implementation could generate approximately 420 students, based on student generation rates shown in Table IV.K-4. The table shows the projected distribution of new students in each school district. Student generation rates used by each school district to predict the number of students that would be generated by new multi-family residential development generally have a lower student generation rate than single-family units.

Table IV.K-4: Student Generation Yield by School District

District	Additional Dwelling Units at Full Implementation of Station Area Plan	Student Generation Rate Used by School District for Multi-Family Residential	Additional Students Generated at Full Implementation of Station Area Plan
San Rafael City Schools	850	Elementary/Middle School: 0.367 [a]	311
		High School: 0.092 [a]	78
Tamalpais Union High School	70	0.092 [b]	6
Larkspur/Corte Madera School	0	0.367	0
Kentfield School	70	0.367 [c]	25
		Plan Area Total:	**420**

[a] The San Rafael City Schools District does not have a student generation rate of residential developments. For this analysis, student generation rates from Larkspur/Corte Madera School District (for elementary and middle school) and Tamalpais Union High School District (for high school) are used for the San Rafael City Schools District.
[b] Student generation rate provided by Jack Schreder & Associates, 2012.
[c] The Kentfield School District does not have a student generation rate of residential developments. For this analysis, student generation rate from Larkspur/Corte Madera School District (for elementary and middle school) is used for the Kentfield District.

Source: LSA Associates, Inc., 2013.

San Rafael City Schools District. As shown in Table IV.K-3, the Bahia Vista Elementary School is currently slightly over-capacity, and according to the San Rafael City Schools District, San Pedro Elementary School is currently at capacity.[65] Based on the student generation rates shown in Table IV.K-4, the addition of 850 dwelling units in the Plan Area that are within the San Rafael City Schools boundary would generate approximately 311 new elementary and middle school students, and 78 high school students within the San Rafael City Schools District.

Because existing elementary and middle schools (grades K-8) within the San Rafael City Schools District are currently operating at capacity, the San Rafael City Schools District would not be able to accommodate additional students generated by development associated with the Station Area Plan in

[64] Ibid.

[65] Thomas, Chris, 2013. Chief Business Official. San Rafael City Schools District. Written communication with LSA Associates. May 30.

its existing facilities.[66] Specifically, the San Rafael City Schools District is experiencing considerable growth in its kindergarten enrollment. This level of growth would likely result in higher enrollment numbers in already at-capacity elementary schools as enrolled schoolchildren advance up to each grade.[67] The San Rafael City School District is currently in the early stages of a master planning process to address existing and anticipated facility constraints and capacity issues.[68]

The additional 311 elementary and middle school students would exceed the current capacities available within Bahia Vista, San Pedro, and James B. Davidson Middle schools. Due to the recent growth trend at the San Rafael City Schools District's elementary schools, planned new facilities would likely be needed to accommodate additional students generated by the implementation of the Station Area Plan.[69] The additional 78 high school students would not exceed the current excess capacity available at San Rafael and Terra Linda High Schools.

In order to fund the development and construction of new school facilities, the San Rafael City Schools would impose a school impact fee of $2.06 per square foot of residential development for the elementary and middle schools, and $0.91 per square foot of residential development for the high school. San Rafael City Schools would impose a school impact fee school impact fee of $0.33 per square foot of commercial development for the elementary and middle schools, and $0.14 per square foot of commercial development for the high school.

Tamalpais Union High School District. As shown in Table IV.K-3, Tamalpais Union High School District is currently operating below their capacity at Redwood High School. Based on the student generation rates shown in Table IV.K-4, the addition of 70 dwelling units in the Plan Area that are within the Tamalpais Union High School boundary would generate approximately six new high school students. The additional six new students would not exceed the current excess capacity available within Redwood High School, and as a result, would not require the construction of new facilities to serve the increased high school student population.

Larkspur-Corte Madera School District. Residential development associated with the Station Area Plan is not located within the Larkspur-Corte Madera School District boundary.[70] Therefore, no students within the Larkspur-Corte Madera School District would be generated from full implementation of the Station Area Plan.

Kentfield School District. As shown in Table IV.K-3, the Kentfield School District is currently over-capacity at Anthony G. Bacich Elementary School. Based on the student generation rates shown in Table IV.K-4, the addition of 70 dwelling units in the Plan Area that are within Kentfield School District boundary would generate approximately 25 new elementary and middle school students. The additional 25 elementary and middle school students would exceed the current excess capacity

[66] Thomas, Chris, 2013. Chief Business Official. San Rafael City Schools District. Verbal communication with LSA Associates. May 30.

[67] Ibid.

[68] Ibid.

[69] Ibid.

[70] White, Becky, 2013. Business Manager. Larkspur-Corte Madera School District. Written communication with LSA Associates. May 21.

available within Anthony G. Bacich and Adaline E. Kent Middle Schools, and as a result, could require the construction of new facilities to serve the increased elementary and middle school student population. In order to fund the development and construction of new school facilities, the Kentfield School District could impose a school impact fee of $2.89 per square foot of residential development (residential developments less than 500 square feet are exempt from this fee) and $0.47 per square foot of commercial development.

School Impact Fees. As discussed above, new school facilities would likely be needed to accommodate anticipated increases in student enrollment resulting from implementation of the Station Area Plan. These school facilities would be funded in part by new development that would occur as part of Station Area Plan implementation. New projects in Larkspur are subject to statutory fees established by the State. These fees are used for the construction of new school facilities, which would be built to accommodate increased student enrollment resulting from development. Payment by developers of statutory fees would provide funding for planned school projects. Once funded, the school districts are responsible for identifying the location of new school facilities and undertaking acquisition, design, and construction of the facilities.

The school districts are responsible for implementing the specific methods of mitigating school impacts under the Government Code. The school impact fees and the school districts' methods of implementing measures specified by Government Code 65996 are meant to offset increased student enrollment. Payment of school facility mitigation fees has been deemed by the State legislature (per Government Code Section 65995(h)) to constitute full and complete mitigation of impacts of a development project on the provision of adequate school facilities, even though, as a practical matter, additional funding, usually from statewide or local bond measures, are needed to create new school capacity. Specific school facility developments would be subject to environmental review on a project-by-project basis.

Development associated with the implementation of the Station Area Plan would be subject to fund necessary school service and facility improvements to accommodate anticipated school enrollment growth within the school district areas. Therefore, through the payment of associated development fees, compliance with applicable State and local regulations, implementation of the Station Area Plan would have a less-than-significant impact on school facilities.

c. Cumulative Impacts of the Station Area Plan. Cumulative impacts associated with fire protection and police services that would occur under the Station Area Plan would occur entirely within the LFD and TCPA service areas. Expected increases in demand for fire and police services would thus be spatially limited and would not make a considerable contribution to increased demand for these public services in the region. Therefore, cumulative impacts to fire and police services are expected to be less than significant. Additionally, the City will consider the environmental effects of new facilities at a project level when they are proposed over time.

For school services, the geographic setting for cumulative impacts includes Larkspur-Corte Madera School District, Kentfield School District, San Rafael City Schools District, and Tamalpais Union High School Districts service areas, which include cities and towns in southern Marin County, including Larkspur, Corte Madera, San Rafael, and Kentfield. As expected residential and non-residential growth occurs within the four school service areas, increased demand would be placed on the school districts' services and facilities. The Larkspur-Corte Madera School and San Rafael City Schools Districts are currently studying the potential for expanding existing school sites and planned facilities to accommodate a growing student population, which would occur even without implementation of the Station Area Plan. The cumulative demand within all four school districts is expected to increase as a result of implementation of the Station Area Plan, as well as other population growth within these school districts.

With current K-8 enrollment at the Larkspur-Corte Madera School District, Kentfield School District, and San Rafael City Schools District (specifically elementary schools) schools nearing or exceeding capacity, implementation of the Station Area Plan would result in a potentially significant cumulative impact on schools. However, any development carried out under the Station Area Plan, or other development proposed within the school districts, that may affect service levels within the four school districts would be required to contribute school facility fees in conformance with State law and Districts' requirements. School impact fees are deemed by statute to constitute full mitigation to reduce the impact of development projects on school facilities. Therefore, cumulative impacts of development on school district facilities would be less than significant. Additionally, the school districts will conduct their own environmental analysis to address proposals for new facilities and will address project-level adverse environmental impacts on a case by case basis at that time.

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L. UTILITIES AND INFRASTRUCTURE

This section evaluates the effects of implementation of the Station Area Plan on water, wastewater, and solid waste and disposal. Potential impacts on these services are identified, and mitigation measures are recommended, as necessary. The information provided in this section is based on the Larkspur SMART Station Area Plan Existing Conditions Report,[1] Station Area Plan[2] and Infrastructure Needs Analysis Technical Report (Technical Report).[3] This Technical Report is included in Appendix E.

1. Setting

This section describes Larkspur's existing infrastructure, including the water supply and distribution system; the wastewater collection, treatment, and disposal system; and solid waste.

a. Water. The following discussion provides background information on the City's water supply, water treatment facilities, and water distribution system.

(1) Water Supply. The Marin Municipal Water District (MMWD) owns and operates existing water facilities within the City of Larkspur and the Plan area. MMWD provides water to an area of 147 square miles within south and central Marin County through an approximately 900-mile distribution and transmission piping system. The majority of water supplied to this region consists of surface water runoff from Lagunitas Creek stored in MMWD reservoirs. The balance of the water, approximately 25 percent of the total supply, comes from the Russian River Basin in Sonoma County under a contract with the Sonoma County Water Agency (SCWA).

MMWD also has recycled water available that provides a drought-resistant water supply to portions of MMWD service area for non-potable uses. The current recycled water service area includes portions of Terra Linda, Marinwood, Santa Venetia and the Marin Civic Center. Although a recycled water source has not yet been identified for the Larkspur area, redevelopment of the Plan area would likely require installation of recycled water infrastructure in anticipation of future availability.

Long-term water supply for most communities within the San Francisco Bay Area region continues to be a concern. MMWD adopted the 2010 Urban Water Management Plan (UWMP) in July 2011. The UWMP included an assessment of water demand and supplies over a 25-year planning horizon (2010-2035). The conclusion of the assessment was that the District's commitment to water conservation and implementation of the Water Conservation Master Plan, as well as its commitment to complying with the Water Conservation Bill of 2009, are projected to maintain water demand at a level that can be supplied from existing water supply sources. The Water Conservation Bill of 2009 includes elements of the 20x2020 Water Conservation Plan which was designed to reduce the statewide per capita urban water use by 20 percent by the year 2020.

[1] BMS Design Group, 2012. *Larkspur SMART Station Area Plan Existing Conditions Report,* July 31.

[2] Larkspur, City of, 2014. *Larkspur SMART Station Area Plan, Public Review Draft*. February.

[3] BMS Design Group, 2013. *Larkspur Station Area Plan Infrastructure Needs Analysis Technical Report*. December 10.

(2) Water Facilities and Distribution. MMWD has three water treatment plants that treat and purify water prior to distribution to MMWD service area customers. Surface water that fills the reservoirs is treated at either the San Geronimo Treatment Plant in Woodacre or the Bon Tempe Treatment Plant in the Mount Tamalpais watershed. The balance of the water supply is imported from the SCWA and is treated at MMWD's Ignacio treatment facility.

The MMWD water storage capacity, treatment capacity, and distribution systems are currently functioning within normal operating ranges. MMWD defines its service capabilities in the Plan area as very good with sufficiently sized pipes, modern construction, and good service pressures.[4] The water distribution system within the vicinity of the Plan area consists of a network of pressure pipes, pressurized by both gravity and/or booster pumps. The major water main within Sub-area 1A is a 16-inch pipe that runs from U.S. Highway 101 (U.S. 101) within Sir Francis Drake Boulevard and loops around Larkspur Landing Circle. The 16-inch main is fed from the Greenbrae storage tank in Sub-area 1B near Eliseo Drive and Corte Fedora through a 14-inch main under U.S. 101. This main connects the water facilities within Via La Combre to those within Larkspur Landing Circle through the Century Larkspur Landing Theater site east of U.S. 101. A network of predominantly 8-inch water mains forms the bulk of the water distribution within Sub-area 1A.[5]

Sub-area 1B consists of a mixture of water main sizes where pipes range from 4 to 16 inches. A 16-inch main is located within Sir Francis Drake Boulevard west of Barry Way. The southernmost portion of Sub-area 1B is fed by 8-inch water mains within the roads connected to the north by a 16-inch pipe crossing Sir Francis Drake Boulevard within Barry Way. The major water main within Sub-area 2 is a 12-inch pipe within Redwood Highway. Sub-areas 1A and 2 are also connected by a 12-inch main within U.S. 101 that crosses Corte Madera Creek.

(3) Existing Water Demand. Based on the Technical Report, estimated rates of water use were assumed for each opportunity site within the Plan area based on existing land uses and current water usage rates. These rates are shown in Table IV.L-1. Current water usage rates do not account for future water conservation measures, which could reduce anticipated water demands, nor do they account for changes to other areas not identified as an opportunity site. As shown in Table IV.L-2, existing water demand for the Plan area (excluding Redwood Highway area, as no changes are proposed to that area) is approximately 0.1 million gallons per day (mgd).

Table IV.L-1: Estimated Water Demand Rates for Land Uses on Opportunity Sites

	Office/Public (gpd/sf)	Hotel (gpd/room)	Retail/Cinema (gpd/sf)	Residential (gpd)	Industrial/ Auto-Serving (gpd/sf)
Rates	0.1035	175	0.2820	179	0.1035

gpd = gallon per day
sf= square feet

Source: BMS Design Group, 2013. *Larkspur Station Area Plan Infrastructure Needs Analysis Technical Report*. December 10.

[4] BMS Design Group, 2013.

[5] BMS Design Group, 2012, op. cit.

Table IV.L-2: Estimated Water Demand for Existing Uses on Opportunity Sites

Opportunity Sites	Office/Public (gpd)	Hotel (gpd)	Retail/Cinema (gpd)	Residential (gpd)
1. Ferry Terminal	2,588	0	0	0
2. Airporter	259	0	0	0
3. Larkspur Offices and Cinema	19,665	0	4,512	0
4. Marin Country Mart	4,658	0	49,350	0
5. Sanitary District	0	0	0	0
6. Drakes Landing	13,041	0	0	0
7. Offices	1,863	0	0	0
Total	**42,073**	**0**	**53,862**	**0**

gpd = gallon per day
Note: Sites within the Redwood Highway area are not included in the estimated water demand analysis for existing land use.

Source: BMS Design Group, 2013. *Larkspur Station Area Plan Infrastructure Needs Analysis Technical Report*. December 10.

(4) Regulatory Context. The following discussion summarizes regulations that apply to water supply and water quality in Larkspur.

Federal. Drinking water is regulated by federal and State laws. The federal government sets minimum standards for water quality, including for drinking water and bodies of water. The Safe Drinking Water Act (SDWA) of 1974 and subsequent amendments, gave the U.S. Environmental Protection Agency (EPA) the authority to establish standards for contaminants in drinking water supplies. The National Primary Drinking Water Standards establish the maximum contaminant levels (MCLs) allowed in public distribution systems. The National Secondary Drinking Water Standards establish the MCLs that apply to potable water supplies at the point of delivery to the customer. The EPA administers the SDWA at the federal level and establishes MCLs for bacteriological, inorganic, organic and radiological contaminants.[6]

State. The California Environmental Protection Agency (Cal EPA) administers and enforces the drinking water program and has adopted its own SDWA, which incorporates the federal SDWA requirements, including some requirements specific only to California (California Health and Safety Code, Section 116350 and related sections).

The California Office of Environmental Health Hazard Assessment (OEHHA) has initiated evaluation of several chemicals for which new MCLs have been promulgated by the EPA, which triggers a requirement that OEHHA prepare a Public Health Goal (PHG) designed to define the level of pollutant at which no adverse health effect is expected to occur. PHG levels are concentrations of chemicals in drinking water that are not anticipated to produce adverse health effects following long-term exposures. These goals are advisory but must be used as the health basis to update the State's primary drinking water standards (MCLs) by the California Department of Public Health (DPH).[7]

[6] U.S. Code Title 42, and Code of Federal Regulations Title 40.

[7] Health and Safety Code, Section 116365(b)(1).

Pursuant to State Water Code requirements, water suppliers providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet (approximately 980 million gallons) of water annually must prepare and adopt an urban water management plan and update it every 5 years. The State Water Code requires water agencies to evaluate and describe their water resource supplies and projected needs over a 20-year planning horizon, and to address a number of related subjects including water conservation, water service reliability, water recycling, opportunities for water transfers, and contingency plans for drought events. MMWD adopted its 2010 Urban Water Management Plan in June 2011.[8]

In February 2008, Governor Schwarzeneger introduced a comprehensive plan for improving the Sacramento-San Joaquin Delta. A key component of the plan is to achieve a 20 percent reduction in per capita water use statewide by the year 2020. In November 2009, SB 7, the Water Conservation Act of 2009, was enacted, which directs urban water suppliers to calculate their baseline per capita water use and to establish a 2020 water use target that will result in a 20 percent reduction compared to the baseline use. Water agencies had until July 2011 to fulfill the mandate to calculate their baselines and reduction targets. These baselines and targets are included in the MMWD's 2010 Urban Water Management Plan.

Larkspur General Plan Policies. The following policies from the 1990 General Plan are related to water supply.

Environmental Resources Element

Goal 5: Reduce water consumption.

- Policy j: Support the efforts of the Marin Municipal Water District to reduce water consumption.
  - Action Program [16]: Require new and replacement public and private landscaping to use drought tolerant plantings. Standards will be developed in an implementing ordinance.
  - Action Program [17]: Require the installation of water-conserving plumbing fixtures in new buildings and when existing fixtures are replaced.

Larkspur Municipal Code Ordinance 990. In addition to the water conservation goals set by the State with the 20x2020 Plan, the City of Larkspur has recently adopted amendments to their Municipal Code with Ordinance 990 on May 1, 2013, which will assist in meeting the goals set by the 20x2020 Plan. For new residential construction or residential alteration projects of various values, minimum levels of compliance with the 2010 Edition of the California Green Building Standards Code have been adopted. For new non-residential construction, or alterations of various values, minimum levels of compliance with LEED must be met. Both of these "green construction codes" have various options for compliance and reduction of energy consumption and water consumption (and therefore wastewater production) to allow for a selection of methods to meet the requirements for all projects. However, for all non-residential construction projects, the new Municipal Code specifies that LEED Water Efficiency Pre-requisite 1 (WE P1) must be met as a minimum requirement. WE P1 states that water consumption for a building must be 20 percent below its established baseline.

[8] HDR, 2011. *2010 Urban Water Management Plan, Marin Municipal Water District*. June.

b. Wastewater. The following discussion provides background information on the City's wastewater collection and treatment system.

(1) Wastewater Facilities. Wastewater facilities within the Plan area are owned and maintained by several different agencies including Sanitary District No. 1 (Ross Valley Sanitary District [RVSD]), Sanitary District No. 2 (Corte Madera), and the Central Marin Sanitation Agency (CMSA). Sanitary District No. 1 is responsible for wastewater collection and maintenance of the wastewater facilities in Sub-areas 1A and 1B. Wastewater facilities located within Sub-area 2 are under the jurisdiction of Sanitary District No. 2. Both districts ultimately convey their sewage to the CMSA sanitation treatment plant located in San Rafael through a 54-inch transmission force main in Sir Francis Drake Boulevard.

The RVSD service area includes the communities of Fairfax, San Anselmo, Ross, Larkspur, Bon Air, Sleepy Hollow, Kentfield, Kent Woodlands, Oak Manor, and Greenbrae, in addition to Murray Park and San Quentin Prison. RVSD's wastewater facilities within Sub-areas 1A and 1B consist of gravity and pressure force mains of various sizes and materials including polyvinyl chloride (PVC), vitrified clay (VCP), high density polyethylene (HDPE), and cast iron (CIP). In addition to the over 40,000 linear feet of sewer pipes, RVSD also owns and maintains four sewer pump stations within the Plan area. These pump stations, and associated force mains, convey wastewater within areas of flat topography where it is not feasible to provide gravity flow to the CMSA facilities.

The major sewer trunk line within Sub-area 2 is a 22-inch force main that conveys wastewater flow north within Redwood Highway and connects to a CMSA 54-inch force main in Sir Francis Drake Boulevard at U.S. 101. Gravity mains within Sub-area 2 are limited to a few service lines within the retail center and in Redwood Highway. Two pump stations located within Sub-area 2, in addition to one pump station located immediately west of the Plan area at Fifer Avenue and Tamal Vista Boulevard, pump to the 22-inch force main. Sanitary District No. 2 (Corte Madera) owns and maintains all of the sewer facilities within Sub-area 2. However, maintenance for the pump stations is contracted out directly to CMSA.

Much of the wastewater infrastructure within the Station Area Plan area is old and many of RVSD's wastewater facilities currently in service were installed prior to 1950. In January 2007, RVSD published a Sewer System Replacement Plan, which documents a specific strategy for maintenance and replacement of existing lines on a timeline commensurate with the known state of the system at that time. Since 2011, RVSD has been in the process of performing a video assessment of the entire system. As of March 2013, 50 percent of the assessment is complete.[9]

On March 25, 2013, the San Francisco Bay Region of the California Regional Water Quality Control Board (RWQCB) issued a Tentative Cease and Desist Order for RVSD. A public hearing was held on May 8, 2013. Because of the recent discovery of the deteriorated conditions of the system, an accelerated rate of main replacement is likely to be implemented. A new evaluation and report of the system is yet to be completed, and it is not clear if lines in the Plan area are included among the sewer mains of highest concern. In either case, replacement of sewer mains due to age would occur, regardless of new development in any area of RSVD.

[9] BMS Design Group, 2013, op. cit.

(2) Wastewater Treatment. The CMSA wastewater treatment plant serves the communities of Larkspur, San Rafael, Ross Valley, and Corte Madera and treats an average of approximately 11 million gallons of wastewater per day (mgd). As part of their NPDES permit requirements, CMSA completed improvements to their treatment facilities in 2010, which increased their treatment capacity from 90 mgd to 125 mgd and their hydraulic capacity from 90 mgd to over 155 mgd.

(3) Wastewater Generation. As a general estimate, wastewater flows for dry weather can be estimated as 90 percent of the water usage rates. Using this assumption, existing land uses in the Plan area would generate an estimated 0.09 mgd of sewer flow in dry weather conditions.[10]

(4) Regulatory Context. The following discussion summarizes regulations that apply to wastewater in Larkspur.

Federal and State. The EPA is the lead federal agency responsible for managing water quality. The Clean Water Act (CWA) of 1972 regulates the discharge of pollutants to waters of the United States from any point source. The California State Water Resources Control Board (State Board) and the nine Regional Water Quality Control Boards (RWQCBs) have the authority in California to protect and enhance water quality, including administration of the National Pollutant Discharge Elimination System (NPDES) permit program for discharges, stormwater and construction site runoff. The discharge of treated wastewater is included in the NPDES program. Wastewater systems are closely regulated for health and environmental concerns. The RWQCB regulates operations and discharges from sewage systems through the NPDES permit.

Adopted on October 14, 2009, the permit provides a uniform standard for wastewater and stormwater discharges for the counties and agencies surrounding the San Francisco Bay. Municipalities in Marin County are under the jurisdiction of the San Francisco Bay RWQCB. State and federal laws, statutes, and regulations mandate compliance with the Municipal Regional Stormwater NPDES Permit (MRP).

As previously described in Section IV.H-Hydrology and Water Quality, pursuant to Section 402 of the CWA and the Porter-Cologne Water Quality Control Act, municipal stormwater discharges in Marin County are regulated under the statewide NPDES General Permit for the Discharge of Storm Water from Small Municipal Separate Storm Sewer Systems (Small MS4 Permit). Local Small MS4 Permit activities (MCSTOPPP) are overseen by the Water Board.

An updated Small MS4 Permit (Order No. 2013-0001-DWQ) will go into effect July 1, 2013. This updated permit includes a number of post-construction stormwater management criteria for new development and redevelopment projects including Site Design and Low Impact Development (LID) runoff requirements. After June 30, 2015, the use of runoff reduction and treatment measures for development and redevelopment projects that create or replace more than 5,000 square feet of impervious surface will be required. MCSTOPP is currently developing the administrative tools to implement these changes in the MS4 permit.

c. Stormwater Drainage System. The following discussion provides information on the City of Larkspur stormwater drainage system.

[10] Ibid.

(1) Existing Conditions. As described in Section IV.H-Hydrology and Water Quality, the City of Larkspur has 15 miles of public storm drains, most of which were built in the 1950s and 1960s. The storm drains were developed in piecemeal fashion as the City developed and to resolve flooding problems. As a result, the City's storm drainage system has inconsistent construction quality and varying pipe sizing that has insufficient capacity for current stormwater flows.[11] Some of the system is located on private property with details not recorded with the City's Public Works Department. As a result, the drainage system has severe flooding and maintenance problems, including rusted metal pipes that cause drainways to collapse, and a lack of or under-designed inlets and pipes that cause flooding and erosion to occur.

Although deficiencies are present throughout the system, the City has determined that the most critical problems are present in the areas adjacent to Corte Madera Creek, which includes the central portion of the Plan area.[12] An intensive capital improvement program has been proposed to address these deficiencies. The City of Larkspur 2050 Capital Expenditure Plan[13] has designated streets, drainage systems, and bridges as its second priority and proposes replacement of approximately 4.5 miles of drain pipe over the next 20 years.

(2) Storm Drainage System in Plan Area. Major storm drainage infrastructure within the Plan area is owned and operated by the City of Larkspur and maintained by the City's Maintenance Division. The City is responsible for maintaining the drainage infrastructure, which includes drainpipes, flood channels, and natural creeks. Local collection systems consisting of underground pipes, concrete channels, culverts, and swales collect and convey stormwater to the creeks and San Francisco Bay.[14] Storm drainage pipes within the Plan area generally range from 12 to 24 inches. A 36-inch and 86-inch storm drainpipes with an outfall to Corte Madera Creek, are located adjacent west of Drake's Landing, and a pump station is located in the northern portion of Sub-area 2, south of Corte Madera Creek. Several outfalls are located along the Corte Madera Channel, along the Larkspur Ferry Terminal area.[15]

The Plan area consists of parcels that range from developed land with high percentages of impervious areas (Sub-areas 1A and 2) and parcels that contain more landscaping and open space (Sub-area 1B north of Sir Frances Drake Boulevard). It is assumed that the majority of stormwater runoff from parcels that contain more pervious surfaces currently flows directly into the public storm drainage system with little to no retention or treatment, resulting in negative impacts on downstream capacity and water quality in local creeks and Bay.[16]

d. Solid Waste. The following discussion provides background information on solid waste disposal in the City of Larkspur.

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[11] Larkspur, City of, 2001. *Larkspur 2050 Capital Expenditure Plan*. March.

[12] Ibid.

[13] Ibid.

[14] BMS Design Group, 2013, op. cit.

[15] Ibid.

[16] Ibid.

(1) Nonhazardous Solid Waste. Marin Sanitary Services (MMS) provides solid waste and recycling services to the Plan area. These services include weekly garbage, recycling, food scrap, and yard waste collection for residents and businesses. All refuse collected is transferred to the Marin Sanitary Service Transfer Station at 1060 Andersen Drive in San Rafael and then transported to the Redwood Sanitary Landfill. MMS delivers recyclable materials and yard waste to either the Marin Resource and Recovery (MRR) or the Marin Resource Recovery Center (MRRC), where the materials are processed. Residual waste from both facilities is sent to the Transfer Station. Yard waste is delivered to Northern Recycling Compost-Zamora for composting.[17]

The Redwood Sanitary Landfill is located at 8950 Redwood Highway in the Novato, and handles mixed municipal, sludge, agricultural, construction/demolition, asbestos, tires, ash, wood waste, and other designated solid waste.[18] The landfill has a total estimated capacity of 19.1 million cubic yards. As of June 2011, the landfill's total estimated used capacity was approximately 12.9 million cubic yards, or 67.5 percent of the landfill's total capacity. The landfill has a permitted throughput of 2,300 tons per day[19] and is anticipated to have sufficient capacity until January 2039, its expected closure date.[20]

The City of Larkspur provides street sweeping services to each city-maintained street on a monthly basis. The streets are swept twice a month from October through January through a contract with MSS.[21]

(2) Hazardous Solid Waste. The City of San Rafael and the Marin County Hazardous & Solid Waste Joint Power Association sponsor the Marin Household Hazardous Waste Facility (HHWWF). MHHWF offers household hazardous waste disposal options for Larkspur residents at drop-off facilities. Hazardous waste generated by residential and business uses includes: paint, insecticides, herbicides, automotive parts, florescent lights, compact fluorescent lamps, batteries, computers, cell phones, cleaning products, solvents, and sharp objects. The Marin Resource Recycling and Resource Recovery Association works in partnership with these agencies to provide households and businesses who are Conditionally Exempt Small Quantity Household Hazardous Waste generators in Marin County (except Novato) with safe and hazardous waste disposal.[22]

(3) Regulatory Framework. The following section describes the solid waste regulatory context in Larkspur, including statewide mandates and Municipal Code requirements.

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[17] Hilton Farnkopf & Hobson (HF&H) Consultants, 2009. *Review of Marin Sanitary Sewer's 2010 Rate Application*. December 32.

[18] California Department of Resources Recycling and Recovery, 2013. *Solid Waste Information System*. Facility/Site Summary Details: Redwood Landfill. Website: www.CalRecycle.ca.gov/SWFacilities/Directory/ (accessed April 4).

[19] Permitted throughput is the maximum permitted amount of waste a landfill can handle and dispose of in one day. This figure is established in the current solid waste facilities permit issued by the Integrated Waste Management Board.

[20] California Department of Resources Recycling and Recovery, 2013, op. cit.

[21] Larkspur, City of, 2012. Frequently Asked Questions, "When is My Street Scheduled to be Swept?" Website: www.ci.larkspur.ca.us/FAQ.aspx?QID=108 (accessed May 21).

[22] Marin Sanitary Service, 2013. *Marin Household Hazardous Waste Facility*. Website: www.marinsanitary.com/customer-service/recycling-information-directory/marin-sanitary-services/marin-household-hazardous-waste (accessed April 4).

California Integrated Waste Management Act (AB 939). In 1989, the California Legislature enacted the California Integrated Waste Management Act (AB 939), which requires the diversion of waste materials from landfills in order to preserve landfill capacity and natural resources. Cities and counties in California were required to divert 25 percent of solid waste by 1995, and 50 percent of solid waste by the year 2000. AB 939 further requires every city and county to prepare two documents demonstrating how the mandated rates of diversion will be achieved. The Source Reduction and Recycling Element (SRRE) must describe the chief source of the jurisdiction's waste, the existing diversion programs, and current rates of waste diversion and new or expanded diversion programs. The Household Hazardous Waste Element (HHWE) must describe each jurisdiction's responsibility in ensuring that household hazardous wastes are not mixed with non-hazardous solid wastes and subsequently deposited at a landfill. In 1997, the California Integrated Waste Management Board (now known as CalRecycle) recognized the Marin County Hazardous and Solid Waste Management Authority, which includes the cities and towns of Belvedere, Corte Madera, Fairfax, Larkspur, Mill Valley, Novato, Ross, San Anselmo, San Rafael, Sausalito, and Tiburon, and the County of Marin, as a regional agency. The regional agency status allows its members to report to the State as one political body instead of 12, as was previously required.[23] In 2006, CalRecycle certified that the Marin County Hazardous and Solid Waste Management Authority (JPA) had diverted 72 percent of its solid waste and met the requirements of the California Integrated Waste Management Act.[24]

In April 2012, the City of Larkspur joined the JPA in adopting a Zero Waste Goal, and pledged to develop a Strategic Plan to help achieve the County's Zero Waste Goal under Resolution No. 15/12.[25]

City of Larkspur Construction and Demolition Debris Program.[26] The City of Larkspur Construction and Demolition Debris Program establishes a program for the recycling and salvage of construction and demolition debris. The ordinance requires project applicants obtaining a building permit to submit a Construction and Demolition Diversion Report to the City's Building Department prior to final inspection of the project, except for those that may be eligible for self-certification. If the Building Official determines that the project applicant has not satisfied the diversion requirements, the project applicant must pay an Avoided Disposal Regulatory Fee, which is 3 percent of the value of the project and not to exceed $10,000. Diversion requirements for a project and for a certified construction and demolition recovery facility must be a minimum of 80 percent by December 31, 2012, and will increase to 85 percent by December 31, 2015, to 90 percent by December 31, 2018, and to 94 percent by December 31, 2025.

Larkspur General Plan Policies.[27] The following policies from the 1990 General Plan are related to solid waste.

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[23] Zero Waste Marin, 2013. *About the JPA.* Website: zerowastemarin.org/who-we-are/about-the-jpa (accessed May 17).

[24] California Department of Resources Recycling and Recovery, 2013. *Jurisdiction Diversion/Disposal Rate Summary (1995-2006).* Website: www.calrecycle.ca.gov/LGCentral/reports/diversionprogram/JurisdictionDiversion.aspx (accessed May 17).

[25] Larkspur, City of, 2012. *Resolution No. 15/12-A Resolution of the City Council of the City of Larkspur Adopting a Zero Waste Goal.* April 18.

[26] Larkspur, City of, 2012. Municipal Code, Chapter 15.26, Construction and Demolition Debris Program.

[27] Larkspur, City of, 1990. *General Plan-Chapter 6, Environmental Resources.* November.

Environmental Resources Element

Goal 6: Reduce the Total Volume of the City's Waste Stream.

- Policy k: Support programs to recycle paper, cardboard, glass, metal, plastics, motor oil, and to compost or generate energy from tree prunings, brush and other vegetation.
  - Action Program [18]: Promote the use of goods containing recycled materials through City purchasing policies and other efforts.

2. Impacts and Mitigation Measures

This section discusses potential impacts to utilities that could result from implementation of the Station Area Plan. The section begins with the significance criteria, which establish the thresholds used to determine whether an impact is significant. The latter part of this section evaluates the Station Area Plan, and identifies mitigation measures, as necessary.

a. Criteria of Significance. Implementation of the Station Area Plan would have a significant effect on utilities and infrastructure if it would:

- Require new or expanded entitlements for water supplies, the development of which could result in significant environmental effects;
- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which would cause significant environmental effects;
- Generate a demand for wastewater treatment that exceeds the capacity of the wastewater treatment provider, when considered in addition to the provider's existing commitments;
- Result in a determination by the wastewater treatment provider which serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to the provider's existing commitments;
- Exceed wastewater treatment requirements of the Regional Water Quality Control Board;
- Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which would cause significant environmental effects;
- Generate a demand for solid waste disposal that cannot be accommodated by the landfill serving the project area; or
- Be inconsistent with federal, State, or local statutes and regulations related to solid waste.

b. Impacts Analysis. The following discussion describes impacts on utilities and infrastructure associated with implementation of the Station Area Plan.

(1) New or Expanded Entitlements for Water Supplies. In 2001, Senate Bill (SB) 610 amended California law regarding review of water availability for large projects (Section 10910 et seq. of the Water Code, Section 21151.9 of the Public Resources Code [CEQA] and Section 15155 of the State CEQA Guidelines). Pursuant to SB 610, the preparation of a "water supply assessment" (WSA) is required for projects subject to CEQA that meet specified criteria regarding project size (e.g., for projects of 500 or more residential units, 500,000 square feet or more of retail commercial space, 250,000 square feet or more of office commercial space, 500 or more hotel rooms, specified industrial uses, or a project that would result in a water demand equal to or greater than the amount needed to serve a 500-unit residential project). These assessments, prepared by "public water systems" responsible for service, address whether there are adequate existing or projected water supplies available to serve proposed projects over a 20-year period, in addition to existing demand

and other anticipated development in the service area. Where a WSA concludes that insufficient supplies are available, the WSA must lay out steps that would be required to obtain the necessary supply. If the development was included as part of the projected water demand of the current Urban Water Management Plan (UWMP), the water demand for the proposed development does not need to be separately analyzed as long as water demand for the project has remained substantially the same.

As noted previously, the Station Area Plan includes many components; it identifies pedestrian, transit, vehicular, and bicycle access to the future station and circulation throughout the Plan area; it identifies the preferred land use scenario to be implemented over the next 20 years; and it incorporates public and private design policies and standards that will encourage pedestrian friendly design. While development parameters for opportunity sites have been identified, no projects which include site-specific development plans have been proposed, developed or submitted to the City. The Station Area Plan identifies the vision for development within the Plan area, but does not include site-specific development projects. As the Station Area Plan is a policy document, this EIR contains a "program level" evaluation, and WSAs are required for specific *projects* meeting the criteria included in Section 15155 of the *CEQA Guidelines*; a WSA would not be required as part of the adoption of the Station Area Plan.

According to the Infrastructure Needs Analysis Technical Report, and as shown in Table IV.L-3, the future water demand associated with development on opportunity sites is estimated to amount to approximately 0.3 MGD. With compliance with the California Green Building Standards Code requirements, as required by Ordinance 990, the projection is reduced to 0.24 MGD.

The MMWD Urban Water Management Plan (UWMP) accounts for some regional growth in their future estimates for water demand and system design. Development proposed by the Station Area Plan represents more than a 300 percent increase in water demand as compared with the current demand in the Plan area. The 300 percent increase is reduced to 254 percent using the 20 percent reduced future use rates. Only a portion of this increase is accounted for in the UWMP.

The 2010 UWMP is based on ABAG's 2009 projections for population growth in Larkspur that show an increase of 1,100 residents from 2010 to 2030. ABAG's projections, in turn, are based on the 1990 General Plan. The City is currently updating the General Plan, and this Station Area Plan and its increased growth projections will be incorporated into the updated General Plan.

The MMWD will publish a new UWMP in 2015. They are anticipating inclusion of updated growth estimates for the City of Larkspur based on the Station Area Plan. At this time, it is estimated that current MMWD storage facilities and distribution network are adequate to accommodate the projected growth; however, water supply must be confirmed for specific projects as they are proposed. New projects may be required to install infrastructure for recycled water, although it is not clear at this time what standards will trigger implementation.

It should be noted that on January 17, 2014, Governor Brown declared a drought State of Emergency within California, requesting that Californians reduce water usage by 20 percent. Furthermore, on January 21, 2014, the MMWD Board of Directors passed a resolution calling for an immediate 25 percent voluntary reduction in water usage as an initial phase of the District's Water Shortage Contingency Plan.

<u>Impact UTIL-1</u>: Existing water supply available to the City of Larkspur may not be adequate to accommodate full implementation of the Station Area Plan. (S)

As noted above, the MMWD UWMP does account for some regional growth; however, full implementation of the Station Area Plan, which would occur over 20 years, would be more than the City of Larkspur growth anticipated in the UWMP. The MMWD will include an updated growth estimate for the City of Larkspur in the 2015 UWMP update.

Implementation of Mitigation Measure UTIL-1 would reduce impacts associated with adequate water supply to a less-than-significant level:

> Mitigation Measure UTIL-1: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:
>
> - Until the Marin Municipal Water District (MMWD) updates their Urban Water Management Plan (UWMP) to account for water demands associated with the implementation of the Station Area Plan, and as a condition of approval, the City shall require all new development within the Plan area to confirm with the MMWD that adequate water to serve the project is available within current water allocations. This written confirmation of available water supply shall be provided prior to approval of any proposed development project. (LTS)

(2) Construction of New Water Facilities. As previously described, the Technical Report evaluates potential operational capacity impacts associated with the implementation of the Station Area Plan. The report indicated that new development in the Plan area is not anticipated to trigger improvements to regional storage capacity or treatment facilities. Standard water service extensions and the relocation of existing infrastructure could be necessary to support future development. Private development projects associated with the implementation of the Station Area Plan would be responsible for extending utilities to their site or modifying existing services. The Technical Report also indicated that standard operations and maintenance practices and schedules already in place are expected to accommodate the functionality of existing lines.

Although a recycled water source has not yet been identified for the Larkspur area, redevelopment of the Plan area would likely require installation of recycled water infrastructure in anticipation of future availability.

Implementation of the Station Area Plan would not require or result in the construction of new water facilities, the construction of which would cause significant environmental effects. This impact would be considered less than significant.

Table IV.L-3: Estimated Water Demand for Development of Opportunity Sites

Opportunity Sites	Office/Public (gpd)	Hotel (gpd)	Retail/Cinema (gpd)	Residential (gpd)
1. Ferry Terminal	2,588	0	705	53,700
2. Airporter	259	0	0	0
3. Larkspur Offices and Cinema	24,840	0	14,382	0
4. Marin Country Mart	0	0	60,630	53,700
5. Sanitary District	1,294	17,500	0	44,750
6. Drakes Landing	13,041	0	0	12,530
7. Offices	4,140	0	0	0
Total	**46,162**	**17,500**	**75,717**	**164,680**

gpd = gallon per day
Note: Sites within Redwood Highway North and South, and Cost Plus represent the Redwood Highway areas and are therefore not included in the estimated water demand analysis for existing lands use.

Source: BMS Design Group, 2013.

(3) Demand for Wastewater Treatment, Capacity, and Facilities. New growth and development associated with the implementation of the Station Area Plan would increase the demand for wastewater conveyance and treatment at the CMSA treatment plant. According to the Technical Report, the redevelopment of the Station Area Plan area is not anticipated to significantly impact the capacity of the CMSA treatment plant.

As a general estimate, sewer flows for dry weather can be estimated as 90 percent of the water usage rates. Using this rule, existing land uses in the station area would generate an estimated 0.09 MGD of sewer flow in dry weather, while the future flows with implementation of the Station Area Plan would be approximately 0.27 MGD, or an additional 0.19 MGD of sewer flow. Since the Central Marin Sanitation Agency (CMSA) wastewater treatment plant currently treats an average of 11 MGD, the anticipated flows represent about 2.5 percent of current treatment rates. However, with the current capacity of the plant at 125 MGD, it represents only about 0.2 percent of total capacity. Again, the future numbers will be lower than anticipated after the 20x2020 Plan is fully implemented.

It should be noted that while the existing lines may require replacement in the near future due to deteriorating structural integrity, the current line sizes appear to be adequate to support the development of the Station Area Plan. Aging lines requiring repair or replacement would require the work whether or not there was any new development in the area. This impact would be less than significant.

While existing lines could require replacement in the near future due to deteriorating structural conditions, the Infrastructure Needs Analysis Technical Report indicated that current line sizes appear to be adequate to support the development associated with the Station Area Plan. As previously described, aging lines in needs of repair or replacement would be required whether or not there was any new development in the area. Impacted wastewater lines may require mitigation, which could include modifications to the pump stations. Extensions of the main lines and construction of new services may also be required for the areas that may have limited existing infrastructure.[28]

<u>Impact UTIL-2</u>: Implementation of the Station Area Plan could require replacement or expansion of existing wastewater infrastructure. (S)
Implementation of Mitigation Measure UTIL-2 would reduce impacts associated with the replacement or expansion of wastewater infrastructure to a less-than-significant level:

<u>Mitigation Measure UTIL-2</u>: The following language shall be included as a Condition of Approval for new projects associated with implementation of the Station Area Plan:

- As private properties within the Plan area are developed, project-specific capacity and condition analyses of applicable wastewater facilities on and adjacent to the project sites shall be performed to identify any impacts to the wastewater system. The project applicants shall be responsible for any required modifications to impacted facilities identified in the analyses. (LTS)

(4) Stormwater Facilities. Employment and population growth associated with implementation of the Station Area Plan would increase the amount of impervious surfaces and the amount and rate of stormwater runoff volumes. As developments associated with the implementation of the Station Area Plan are constructed within a drainage area, new impervious surface cover would

[28] Ibid.

generate additional runoff that would be added to existing stormwater volumes. Unless appropriate controls are in place, over time, the cumulative runoff could exceed the capacity of existing drainage facilities during peak-flow conditions, resulting in localized flooding.

As previously described, future development within the Plan area must comply with programs and regulations currently in place that regulate storm drainage facilities, including the NPDES MRP regulations. An updated Small MS4 Permit, which includes post-construction stormwater management criteria for new development and redevelopment projects including Site Design and Low Impact Development (LID) runoff requirements, will go into effect July 1, 2013. The updated Small MS4 Permit would require the use of runoff reduction and treatment measures for development and redevelopment projects that create or replace more than 5,000 square feet of impervious surface. New developments that create or replace more than 10,000 square feet of impervious surface must also comply with Provision C.3 of the Marin County municipal stormwater permit and with the California State Water Board.[29]

Current State stormwater requirements mandate that new developments must maintain post-construction stormwater flows from the site at pre-construction levels, and no changes to the stormwater system are anticipated for the Plan area as a whole.[30] Therefore, implementation of the Station Area Plan would have a less-than-significant impact associated with the construction and expansion of stormwater facilities.

(5) Solid Waste. As previously described, the majority of solid waste generated in Larkspur would be transported to the Redwood Sanitary Landfill, which has a future operation life of approximately 26 years (the anticipated closing date is January 2039).

Construction and operational activities associated with Station Area Plan growth would generate additional solid waste. Estimated growth would add an additional 2,033 residents to the Plan area. According to CalRecycle, Marin County residents dispose about 2.3 pounds of nonhazardous waste per day.[31] New employees associated with the implementation of the Station Area Plan would also generate additional solid waste. Under the Station Area Plan, there would be approximately 558 new jobs by 2035. According to the CalRecycle's estimated solid waste disposal rates, employees dispose approximately 6.4 pounds of nonhazardous solid waste per day.[32,33] Therefore, growth associated with the Station Area Plan would generate a total of 4,676[34] pounds of nonhazardous waste per day

[29] Ibid.

[30] Ibid.

[31] California Department of Resources Recycling and Recovery, 2013. *Solid Waste Characterization Database*. Residential Waste Disposal Rates. Website: www.calrecycle.ca.gov/wastechar/ResDisp.htmApril 18 (accessed May 17).

[32] California Department of Resources Recycling and Recovery, 2013. *Waste Disposal Rates for Business Types*. Website: www.calrecycle.ca.gov/wastechar/DispRate.htm (accessed May 17). April 18.

[33] The disposal rate data was developed as part of the 1999 Statewide Waste Characterization Study. Disposal rates are affected by numerous factors and are used only for planning purposes. The disposal rate for employees was calculated by taking the average of the disposal rates of the following business sectors: Services-Other professional, Services-Motion Pictures, Services-Hotel/lodging, and Retail Trade-General Merchandise Stores.

[34] This calculation used the CalRecycle's per capita disposal rate of 2.3 pounds per resident per day.

associated with residential uses, and 3,571[35] pounds of nonhazardous waste per day associated with employees. In total, approximately 8,247 pounds of solid waste would be generated per day in the Plan area. This represents less than one percent of the permitted daily throughput of the Redwood Sanitary Landfill. Therefore, the current capacity of the Redwood Sanitary Landfill would be able to serve the growth expected to occur under the Station Area Plan. As such, implementation of the Station Area Plan would not generate a demand for solid waste disposal that would not be accommodated by existing landfills.

(6) Regulations Related to Solid Waste. State law requires that 50 percent of solid waste be diverted from landfills. As previously described, as of 2006, the Marin County Hazardous and Solid Waste Management Authority has a waste diversion rate of 72 percent. Therefore, the City of Larkspur is in compliance with State law. Additionally, Larkspur has committed to the waste reduction programs and plans, such as the Construction and Demolition Debris Program. Therefore, implementation of the Station Area Plan would not conflict with a federal, State, or local statute or regulation related to solid waste disposal. This impact would be less than significant.

c. Cumulative Impacts of the Station Area Plan. The utilities identified below are generally provided or delivered on a local level, but often originate from sources outside of the City and/or as a part of a regional distribution system. Development associated with the Station Area Plan would contribute to regional impacts associated with the provision of utilities, which would be considered less than significant, as described below.

Water Supply. Long term water supply for most communities within the San Francisco Bay Area region continues to be a concern. MMWD adopted the 2010 Urban Water Management Plan (UWMP) in July 2011. The UWMP included an assessment of water demand and supplies over a 25 year planning horizon (2010-2035). The conclusion of the assessment was that the District's commitment to water conservation and implementation of the Water Conservation Master Plan, as well as, its commitment to complying with the Water Conservation Bill of 2009 are projected to maintain water demand at a level that can be supplied from existing water supply sources. The Water Conservation Bill of 2009 includes elements of the 20x2020 Water Conservation Plan which was designed to reduce the statewide per capita urban water use by 20 percent by the year 2020.

In addition to the water conservation goals set by the state with the 20x2020 Plan, the City of Larkspur has recently adopted amendments to their Municipal Code with Ordinance 990 on May 1, 2013, which will assist in meeting the goals set by the 20x2020 Plan. For new residential construction, or residential alteration projects, minimum levels of compliance with the 2010 Edition of the California Green Building Standards Code have been adopted. For new non-residential construction, minimum levels of compliance with LEED must be met. Both of these "green construction codes" have various options for compliance at their different levels which could reduce energy consumption and water consumption (and therefore wastewater production). However, for all non-residential construction projects, the new Municipal Code specifies that LEED Water Efficiency Pre-requisite 1 (WE P1) must be met at a baseline as a minimum. WE P1 states that water consumption for a building must be 20 percent below its established baseline.

[35] This calculation used CalRecycle's estimated solid waste disposal rates of 6.4 pounds of nonhazardous solid waste per day.

As noted in this EIR, the MMWD UWMP does account for some regional growth; however, full implementation of the Station Area Plan would allow for more growth than anticipated in the UWMP. Implementation of the water conservation measures described above, in addition to the water service mitigation measure described in this Draft EIR, would ensure that cumulative water impacts would be less than significant.

Wastewater Treatment. Implementation of the Station Area Plan would generate additional wastewater treatment demand for the entire service area. However, as previously described, the CMSA wastewater treatment plant, has sufficient capacity for current dry and wet weather loads and for future load projections, and there are no plans for expansion of the plant. While it may be possible that on-site wastewater infrastructure may need to be replaced as new development is proposed (as discussed in the wastewater analysis section), implementation of Mitigation Measure UTIL-2 would ensure that development associated with implementation of the Station Area Plan would not result in a cumulative wastewater impact.

Stormwater System. Stormwater drainage systems are generally provided by local governments for areas within their jurisdictions, and are not provided on a regional basis. Future development within Larkspur and surrounding communities must comply with the NPDES MRP regulations currently in place, which regulate storm drainage facilities. New stormwater infrastructure that would be required to serve expected growth would be developed in compliance with existing local, State, and federal regulations, and would be appropriately sized for each development. Therefore, implementation of the Station Area Plan would not result in a significant cumulative impact on the stormwater drainage systems. This impact is considered to be less than significant.

Solid Waste. New development estimated to occur under the Station Area Plan would increase the generation of solid waste in Larkspur. Since growth associated with Station Area Plan would represent less than 1 percent of the permitted daily throughput of the Redwood Sanitary Landfill,[36] it is anticipated the landfill would have adequate capacity to accommodate solid waste generation from its surrounding communities. Therefore, implementation of the Station Area Plan would not result in a significant cumulative impact on solid waste management. This impact is considered to be less than significant.

[36] California Department of Resources Recycling and Recovery, 2013, op. cit.

V. ALTERNATIVES

The *CEQA Guidelines* require the analysis of a range of reasonable alternatives to the project, or to the location of the project that would feasibly attain most of the project's basic objectives and avoid or substantially lessen any of the significant effects of the project (Section 15126.6(a) of the *CEQA Guidelines*). The range of potentially feasible alternatives required in an EIR is governed by a "rule of reason" that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice.[1] CEQA states that an EIR should not consider alternatives "whose effect cannot be ascertained and whose implementation is remote and speculative."

The primary purpose of the alternatives analysis in an EIR, as stated in Section 15126.6(a) of the *CEQA Guidelines*, is to "describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." Further, Section 15126.6(b) of the *CEQA Guidelines* states that the "discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly." The potential feasibility of an alternative may be determined based on a variety of factors, including but not limited to economic viability, availability of infrastructure, and other plans or regulatory limitations.[2]

The Station Area Plan has been described and analyzed in the previous chapters, with an emphasis on significant impacts resulting from the project and mitigation measures recommended to avoid these impacts (Please refer to Chapter IV, Setting, Impacts and Mitigation Measures). The following discussion is intended to inform the public and decision-makers of the relative impacts of three potentially feasible alternatives to the Station Area Plan. This chapter also includes a discussion of alternatives that were initially considered but ultimately rejected from detailed consideration.

The three alternatives to the Station Area Plan that are discussed in this chapter include the following:

- The CEQA-required **No Project alternative** assumes that the Station Area Plan would not be adopted and implemented. While the Station Area Plan would not be implemented, this alternative does evaluate the development approved by the Larkspur City Council in 2006-2007 on the Sanitary District Site (Opportunity Site 5). Development associated with the No Project alternative would include a 64,000-square-foot hotel, 126 residential units, and 11,000 square feet of office/retail.

[1] *CEQA Guidelines*, 2010, Section 15126.6.

[2] *CEQA Guidelines*, 2010, Section 15126.6(f)(1).

- The **No Larkspur Ferry Terminal Development alternative** assumes that there would be no development on the Larkspur Ferry Terminal site, but that the development identified on the other opportunity sites within the Plan area would occur. This alternative would include the following: 39,500 square feet of office space; 75,000 square feet of retail space; 620 residential dwelling units; and a 60,000-square-foot hotel.
- The **Reduced Residential Development alternative** assumes that the Station Area Plan is adopted, but that the residential uses proposed within the Plan area would be developed at the minimum density identified in the Station Area Plan of 20 dwelling units per acre. The hotel, office and retail use square footage identified in the Station Area Plan would be developed as proposed under this alternative. This alternative would include the following: 39,500 square feet of office space; 75,000 square feet of retail space; 560 residential dwelling units; and a 60,000-square-foot hotel.

For each alternative, a brief discussion of its principal characteristics is followed by an analysis of the alternative. The emphasis of the analysis is on a determination of whether or not the alternative would reduce, eliminate, or create new significant impacts, as well as the alternative's relative beneficial effects compared to the proposed project and how well the alternative meets each of the project objectives. The third section provides a discussion of the environmentally superior alternative.

The objectives developed for the Station Area Plan are an important part of the context for evaluating alternatives. The Station Area Plan is described in detail in Chapter III, Project Description. The objectives of the Station Area Plan are listed below:

- Increase and support transit ridership and reduce vehicle miles traveled;
- Increase walking, bicycling, carpooling, carsharing, local transit and other transportation options for people in the area;
- Increase the housing supply, particularly affordable housing near the SMART Station, meeting the City's share of regional housing needs;
- Locate key services and promote retail opportunities within and near the Plan area;
- Promote a walkable, livable and accessible environment and provide safe and comfortable connections for pedestrians and bicyclists within the area and between the major transit nodes; and
- Identify mitigation measures to protect existing and new development from flooding and sea level rise, especially in the Redwood Highway Area.

Table V-1 provides a summary of the development assumptions for each alternative. Table V-6 (provided at the end of this chapter) compares how these meet the identified project objectives.

Table V-1: CEQA Alternatives Compared To The Station Area Plan

Alternative Scenarios	Population	Dwelling Units	Jobs
The Project: Station Area Plan	2,033	920	558
No Project alternative	278	126	134
No Larkspur Ferry Terminal Development alternative	1,370	620	548
Reduced Residential Development alternative	1,238	560	558

Source: LSA Associates, Inc., 2013.

A. ALTERNATIVES THAT WERE CONSIDERED BUT NOT FURTHER EVALUATED

The following three alternatives to the Station Area Plan were considered but rejected. These alternatives are described below, along with the reasons they were rejected from further consideration in this EIR.

- **Relocate Larkspur SMART Station.** One of the alternatives suggested during the Notice of Preparation comment period was to relocate the SMART Station. Alternative station locations included the Larkspur Ferry Terminal site, to result in the creation of a "transit hub," with the Larkspur Ferry Terminal and SMART Station in closer proximity. This alternative was not evaluated within the Draft EIR because: a) relocation of the SMART Station is not an objective of the Station Area Plan, and b) the location of the SMART Station is outside of the control of the City of Larkspur; SMART is responsible for placement and construction of the SMART rail line as well as all station locations. As the Station Area Plan evaluates potential development around the SMART station, but not development of the station itself, this alternative was not further evaluated.
- **Alternative Station Plan Area Location.** *CEQA Guidelines* require that the alternatives section consider potential alternative locations for a project that could reduce impacts; for this project, the project location would be the Plan area. If no feasible alternative location exists, Lead Agencies are required to disclose the reasons for this conclusion. The Station Area Plan is intended to encourage an increase in development around the proposed Larkspur SMART Station. As noted above, SMART will be responsible for placement and construction of the SMART rail line as well as all station locations. As such, the SMART Station is fixed to its location on the rail line. Evaluating a Station Area Plan for an alternative location would not be feasible as the City cannot move the location of the SMART Station, and because of this the City did not evaluate an alternative Plan area location.
- **No Build Alternative.** The No Build alternative assumes the Plan area would remain in its existing condition, and no additional development would occur. This alternative assumes that physical conditions that existed in Plan area at the time the Notice of Preparation for this EIR was circulated (January 2013) would remain until 2035, and no additional development would occur. This alternative was rejected from further consideration primarily because it would be infeasible to "freeze" development within the Plan area, and it would not allow the City to accommodate its RHNA assigned by ABAG, and would not achieve any of the objectives of the proposed project.

B. NO PROJECT ALTERNATIVE

1. Principal Characteristics

The No Project alternative assumes that the Station Area Plan would not be adopted or implemented, and that the only development within the Plan area would occur at the Sanitary District site (Opportunity Site 5), which was approved by the City Council in 2006 – 2007. This alternative would include a 64,000-square-foot hotel, 11,000 square feet of office/administrative space, and 126 residential units. While this alternative assumes that the Larkspur SMART Station would be developed, as its construction and operation are outside of the City's control, implementation of the Station Area Plan would not occur. The 1990 General Plan land use designations and the overall framework for land use decisions within the Plan area would remain unchanged. For analysis of this alternative, it is assumed that no additional employment development would occur within the Plan area. This assumption is based on the existing zoning regulations in place that prohibit expansion of any use located north of Corte Madera Creek that generates at least one peak hour trip, without obtaining a discretionary permit from the City of Larkspur. This assumption also acknowledges the limited potential for expansion of commercial and industrial uses beyond those currently existing in the Redwood Highway area south of Corte Madera Creek, based on existing zoning regulations.

Table V-1 shows the demographic characteristics of the No Project alternative. At full implementation of the No Project alternative (2035), the population of the Plan area would increase by 278 residents and 126 dwelling units. There would be approximately 134 new jobs within the Plan area, all located on the Sanitary District site Development associated with a 64,000-square-foot hotel and 11,000 square feet of office/retail. While this additional development could occur, the City would not implement a trip cap or transportation demand management plan proposed as part of the Station Area Plan project. Additionally, this alternative assumes that many of the transit, pedestrian and bike features associated with the Station Area Plan would not be incorporated into development within the Plan area.

Implementation of the No Project alternative would not meet the following project objectives:

- Increase and support transit ridership and reduce vehicle miles traveled;
- Increase walking, bicycling, carpooling, carsharing, local transit and other transportation options for people in the area;
- Promote a walkable, livable and accessible environment and provide safe and comfortable connections for pedestrians and bicyclists within the area and between the major transit nodes; and
- Identify mitigation measures to protect existing and new development from flooding and sea level rise, especially in the Redwood Highway Area.

Implementation of the No Project alternative would partially meet the following objectives, but not to the extent of the proposed Station Area Plan:

- Increase the housing supply, particularly affordable housing near the SMART Station, meeting the City's share of regional housing needs;
- Locate key services and promote retail opportunities within and near the Plan area;

2. Analysis of the No Project Alternative

The potential impacts associated with the No Project alternative are described below.

a. Land Use. The land use pattern that would develop under this alternative would be different than the one associated with implementation of the Station Area Plan. Development would only occur on Opportunity Site 5, resulting in significantly less residential development, approximately the same amount of hotel development, and less retail/office development.

Similar to the proposed project, this alternative would not result in any significant land use impacts. As with the proposed project, the No Project alternative would not include large-scale infrastructure projects that would divide an established community; however, this alternative would not include the measures associated with the proposed project that would enhance mobility within the Plan area and create a more pedestrian-oriented environment. Additionally, as with the proposed project, this alternative would not introduce new land uses which would result in an incompatible adjacent use. The No Project alternative would result in similar level of land use impacts when compared to the proposed project.

b. Transportation and Circulation. The No Project alternative would generate less traffic than the project due to the lower intensity of development. The Traffic Impact Assessment and Parking Report for 2000 Larkspur Landing Circle[3] documented that development of the Sanitary District Site would generate approximately 100 new AM and PM peak hour trips. Therefore, implementation of the No Project alternative would result in fewer vehicle trips added to the roadway network compared to those proposed for the Station Area Plan. The No Project alternative would result in several impacts similar but less severe to those identified in Section IV.B, Transportation and Circulation, including impacts at #8 Sir Francis Drake Boulevard/Andersen Drive and #6 Sir Francis Drake Boulevard/Larkspur Landing Circle (West). The mitigation measures identified in the Larkspur Landing Circle study would be similar to those identified in Section IV.B. While the No Project alternative is expected to reduce the severity of impacts at #3 Sir Francis Drake Boulevard/Eliseo Drive or on US 101 compared to the Station Area Plan, it is unknown whether the traffic generated by this alternative would reduce the significant and unavoidable contribution to the transportation network or whether this impact would be considered less-than-significant.

The No Project alternative would not improve existing pedestrian, bicycle, and transit facilities. The Station Area Plan proposes improvements to these facilities to minimize on-site potential conflicts between various modes, and provide safe and efficient pedestrian, bicycle, and vehicle connections between the Ferry Terminal, Larkspur Landing, and the surrounding circulation systems. The No Project alternative would not include the transportation demand management (TDM) program and vehicle trip cap which would be provided in the Station Area Plan to allow the City of Larkspur and County of Marin to monitor and manage vehicle traffic into and out of the Plan area.

c. Air Quality. Implementation of the No Project alternative would result in construction activity within the Plan area; however construction associated with this alternative would be reduced compared to the proposed plan. While the No Project alternative would result in reduced development, this

[3] Dowling Associates, 2003. *Traffic Impact Assessment and Parking Report for 2000 Larkspur Landing Circle*.

project would not include the transit oriented development features of the Station Area Plan, which encourages increased development, facilitates increased transit usage, and provides pedestrian and bicycle pathway improvements. As noted in Section IV.C, Air Quality, when considering the trip reduction measures (i.e., trip cap and TDM program) incorporated into the Station Area Plan, the transportation modeling indicated that the average daily traffic would be reduced by 19 percent over the typical trip generation rates; this reduction of traffic, and the associated reduction in air quality emissions, would not occur under this alternative. This alternative would likely result in a similar cumulative regional air quality impacts as the proposed project. Therefore, development associated with the No Project alternative would likely not reduce the significant and unavoidable contribution of criteria air pollutants.

d. Global Climate Change. Implementation of the No Project alternative would result in construction activity within the Plan area; however construction associated with this alternative would be reduced compared to the proposed plan. As noted in Section IV.D, Global Climate Change, Larkspur's Climate Change Action Plan (CAP) includes specific mitigation measures that government and the community can use to reduce, and encourage the reduction of, GHG emissions. For example, emissions generated from the transportation sector are one of the largest sources of GHG emissions, and transportation and land use development are strongly interrelated. Therefore, the CAP encourages compact, transit-oriented development, increasing walking and biking for local trips, and increasing public transit use in Larkspur. The No Project alternative would reduce the development density within the Plan area, and would also not include the design features to encourage transit use and pedestrian, and bicycle facility improvements, resulting in higher GHG emissions per service population. Therefore, the significant and unavoidable impact identified for the project would likely not be reduced under the No Project alternative.

e. Noise. The type of noise impacts associated with the No Project alternative would likely be very similar to the proposed project, but the occurrence of the impacts would be reduced given the reduced level of development associated with this alternative. New development would still need to implement mitigation measures complying with exterior noise limits, sensitive receptors in the area would be exposed to roadway noise, and construction noise impacts could still occur. As with the proposed project, all noise impacts associated with this alternative could be reduced to a less-than-significant level with implementation of the identified mitigation measure. Noise impacts that would result from the No Project alternative would be similar to the proposed project.

f. Biological Resources. As with the proposed project, the No Project alternative could have potential impacts to biological resources. Because all the development associated with the alternative would occur at one opportunity site, several of the biological resources impacts would be reduced and mitigation measures would not be necessary. Implementation of the No Project alternative would likely result in a reduction of biological resources impacts when compared to the proposed project.

g. Geology, Soils and Seismicity. While the amount of development associated with the No Project alternative would be reduced when compared to implementation of the Station Area Plan, this alternative would be exposed to the same seismic hazards as the proposed project and would require the same design-level geotechnical mitigation measure. Implementation of the No Project alternative would result in similar geotechnical impacts as the proposed project.

h. Hydrology and Water Quality. Development associated with the No Project alternative would only occur on Opportunity Site 5. However, as shown in Figure IV.H-3, a portion of this site could be impacted by a 55 inch sea level rise, and would still require Mitigation Measures HYDRO-1. Implementation of the No Project alternative would result in similar hydrology impacts as the proposed project.

i. Hazards and Hazardous Materials. Development associated with the No Project alternative would be reduced when compared to implementation of the Station Area Plan, but would require the same mitigations to address potential site contamination and hazardous building materials. Implementation of the No Project alternative would result in similar hazards and hazardous materials impacts as the proposed project.

j. Cultural Resources. While the amount of development associated with the No Project alternative would result in development at only one opportunity site, implementation of the No Project alternative would result in similar cultural impacts as the proposed project. Under the No Project alternative, new development would need to implementation mitigation measures to address potential paleontological resources and archaeological materials impacts. The potential impact to cultural resources would be similar as the proposed project.

k. Public Services. Given the reduced level of development associated with the No Project alternative, there would be a corresponding reduced level of demand for public services. Under the No Project alternative, there would be only 126 residential units developed, resulting in 46 elementary/middle school students and 12 high school students added to the San Rafael City School District. This represents an over 80 percent reduction in the students generated by the No Project alternative when compared to implementation of the Station Area Plan. Similarly, the demand for fire protection services would be reduced, but a mitigation measure to address potentially inadequate levels of fire services would still be required. Given the general reduction in development associated with this alternative, the demand for school, fire and police services would be reduced when compared to the proposed project. The potential public services impact would be reduced when compared to the proposed project.

l. Utilities and Infrastructure. Given the reduced level of development associated with the No Project alternative, there would be a corresponding reduced level of demand for utilities. Water, wastewater and solid waste demand and generation would all be reduced under this alternative when compared to the proposed project. While the demand would be reduced, mitigation measures addressing adequate water supply and sewer infrastructure would still be required. This alternative would result in reduced utilities impacts when compared to the proposed project.

C. NO FERRY TERMINAL DEVELOPMENT ALTERNATIVE

1. Principal Characteristics

This alternative assumes that the Station Area Plan is adopted, but that the development associated with the Larkspur Ferry Terminal site does not occur, and no changes would be made to the Larkspur Ferry Terminal site. All other opportunity sites would develop as proposed in the Station Area Plan. As part of this alternative, the City would implement a trip cap and the transportation demand management plan proposed as part of the Station Area Plan. Additionally, this alternative assumes that many of the transit, pedestrian and bike features associated with the Station Area Plan would be incorporated into development within the Plan area. Development assumptions associated with this alternative are shown in Tables V-2 and V-3. This alternative would include the following: 39,500 square feet of office space; 75,000 square feet of retail space; 620 residential dwelling units; and a 60,000-square-foot hotel.

Table V-2: No Ferry Terminal Development Alternative Summary

Opportunity Site	Existing Development (square footage)		Proposed Station Area Plan New Development (square footage, dwelling units, acres)		Total Development on Opportunity Sites (Existing + Proposed) (square footage, dwelling units, acres)	
1. Ferry Terminal	Public Facility/Transit	25,000 sf	–	–	Public Facility/Transit	25,000 sf
2. Marin Airporter	Public Facility/Transit	2,500 sf	Public Facility/Transit	–	Public Facility/Transit	2,500 sf
3. Larkspur Offices & Cinema	Office (Admin & Prof) Cinema	190,000 sf 16,000 sf	Office (Additional) Retail	50,000 sf 35,000 sf	Office Retail Cinema	240,000 sf 35,000 sf 16,000 sf
4. Marin Country Mart	Office Retail (Gen Commercial)	45,000 sf 175,000 sf	Residential (30 du/ac) Retail (Additional)	300 du 40,000 sf	Residential (30 du/ac) Retail	300 du 215,000 sf
5. Sanitary District	Vacant	0 sf	Residential (35 du/ac) Hotel Office	250 du 60,000 sf 12,500 sf	Residential (35 du/ac) Hotel Office	250 du 60,000 sf 12,500 sf
6. Drakes Landing Office Park	Office (Admin & Prof)	126,000 sf	Residential (30 du/ac)	70 du	Residential (30 du/ac) Office	70 du 126,000 sf
7. Offices on Drakes Landing Rd	Office (Admin & Prof)	18,000 sf	Office (0.5 FAR)	22,000 sf	Office	40,000 sf

Note: Under the Station Area Plan, 45,000 square feet of office space is anticipated to be removed from Opportunity Site 4, Marin Country Mart.
ac = acres; du = dwelling units; FAR = floor area ratio; sf = square feet

Source: LSA Associates, Inc., 2013.

Table V-3: No Ferry Terminal Development Alternative Summary

Land Use	Existing Development in Plan Area	New Development on Opportunity Sites	Total Development In Plan Area (Existing + Proposed)
Office/Public	750,800 sf	39,500 sf	790,300 sf
Hotel	119,000 sf	60,000 sf	179,000 sf
Retail/Cinema	317,000 sf	75,000 sf	392,000 sf
Residential	1,350 du	620 du	1,970 du
Industrial/Auto-Serving	245,000 sf	0 sf	245,000 sf

du = dwelling units
sf = square feet
Note: New development on opportunity sites is net development, accounting for the reduction of some land uses on select sites, including removal of 45,000 square feet of office space from the Marin Country Mart Opportunity Site.

Source: LSA Associates, Inc., 2013.

Implementation of the No Ferry Terminal Development alternative would partially meet the following objectives, but not to the extent of the proposed Station Area Plan:

- Increase the housing supply, particularly affordable housing near the SMART Station, meeting the City's share of regional housing needs;

This alternative would meet all the other objectives listed below:

- Increase and support transit ridership and reduce vehicle miles traveled;
- Increase walking, bicycling, carpooling, carsharing, local transit and other transportation options for people in the area;
- Locate key services and promote retail opportunities within and near the Plan area;
- Promote a walkable, livable and accessible environment and provide safe and comfortable connections for pedestrians and bicyclists within the area and between the major transit nodes; and
- Identify mitigation measures to protect existing and new development from flooding and sea level rise, especially in the Redwood Highway Area.

2. Analysis of the No Ferry Terminal Development Alternative

The potential impacts associated with the No Ferry Terminal Development alternative are described below.

a. Land Use. The land use pattern that would develop under this alternative would be the same as the proposed project, except that the Ferry Terminal site would remain in its existing conditions. As with the proposed project, this alternative would not result in any significant land use impacts. This alternative would not include large-scale infrastructure projects that would divide an established community. While this alternative would not include any development at the Ferry Terminal, thus precluding any development at this particular transit node, this alternative would include the Plan measures that would enhance mobility within the Plan area and create a more pedestrian-oriented environment in other parts of the Plan area. This alternative would not introduce any new incompatible land uses to the Plan area. The No Ferry Terminal Development alternative would result in similar level of land use impacts when compared to the proposed project.

b. Transportation and Circulation. The No Ferry Terminal alternative would generate less traffic than the Station Area Plan project due to the removal of development at the Ferry Terminal site. This would result in fewer vehicle trips into and out of the Ferry Terminal site and fewer trips added to the roadway network compared to those proposed for the Station Area Plan. The No Ferry Terminal alternative would result in less severe impacts to those identified in Section IV.B, Transportation and Circulation, but greater than those identified for the No Project alternative. The mitigations measures required for the No Ferry Terminal Development alternative would therefore be similar, but potentially less substantial, to those identified in the Section IV.B. However, it is unknown whether development associated with the No Ferry Terminal alternative would reduce the significant and unavoidable contribution to the transportation network to a less-than-significant level.

The No Ferry Terminal alternative would include improvements to existing pedestrian, bicycle, and transit facilities north of Sir Francis Drake Boulevard and provide a transportation demand management program and trip cap. However, this alternative would not improve existing pedestrian, bicycle, and transit facilities on the Ferry Terminal site. The Station Area Plan proposes improvements to these facilities to minimize on-site potential conflicts between various modes, and provide safe and efficient pedestrian, bicycle, and vehicle connections between the Ferry Terminal, Larkspur Landing, and the surrounding circulation systems.

c. Air Quality. Implementation of the No Ferry Terminal Development alternative would result in construction activity within the Plan area; however construction associated with this alternative would be reduced compared to the proposed plan. This alternative would also include the transit oriented development features of the Station Area Plan, which encourages increased development, facilitates increased transit usage, and encourages pedestrian and bicycle facility improvements. This alternative would also result in a reduction in the significant cumulative regional air quality impact compared to the proposed project; however, it is likely this impact would remain significant and unavoidable.

d. Global Climate Change. Implementation of the No Ferry Terminal Development alternative would result in construction activity within the Plan area; however construction associated with this alternative would be reduced compared to the proposed plan. As noted in Section IV.D, Global Climate Change, Larkspur's Climate Change Action Plan (CAP) includes specific mitigation measures that government and the community can use to reduce, and encourage the reduction of, GHG emissions. The CAP also encourages compact, transit-oriented development, increased walking and biking for local trips, and increased public transit use in Larkspur; all of these features would be incorporated into the No Ferry Terminal Development alternative, but to a lesser degree than the proposed project. This alternative would also result in a reduction in the global climate change impact compared to the proposed project; however, it is likely this impact would remain significant and unavoidable.

e. Noise. The type of noise impacts associated with the No Ferry Terminal Development alternative would be very similar to the proposed project, but the occurrence of the impacts would be reduced given no development would occur on the Ferry Terminal site. New development would still need to implement mitigation measures complying with exterior noise limits, sensitive receptors in the area would be exposed to roadway noise, and construction noise impacts could still occur. As with the proposed project, all noise impacts associated with this alternative could be reduced to a less-than-

significant level with the identified mitigation measures. Noise impacts that would result from the No Ferry Development alternative would be similar to the proposed project.

f. Biological Resources. As with the proposed project, the No Ferry Terminal Development alternative could have potential impacts to biological resources. However, as the Ferry Terminal site would not be developed, several of the biological resources impacts would be reduced and mitigation measures would not be necessary. Implementation of the No Ferry Terminal Development alternative would likely result in a reduction of biological resources impacts when compared to the proposed project.

g. Geology, Soils and Seismicity. The No Ferry Terminal Development alternative would result in a reduced amount of development when compared to implementation of the Station Area Plan, but this alternative would be exposed to the same seismic hazards as the proposed project and would require the same design-level geotechnical mitigation measure. Implementation of the No Ferry Terminal Development alternative would result in similar geotechnical impacts as the proposed project.

h. Hydrology and Water Quality. The No Ferry Terminal Development alternative would result in a reduced amount of development when compared to implementation of the Station Area Plan. However, development in the Plan area would still be susceptible to sea level rise and would requiring a mitigation measure. Implementation of the No Ferry Terminal Development alternative would result in similar hydrology impacts as the proposed project.

i. Hazards and Hazardous Materials. Development associated with the No Ferry Terminal Development alternative would be reduced when compared to implementation of the Station Area Plan, but would require the same mitigations to address potential site contamination and hazardous building materials. Implementation of the No Ferry Terminal Development alternative would result in similar hazards and hazardous materials impacts as the proposed project.

j. Cultural Resources. While the amount of development associated with this alternative would result a reduced amount of development, implementation of this alternative would result in similar cultural impacts as the proposed project. Under the No Ferry Terminal Development alternative, new development would need to implement mitigation measures to address potential paleontological resources and archaeological materials impacts. The potential impact to cultural resources would be similar as the proposed project.

k. Public Services. Given the reduced level of development associated with the No Ferry Terminal Development alternative, there would be a corresponding reduced level of demand for public services. Under this alternative, there would be 620 residential units developed, resulting in 228 elementary/middle school students and 57 high school students added to the schools within the area. This represents an over 30 percent reduction in the students generated by this alternative when compared to implementation of the Station Area Plan. Additionally, the demand for public services would be reduced under this alternative, but a mitigation measure to address potentially inadequate levels of fire protection services would still be required. Given the general reduction in development associated with this alternative, the demand for school, fire and police services would be reduced when compared to the proposed project, but the public services mitigation measures would still be required.

l. Utilities and Infrastructure. Given the reduced level of development associated with this alternative, there would be a corresponding reduced level of demand for utilities. Water, wastewater and solid waste demand and generation would all be reduced under this alternative when compared to the proposed project. While the demand would be reduced, mitigation measures addressing adequate water supply and sewer infrastructure would still be required. This alternative would result in reduced utilities impacts when compared to the proposed project.

D. REDUCED RESIDENTIAL DEVELOPMENT ALTERNATIVE

1. Principal Characteristics

This alternative assumes that the Station Area Plan is adopted, but that the residential uses proposed within the Plan area would be developed at the minimum density identified in the Station Area Plan of 20 dwelling units per acre. The hotel, office and retail use square footage identified in the Station Area Plan would be developed as proposed under this alternative. As part of this alternative, the City would implement a trip cap and the transportation demand management plan proposed as part of the Station Area Plan. Additionally, this alternative assumes that many of the transit, pedestrian and bike features associated with the Station Area Plan would be incorporated into development within the Plan area. Development assumptions associated with this alternative are shown in Tables V-4 and V-5. This alternative would include the following: 39,500 square feet of office space; 75,000 square feet of retail space; 560 residential dwelling units; and a 60,000-square-foot hotel.

Table V-4: Reduced Residential Development Alternative Summary

Opportunity Site	Existing Development (square footage)		Proposed Station Area Plan New Development (square footage, dwelling units, acres)		Total Development on Opportunity Sites (Existing + Proposed) (square footage, dwelling units, acres)	
1. Ferry Terminal	Public Facility/Transit	25,000 sf	Residential Retail-Ground Floor	170 du 2,500 sf	Residential Public Park Retail-Ground Floor Public Facility/Transit	170 du 1 ac 2,500 sf 25,000 sf
2. Marin Airporter	Public Facility/Transit	2,500 sf	Public Facility/Transit	–	Public Facility/Transit	2,500 sf
3. Larkspur Offices & Cinema	Office (Admin & Prof) Cinema	190,000 sf 16,000 sf	Office (Additional) Retail	50,000 sf 35,000 sf	Office Retail Cinema	240,000 sf 35,000 sf 16,000 sf
4. Marin Country Mart	Office Retail (Gen Commercial)	45,000 sf 175,000 sf	Residential Retail (Additional)	200 du 40,000 sf	Residential Retail	200 du 215,000 sf
5. Sanitary District	Vacant	0 sf	Residential Hotel Office	145 du 60,000 sf 12,500 sf	Residential Hotel Office	145 du 60,000 sf 12,500 sf
6. Drakes Landing Office Park	Office (Admin & Prof)	126,000 sf	Residential (30 du/ac)	45 du	Residential (30 du/ac) Office	45 du 126,000 sf
7. Offices on Drakes Landing Rd	Office (Admin & Prof)	18,000 sf	Office (0.5 FAR)	22,000 sf	Office	40,000 sf

Note: Under the Station Area Plan, 45,000 square feet of office spaces is anticipated to be removed from Opportunity Site 4, Marin Country Mart.
ac = acres; du = dwelling units; FAR = floor area ratio; sf = square feet

Source: LSA Associates, Inc., 2013.

Table V-5: Summary of Development in Reduced Residential Alternative

Land Use	Existing Development in Plan Area	New Development on Opportunity Sites	Total Development In Plan Area (Existing + Proposed)
Office/Public	750,800 sf	39,500 sf	790,300 sf
Hotel	119,000 sf	60,000 sf	179,000 sf
Retail/Cinema	317,000 sf	77,500 sf	394,500 sf
Residential	1,350 du	560 du	1,910 du
Industrial/Auto-Serving	245,000 sf	0 sf	245,000 sf

du = dwelling units
sf = square feet
Note: New development on opportunity sites is net development, accounting for the reduction of some land uses on select sites, including removal of 45,000 square feet of office space from the Marin Country Mart Opportunity Site.

Source: LSA Associates, Inc., 2013.

Implementation of the Reduced Residential Development alternative would partially meet the following objectives, but not to the extent of the proposed Station Area Plan:

- Increase the housing supply, particularly affordable housing near the SMART Station, meeting the City's share of regional housing needs;

This alternative would meet all the other objectives listed below:

- Increase and support transit ridership and reduce vehicle miles traveled;
- Increase walking, bicycling, carpooling, carsharing, local transit and other transportation options for people in the area;
- Locate key services and promote retail opportunities within and near the Plan area;
- Promote a walkable, livable and accessible environment and provide safe and comfortable connections for pedestrians and bicyclists within the area and between the major transit nodes; and
- Identify mitigation measures to protect existing and new development from flooding and sea level rise, especially in the Redwood Highway Area.

2. Analysis of the Reduced Residential Development Alternative

The potential impacts associated with the No Project alternative are described below.

a. Land Use. The land use pattern that would develop under this alternative would be the same as the proposed project, except that the amount of residential development throughout the Plan area would be reduced. As with the proposed project, this alternative would not result in any significant land use impacts. This alternative would not include large-scale infrastructure projects that would divide an established community. This alternative would include Plan measures that would enhance mobility within the Plan area and create a more pedestrian-oriented environment. This alternative would not introduce any new incompatible land uses to the Plan area. The Reduced Residential Development alternative would result in similar level of land use impacts when compared to the proposed project.

b. Transportation and Circulation. The Reduced Residential Development alternative would generate less traffic than the proposed project due to the lower intensity and amount of residential development. This difference would result in fewer vehicle trips added to the roadway network compared to those proposed for the Station Area Plan. This alternative would result in less severe impacts to those identified in Section IV.B, Transportation and Circulation, but greater than those identified for the No Project alternative. The mitigations measures required for this Reduced Residential Development alternative would therefore be similar, but potentially less substantial, to those identified in Section IV.B. Therefore, it is unknown whether development associated with the Reduced Residential alternative would reduce the significant and unavoidable contribution to the transportation network to a less-than-significant level.

This alternative would include improvements to existing pedestrian, bicycle, and transit facilities in the Plan area and at the Ferry Terminal and would provide a transportation demand management program and trip cap.

c. Air Quality. Implementation of the No Ferry Terminal Development alternative would result in construction activity within the Plan area; however construction associated with this alternative would be reduced compared to the proposed plan. This alternative would also include the transit oriented development features of the Station Area Plan, which encourages increased development and facilitates increased transit usage and encourages pedestrian and bicycle facility improvements and modes of travel. This alternative would also result in a reduction in the significant cumulative regional air quality impact compared to the proposed project; however, it is likely the impact would remain significant and unavoidable.

d. Global Climate Change. Implementation of the No Ferry Terminal Development alternative would result in construction activity within the Plan area; however construction associated with this alternative would be reduced compared to the proposed plan. As noted in Section IV.D, Global Climate Change, Larkspur's Climate Change Action Plan (CAP) includes specific mitigation measures that government and the community can use to reduce, and encourage the reduction of, GHG emissions. The CAP encourages compact, transit-oriented development, increased walking and biking for local trips, and increased public transit use in Larkspur; all of these features would be incorporated into the No Ferry Terminal Development alternative, but to a lesser degree than the proposed project due to the reduced level of development. This alternative would also result in a reduction in the GHG emission impact compared to the proposed project. However, the service population would be reduced, and, therefore, this alternative would likely result in a significant and unavoidable GHG emission impact.

e. Noise. The type of noise impacts associated with this alternative would likely be very similar to the proposed project, but the occurrence of the impacts would be reduced given the reduction in residential development. New development would still need to implement mitigation measures complying with exterior noise limits, sensitive receptors in the area would be exposed to roadway noise, and construction noise impacts could still occur. As with the proposed project, all noise impacts associated with this alternative could be reduced to a less-than-significant level with implementation of the identified mitigation measures. Noise impacts that would result from the Reduced Residential Development alternative would be similar to the proposed project.

f. Biological Resources. As with the proposed project, this alternative could have potential impacts to biological resources. Mitigation measures to address potential impacts to nests, western pond turtles, special-status plants, tidal marsh animal species, riparian woodlands, waters of the United States, bats, and tree removal would still be required despite the reduced level of development. Implementation of the Reduced Residential Development alternative would likely result in similar biological resource impacts as the proposed project.

g. Geology, Soils and Seismicity. The Reduced Residential Development alternative would result in a reduced amount of development when compared to implementation of the Station Area Plan, but this alternative would be exposed to the same seismic hazards as the proposed project and would require the same design-level geotechnical mitigation measure. Implementation of the Reduced Residential Development alternative would result in similar geotechnical impacts as the proposed project.

h. Hydrology and Water Quality. The Reduced Residential Development alternative would result in a reduced amount of development when compared to implementation of the Station Area Plan, but this alternative would require the same mitigation measure to protect against sea level rise. Implementation of this alternative would result in similar hydrology impacts as the proposed project.

i. Hazards and Hazardous Materials. Development associated with the No Ferry Terminal Development alternative would be reduced when compared to implementation of the Station Area Plan, but would require the same mitigations to address potential site contamination and hazardous building materials. Implementation of the No Ferry Terminal Development alternative would result in similar hazards and hazardous materials impacts as the proposed project.

j. Cultural Resources. While the amount of development associated with this alternative would result in a reduced amount of development, implementation of this alternative would result in similar cultural impacts as the proposed project. Under the Reduced Residential Development alternative, new development would need to implement mitigation measures to address potential paleontological resources and archaeological materials impacts. The potential impact to cultural resources would be similar as the proposed project.

k. Public Services. Given the reduced level of development associated with the Reduced Residential Development alternative, there would be a corresponding reduced level of demand for public services. Under this alternative, there would be 560 residential units developed, resulting in 206 elementary/middle school students and 52 high school students added to the schools within the area. Additionally, the demand for public services would be reduced under this alternative, but a mitigation measure to address potentially inadequate levels of fire protection services would still be required. Given the general reduction in development associated with this alternative, the demand for school, fire and police services would be reduced when compared to the proposed project, but the public services mitigation measures would still be required.

l. Utilities and Infrastructure. Given the reduced level of development associated with this alternative, there would be a corresponding reduced level of demand for utilities. Water, wastewater and solid waste demand and generation would all be reduced under this alternative when compared to the proposed project. While the demand would be reduced, mitigation measures addressing adequate water supply and sewer infrastructure would still be required. This alternative would result in reduced utilities impacts when compared to the proposed project.

E. ENVIRONMENTALLY SUPERIOR ALTERNATIVE

CEQA requires the identification of the environmentally superior alternative in an EIR from among the range of reasonable alternatives that are evaluated. For this project, the No Project alternative would be considered the environmentally superior alternative as environmental impacts associated with the project would be reduced under this alternative. However, this alternative does not fully meet any of the objectives of the proposed project.

CEQA Guidelines Section 15126.6(d)(2) states that if the environmentally superior alternative is the No Project alternative, the EIR shall also identify an environmentally superior alternative from among the other alternatives. Among the remaining alternatives, the No Ferry Terminal Development alternative would likely be considered the environmentally superior alternative. This alternative does not include development at the Ferry Terminal site, so any potential impacts associated with development at that site would be eliminated. While the Reduced Residential Development alternative would reduce residential densities, all the opportunity sites would still experience impacts associated with development. The No Ferry Terminal Development alternative would result in reduced levels of biological resources impacts, public services impacts, and utilities impacts. However, while reducing these environmental impacts, the No Ferry Terminal Development alternative would not fully meet the objectives of the Station Area Plan. Not allowing further development of the Ferry Terminal site would inhibit the development of the Plan area as a transit node, a major theme and key objective of the Station Area Plan.

Table V-6: Achievement of Station Area Plan Primary Project Objectives

Objectives	Project	No Project Alternative	No Ferry Terminal Development Alternative	Reduced Residential Development Alternative
Increase and support transit ridership and reduce vehicle miles traveled.	●	○	●	●
Increase walking, bicycling, carpooling, carsharing, local transit and other transportation options for people in the area.	●	○	●	●
Increase the housing supply, particularly affordable housing near the SMART Station, meeting the City's share of regional housing needs.	●	◖	◖	◖
Locate key services and promote retail opportunities within and near the Plan area.	●	◖	●	●
Promote a walkable, livable and accessible environment and provide safe and comfortable connections for pedestrians and bicyclists within the area and between the major transit nodes.	●	○	●	●
Identify mitigation measures to protect existing and new development from flooding and sea level rise, especially in the Redwood Highway Area.	●	○	●	●

Notes:
● = Meets the objective
◖ = Partially meets the objective
○ = Does not meet the objective

Source: LSA Associates, Inc., 2013.

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VI. OTHER CEQA CONSIDERATIONS

As required by the California Environmental Quality Act (CEQA), this chapter discusses the following types of impacts that could result from implementation of the Larkspur SMART Station Area Plan: effects found not to be significant; growth-inducing impacts; unavoidable significant environmental impacts; and significant irreversible changes.

A. EFFECTS FOUND NOT TO BE SIGNIFICANT

Meetings among City of Larkspur staff involved in the project planning and review, and consultants for the City, were held to preliminarily determine the scope of the City of Larkspur SMART Station Area EIR. In addition, a Notice of Preparation (NOP) was circulated on January 8, 2013, and a public scoping session was held on January 22, 2013, to solicit comments from the public and agencies about the scope of this Draft EIR. Written comments received on the NOP (included in Appendix A), as well as oral comments taken in at the scoping session (included in Appendix A), were considered in the preparation of the final scope for this document and the evaluation of the proposed project.

The environmental topics analyzed in Chapter IV, Setting, Impacts and Mitigation Measures, represent those topics which generated the greatest potential controversy and expectation of adverse impacts. The topics found to be less than significant, and not analyzed in the EIR, are described below.

The following four topics were considered but not addressed in this EIR because it was determined that the project would not cause significant impacts related to these topics per the following discussion: agricultural resources; population and housing; recreation; and visual resources.

1. Agricultural Resources

No agricultural resources are located in or near the Plan area. The land within the Plan area is classified as “Urban and Built-Up Land” or “Other Land” by the State Department of Conservation, and is not identified as farmland. Development associated with the Station Area Plan would not convert agricultural land to a non-agricultural use. In addition, no parcels within the Plan area are zoned for agricultural use; as such, the implementation of the Station Area Plan would not conflict with existing zoning for agricultural uses or Williamson Act contracts. There would be no impacts to agricultural resources.

2. Population and Housing

Implementation of the Station Area Plan would result in the construction of the following new development within the Plan area: 920 dwelling units; 39,500 square feet of office space; 77,500 square feet of retail space; and 60,000 square feet of hotel space. This would be expected to result in

2,033 new residents[1] and 558 new employees[2] associated within implementation of the Station Area Plan.

As required by CEQA, an EIR must discuss whether a project, if implemented, would induce substantial population growth in an area, either directly or indirectly; displace substantial numbers of existing housing, or displace substantial numbers of people necessitating the construction of replacement housing elsewhere. As discussed in Chapter III, Project Description and Section IV.A, Land Use, the project would not displace existing housing or people, and no impacts would occur relative to these criteria. However, a key objective of the project is to increase Larkspur's housing supply, particularly affordable housing opportunities, near the SMART Station, and meet the City's share of regional housing needs, and this issue is discussed further below.

The Station Area Plan process and effort is supported by Association of Bay Area Governments (ABAG) and Metropolitan Transportation Commission (MTC) through provision in May 2011 of a Priority Development Area (PDA) Planning Grant because the Station Area Plan supports the goals of ABAG and MTC. These goals are identified in the adopted Plan Bay Area,[3] a long-range transportation and land-use/housing strategy for the San Francisco Bay Area region. The shared goals are to:

- Boost transit ridership and reduce vehicle miles traveled.
- Increase walking, bicycling, carpooling, carsharing, local transit and other transportation options for people in the area.
- Increase the housing supply, particularly affordable housing near station areas.
- Locate key services and retail opportunities near station areas.

ABAG and MTC developed and adopted Plan Bay Area in July 2013 to address the expected population and employment growth in the region, as ABAG expects that the population of the Bay Area region will grow from 7,341,700 residents in 2010 to 8,719,300 residents in 2030. During that period, the number of employed residents is expected to grow from 3,410,300 to 4,547,100. Plan Bay Area provides a strategy for meeting 80 percent of the region's future housing needs in PDAs, which are neighborhoods within walking distance of frequent transit service, offering a wide variety of housing options, and featuring amenities such as grocery stores, community centers, and restaurants. Due to the concentration of existing and proposed transit (e.g., ferry terminal, Marin Airporter, SMART Station), multi-modal transportation features (e.g., bike and pedestrian pathways), and opportunity sites for new housing and services, the Plan area qualified for and received a PDA grant. The housing growth projections in the Station Area Plan are therefore consistent with the current regional plan objectives for growth.

[1] Residents were calculated using a 2.21 residents per household (920 dwelling units) rate.

[2] Employees were calculated using a rate of 1 employee per 250 square feet of office/retail space and 0.9 employee per hotel room.

[3] Association of Bay Area Governments, Metropolitan Transportation Commission, 2013. *Draft Plan Bay Area, Strategy for a Sustainable Region*. March. Adopted with revisions July 18, 2013.

Previous growth forecasts for Larkspur were included in the 2009 ABAG Building Momentum Projections and Priorities Report[4] that estimated in 2010, the population of Larkspur was 12,200 residents, and that the 2035 population would be 13,200 residents (a 1,000 resident increase which is 1,033 residents lower than the potential increase estimated under the Station Area Plan). As described in the 2009 ABAG report, development potential was estimated using general plans, specific plans and other municipal planning documents.[5] For Larkspur, the General Plan document was adopted in 1990, long before the SMART rail line was considered or the Station Area Plan was prepared. The City is currently in the process of updating its 1990 General Plan, and the Larkspur SMART Station Area Plan will be incorporated into the General Plan Update, providing guidance for the future of the Station area. In the intervening 23 years since the adoption of the 1990 General Plan, the City, Marin County and the region have embraced sustainable planning goals that focus new growth near high quality transit nodes.

To support the goals of focusing new growth in the Plan area and providing more housing, especially affordable housing, the Station Area Plan proposes amendments to the Zoning Ordinance, the General Plan, and the Housing Element, including:

- Amend the Zoning Ordinance to provide density bonuses and other incentives for projects including senior and affordable housing, consistent with State law. Encourage an increase in the supply of well-designed housing for extremely low, very low, low and moderate income households.
- In order to allow for land use flexibility on most of the priority development sites, the Station Area Plan adds two new land use designations (Mixed-Use and Administrative & Professional Two) requiring Amendments to the General Plan.
- Update the Housing Element to address affordable housing preservation and production in the Plan area, and undertake actions identified in the Plan to support an adequate supply of high-quality, affordable housing in the Plan area.

Because the Station Area Plan has been prepared as an effort to establish a land use plan and policy framework that will concentrate and guide development in the Plan Area toward uses that will support transit ridership and meet the City's regional housing goals; is part of the City's General Plan update process, and is consistent with the regional Plan Bay Area, it would not create a significant impact by inducing substantial unforeseen population growth in an area, either directly or indirectly.

3. Recreation

According the 1990 General Plan, there are 51.3 acres of park within the City of Larkspur. This translates into approximately 4.2 acres of parkland per 1,000 residents. With the addition of the new residents associated with implementation of the Station Area Plan, this would result in a reduction to 3.6 acres of parkland per 1,000 residents. This rate would still be above the 1972 General Plan ratio identified in the 1990 General Plan of 2.6 acres of parkland per 1,000 residents. Given the amount of

[4] Association of Bay Area Governments (ABAG), 2009. *Building Momentum, San Francisco Bay Area Population, Household and Job Forecasts.*

[5] Ibid.

parkland within not only Larkspur, but Marin County, implementation of the Station Area Plan would not result in the degradation of existing recreation facilities.

4. Visual Resources

The Plan area contains several existing views to Corte Madera Creek, San Francisco Bay, and surrounding hillsides. While the City of Larkspur does not have an ordinance protecting views within the City, there are several goals, policies and actions within the Environmental Resources Element of the 1990 General Plan that address views. These include:

Environmental Resources Element

Goal 1: Preserve and enhance a variety of open space features including ridgelines, the wetlands along the Bay and the creeks, wildlife habitats, view corridors, and other amenities which contribute to a sense of openness in Larkspur.

- Policy f: Increase visual access to the Bay and Corte Madera Creek.
  - Action Program [9]: Provide public spaces with views onto the Bay and Corte Madera Creek.
  - Action Program [10]: Apply conditions of project approval that will preserve or open up views of the Bay and Corte Madera Creek.

Implementation of the Station Area Plan would increase development within the Plan area which could have the potential to impacts views to the Bay as well as to Corte Madera Creek. As noted in Action Program [10] listed above, as specific projects are proposed within the Plan area, the City will review site plan designs and address potential impacts to views within the area.

Additionally, the Urban Design Guidelines included in the Station Area Plan will include several measures to address the visual aspects of proposed development within the Plan area. These guidelines would include:

- Design buildings to conform to the height zones shown in Figure 6.4 of the Station Area Plan (identified as Figure VI-1 in this Draft EIR).
- Scale buildings to assure maximum daylight into public open space areas.
- Design buildings to avoid significantly blocking views to the bay, Mount Tamalpais, or other surrounding hillsides from public gathering places, parks, or event spaces.
- Break up building massing to ensure views from public spaces to the Bay and to Mount Tamalpais.
- Design the plaza to provide views across Sir Francis Drake Boulevard to the waterfront as well as long views to the surrounding hillsides and larger Bay.
- Highlight views to the water and be careful not to block views with tall trees or other site elements.

As noted in the Station Area Plan, appropriate building heights depend on the building and geographical context in which new development may occur. Future development in the Larkspur Landing Circle should continue the existing development pattern, with taller buildings adjacent to higher sites and lower buildings encourage closer to Sir Francis Drake Boulevard.

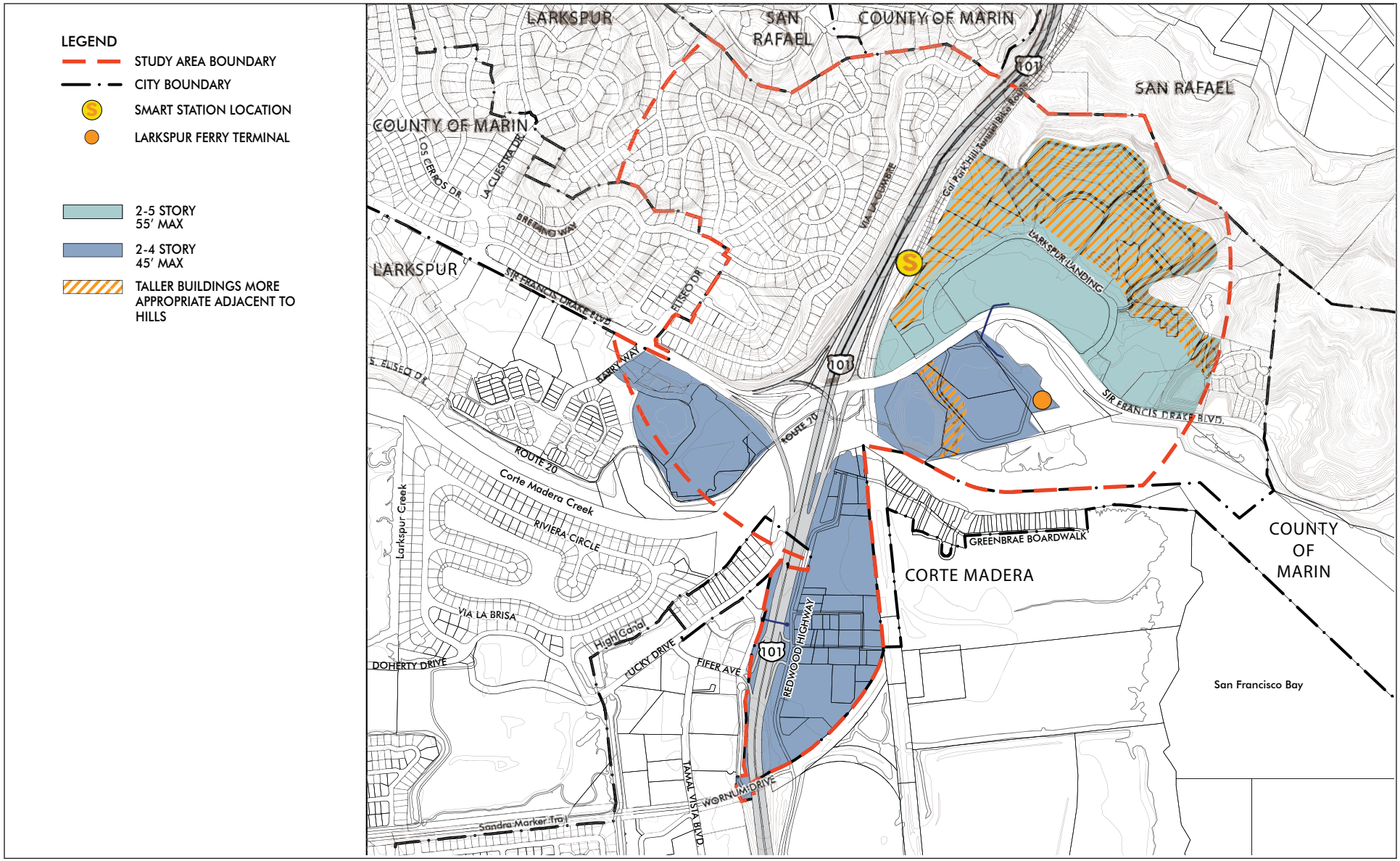

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FIGURE VI-1

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City of Larkspur SMART Station Area Plan EIR
Urban Design Guidelines
Allowable Building Heights

SOURCE: CITY OF LARKSPUR, OCTOBER 2013.

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At the Ferry Terminal site, building heights and development associated with implementation of the Station Area Plan should be sensitive to maintaining views to the water, with taller buildings adjacent to the Wood Island hillside. Buildings located along the waterfront edges should not exceed two floors in height at their waterfront edge, but additional stepped back floors may be incorporated.

At Drakes Landing, taller buildings may be appropriate against the large-scaled intersection structure to the east. Additionally, the residences in the Greenbrae Hills neighborhood to the north and on Drake View Circle are located at higher elevations, so their views would not be impacted. This area could accommodate taller buildings, provided that the visual and physical connection to the water remains possible.

As shown in Figure VI-1, as part of implementation of the Station Area Plan, building heights east of US 101 will be allowed to range from two to five stories. Buildings should step down in height from the higher elevations towards the Bay, with portions of the buildings immediately adjoining the Bay not exceeding two floors in height. On sites with significant topography variances, taller buildings could be situated against the hillside to minimize impacts to views through the site.

As specific developments are proposed within the Plan area, the City would provide environmental review of projects, and would ensure that applicable programs and the Urban Design Guidelines from the General Plan and the Station Area Plan are implemented. The potential impact related to visual resources would be considered less than significant.

B. GROWTH INDUCING IMPACTS

This section summarizes the project's growth-inducing impacts on the surrounding community. According to CEQA, a project is typically considered growth-inducing if it would foster economic or population growth. Examples of projects likely to have significant growth-inducing impacts include extensions or expansions of infrastructure systems beyond what is needed to serve project-specific demand, and development of new residential subdivisions or industrial parks in areas that are currently only sparsely developed or are undeveloped.

ABAG and MTC developed and adopted Plan Bay Area in July 2013 to address the expected population and employment growth in the region, as ABAG expects that the population of the Bay Area region will grow from 7,341,700 residents in 2010 to 8,719,300 residents in 2030. During that period, the number of employed residents is expected to grow from 3,410,300 to 4,547,100. Plan Bay Area provides a strategy for meeting 80 percent of the region's future housing needs in PDAs, which are neighborhoods within walking distance of frequent transit service, offering a wide variety of housing options, and featuring amenities such as grocery stores, community centers, and restaurants. Due to the concentration of existing and proposed transit (e.g., ferry terminal, Marin Airporter, SMART Station), multi-modal transportation features (e.g., bike and pedestrian pathways), and opportunity sites for new housing and services, the Plan area qualified for and received a Station Area planning grant. The housing growth projections in the Station Area Plan are therefore consistent with the current regional plan objectives for growth.

Implementation of the Station Area Plan would directly induce population and employment growth in the City for the purpose of supporting transit by designating land within the Plan area for more intense development than current designations allow. As discussed previously in this chapter,

implementation of the Station Area Plan could result in the development of 558 additional jobs and 920 additional housing units by 2035. The anticipated number of employees, households, and residents exceeds ABAG's 2009 projection for 2035.[6]

The population and employment growth that would occur as a result of development associated with the Station Area Plan would occur entirely within Larkspur's City limits. Because this growth would support and be near a transit node, growth planned for under the Station Area Plan would have several beneficial effects. First, such growth would support regional transit systems by increasing ridership and access to the SMART train and the ferry and would benefit bicycle and pedestrian access. Strengthening the transit system and improving bicycle and pedestrian circulation would reduce traffic and associated environmental effects, such as air pollution and greenhouse gas emissions, within the Bay Area. Second, development associated with the Station Area Plan would increase the construction of housing in Larkspur, assisting the City in addressing its fair-share housing allocation requirements. An increased overall housing supply would allow the City to better address affordable housing needs. Lastly, the population density within Larkspur would increase, allowing more people to live within the current City boundaries. The development of dense residential and mixed-use districts in close proximity to transit nodes represents an environmentally-sound method for accommodating a growing population and reducing sprawl, resulting in beneficial effects on both local and regional levels.

C. UNAVOIDABLE SIGNIFICANT ENVIRONMENTAL IMPACTS

Implementation of the Station Area Plan would result in the following significant unavoidable impacts:

- Implementation of the Station Area Plan would result in the addition of project traffic that would increase the average delay during the AM and PM peak hours by more than 5 seconds at Intersection #8 Sir Francis Drake Boulevard/Andersen Drive, which would operate at unacceptable LOS under Existing Plus Project Conditions and Cumulative Plus Project Conditions.
- Implementation of the Station Area Plan would add traffic greater than 1 percent of the freeway segment capacity on the two segments of northbound U.S. 101 between Tamalpais Drive and Industrial Way, resulting in a significant project contribution under Cumulative Conditions.
- Implementation of the Station Area Plan could generate air pollutant emissions that would exceed the BAAQMD criteria and could substantially contribute to a violation of air quality standards.
- Implementation of the Station Area Plan could result in a significant cumulative net increase in criteria pollutant emissions.
- Implementation of the Station Area Plan could result in GHG emissions that would have a significant impact and cumulatively contribute to global climate change.

[6] Association of Bay Area Governments (ABAG), 2009.

D. SIGNIFICANT IRREVERSIBLE CHANGES

An EIR must identify any significant irreversible environmental changes that could result from implementation of a proposed 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. CEQA dictates that 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 that would commit future generations; 2) irreversible changes from environmental actions; and 3) consumption of non-renewable resources.

1. Changes in Land Use Which Commit Future Generations

Although the Plan area is largely developed, implementation of the Station Area Plan would result in the intensification of residential, commercial, retail and hotel uses in an already urbanized area. This development would commit the City to intensification of uses in the Plan area. The intensification of development in the Plan area would serve several purposes, including: 1) provision of housing; 2) creation of a transit-oriented neighborhood; 3) utilization of underutilized land; and 4) efficient use of existing roadways and infrastructure within Larkspur. Development would be limited to lands within the City limits. Although development associated with the Station Area Plan would commit future generations to more intense development, the new development would benefit the City and the region by providing needed housing, jobs, and transit-oriented development within an existing urban area. Development associated with the Plan area would not commit future generations to a development pattern that is often described as "urban sprawl." The development of dense residential and mixed-uses in close proximity to transit represents an environmentally-sound method for accommodating a growing population and reducing sprawl.

2. Irreversible Damage from Environmental Accidents

Implementation of the Station Area Plan would result in the development of underutilized land. Irreversible environmental changes associated with the modification of existing land uses include: the potential degradation of existing biological and cultural features, loss of aesthetic integrity, and the installation of utility and roadway infrastructure. Although it is unlikely that a major hazardous waste release would occur in Larkspur as a result of implementation of the Station Area Plan, such a release would also constitute a significant irreversible change from an environmental action. The mitigation measures outlined in Chapter IV, Setting, Impacts, and Mitigation Measures, of this Draft EIR would reduce all such irreversible or nearly irreversible effects to less-than-significant levels.

3. Consumption of Nonrenewable Resources

Consumption of nonrenewable resources includes conversion of agricultural lands, loss of access to mining reserves, and non-renewable energy use. As discussed within this section, there are no active agricultural uses in the Plan area. As discussed in Section IV.G, Geology, Soils, and Seismicity, although the northeastern portion of the Plan area was used for aggregate mining prior to 1948, no part of the Plan area is designated as a mineral resource site under the State Mining and Reclamation Act of 1975 (SMARA). Additionally, there are no natural gas, oil, or geothermal resources identified

as being located in or adjacent to the Plan area.[7,8] Finally, the development of dense residential and mixed-use development in close proximity to transit would de-emphasize private automobile use and encourage transit ridership, and would result in the conservation of fossil fuels. Therefore, the implementation of the Station Area Plan would result in the efficient use of non-renewable energy sources.

[7] California Department of Conservation, 2000. *Energy Map of California, Map S-2*, 3rd Edition.

[8] California Department of Conservation, 2001. *Oil, Gas, and Geothermal Fields in California, Map S-1*.

VII. REPORT PREPARATION

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C. COMMUNICATION

Cloney, Kaley. Administrative Assistant, Finance and Facilities, Tamalpais Union High School District. Written communication with LSA Associates. June 21, 2012, and April 4, 2013.

Cusimano, Todd, 2013, Police Chief, Central Marin Police Authority. Written communication with LSA Associates. December 10 and 19.

Higgs, Michelle. Administrative Assistant, Facilities, San Rafael City Schools District. Written communication with LSA Associates. June 21, 2012, and April 10, 2013.

Jackson, Thomas, 1976. Written communication to Mr. Dwight Winther, City of Larkspur Planning Director. August 10.

Parrish, Lori, 2013. Assistant Superintendent. Finance and Facilities. Tamalpais Union High School District. Written communication with LSA Associates, Inc., May 15.

Pesenti, Sylvia. Administrative Assistant to Superintendent, Kentfield School District. Written communication with LSA Associates. June 25, 2012, and April 4, 2013.

Sinnott, Bob, 2012. Executive Director, Ross Valley Medical Authority. Personal Communication with LSA Associates, May 22.

Sinnott, Bob. Fire Chief, Larkspur Fire Department. Personal Communication with LSA Associates, Inc. May 22, 2012, and May 20, 2013.

Thomas, Chris, 2013. Chief Business Official. San Rafael City Schools District. Verbal communication with LSA Associates. May 30.

Urrea, Nichole, 2013. Assistant Business Manager, Larkspur-Corte Madera School District. Written communication with LSA Associates. May 20.

White, Becky, 2013. Business Manager. Larkspur-Corte Madera School District. Written communication with LSA Associates. May 14 and May 21.

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